13 October 2015
DRAFT GCHD/MDHHS Flint Water Action Plan
Highlight Green is completed

Last Updated: 10:00AM on October 13, 2015			
Action	**Local Lead**	**MDHHS Lead**	**Tasks**
Filter/Water Distribution	Tamara Brickley (GCHD)	Sheryl Thompson, MDHHS	- Coordination of distribution (GCHD) - Identify at-risk sub-groups (GCHD) - Tracking filters- uniform registry held by GCHD - Ordering filter replacements (MDHHS)

Blood Testing	Tony LaRocco (GCHD)
	Possible partners:
	- Hurley
	- Great Flint Health Coalition
	- MIHP
	- LHD
	- Schools
		Eden Wells/ Nancy Peeler (CLPPP)	- Test all
			  ○ Students 0-16
			  ○ Priorities:
			  ▪ 3 schools
			  ▪ 2 zip codes
			  ▪ ages 0-15
			- Convene meeting with GCHD and all potential partners (MDHHS)
			  ○ Partner with schools- information about testing sites options distributed through school districts to parents
			  ○ Partner with Great Flint Health Coalition-network to develop testing sites and information about testing to healthcare providers
			  ○ Partner with Hurley/McClaren/Genesys
			  ○ Partner with MIHP/Home Visiting Program
			- Confirm that the state lab has capacity to handle increase in tests- CONFIRMED

Case Management Follow Up	Tony LaRocco (GCHD)	Eden Wells/ Nancy Peeler (CLPPP)	- Identification of all current positives- confirmatory testing for > 5 mcg/dl (as of April 2014) - Maintain registry of all tests performed (-/+) - Follow-up all cases >5 mcg/dl with the CLPP Case Management protocol

Elevated Blood Level Investigations(all > 5 mcg/dl)	Dawn Hallwood (GCHD)	Linda Dykema	- Secure financial resources necessary to support environmental health response - Follow-up CLPPP to see if immediate funds available - Recommendation currently Dykema/Priem is to contract with Lead Investigation company thru SEMHA-licensed investigators
Communications	Hilda McShane (GCHD)	Geralyn Lasher	- Develop plan - Daily MDHHS and GCHD phone calls (3PM) - Add Geralyn, Elizabeth,Chris Shaenow and Sheryl Thompson to 3 PM calls - Provide provider education- links sent for Governor's site to GCHD 10/12 - Provide public education - Provide risk education - Send resources to Flint

From: Wells, Eden (DHHS)
Sent: Tuesday, October 13, 2015 12:47 PM
To: Lyon, Nick (DHHS)
Cc: Grijalva, Nancy (DHHS);Lasher, Geralyn (DHHS)
Subject: Quick proof of Neeley letter
Attachments: Sheldon A. Neely Ltr 10.12.15.docx

I drafted a response to Neeley's letter sent to me last week, attached. Please advise if needs to go out and if so, any edits needed.

STATE OF MICHIGAN
DEPARTMENT OF HEALTH AND HUMAN SERVICES
LANSING

RICK SNYDER
GOVERNOR

NICK LYON
DIRECTOR

October 13, 2015

The Honorable Sheldon A. Neeley
Michigan House of Representatives
P.O. Box 30014
Lansing, MI 48909

Dear Representative Neeley:

Thank you for your concerns, and request for information last week.

Currently, all children in Flint on Medicaid will be covered for lead testing. Further, any physician can order a lead test and this test should be covered by all health insurance programs.

Any Flint child not on Medicaid, WIC, or health insurance can get a blood lead level drawn at the Genesee County Health Department.

Sincerely,

Eden Wells, MPH, FACPM
Chief Medical Executive
Michigan Department of Health and Human Services

EW:cr

cc: Nick Lyon
Nancy Grijalva

From: Wells, Eden (DHHS)
Sent: Tuesday, October 13, 2015 2:51 PM
To: Hertel, Elizabeth (DHHS);Moran, Susan (DHHS);Lasher, Geralyn (DHHS)
Subject: Re: IMPORTANT - Flint Water

:)

From: Hertel, Elizabeth (DHHS)
Sent: Tuesday, October 13, 2015 2:43 PM
To: Wells, Eden (DHHS); Moran, Susan (DHHS); Lasher, Geralyn (DHHS)
Subject: RE: IMPORTANT - Flint Water

I did.

-----Original Message-----
From: Wells, Eden (DHHS)
Sent: Tuesday, October 13, 2015 2:44 PM
To: Hertel, Elizabeth (DHHS); Moran, Susan (DHHS); Lasher, Geralyn (DHHS)
Subject: Re: IMPORTANT - Flint Water

Hi there ,

Are you able to respond to Kyle, or do you want me or SUe to?

E

From: Hertel, Elizabeth (DHHS)
Sent: Tuesday, October 13, 2015 2:28 PM
To: Moran, Susan (DHHS); Lasher, Geralyn (DHHS); Wells, Eden (DHHS)
Subject: FW: IMPORTANT - Flint Water

Fyi.

-----Original Message-----
From: Guerrant, Kyle (MDE)
Sent: Tuesday, October 13, 2015 2:28 PM
To: Hertel, Elizabeth (DHHS)
Subject: IMPORTANT - Flint Water

Hey. At our state board of education meeting, the question of testing Flint children for lead is being brought up...has there been any discussion about testing kids for lead levels??

Sent from my iPad

From: Wells, Eden (DHHS)
Sent: Tuesday, October 13, 2015 4:15 PM
To: Reynolds, Lawrence
Cc: mvalacak@gchd.us
Subject: Re: definition of TIER 1 plumbing sites and school testing results

Thank you!!

Sent from my iPhone

On Oct 13, 2015, at 3:35 PM, Reynolds, Lawrence <LawrenceR@mottchc.org> wrote:

> Fyi.
>
> ---
>
> **From:** Marc Edwards [mailto:edwardsm@vt.edu]
> **Sent:** Tuesday, October 13, 2015 11:30 AM
> **To:** Reynolds, Lawrence
> **Subject:** RE: TIER 1
>
> Feel free to forward it to her.
>
> ---
>
> **From:** Reynolds, Lawrence [mailto:LawrenceR@mottchc.org]
> **Sent:** Tuesday, October 13, 2015 11:23 AM
> **To:** Marc Edwards
> **Subject:** RE: TIER 1
>
> **You have sensed my concern .Thank you for info. I did ask Dr. Eden last night and she was seeking that info today.**
>
> ---
>
> **From:** Marc Edwards [mailto:edwardsm@vt.edu]
> **Sent:** Tuesday, October 13, 2015 11:13 AM
> **To:** Reynolds, Lawrence; isulliva@kettering.edu
> **Cc:** Tomlin, Chris; Willis, Gary
> **Subject:** RE: TIER 1
>
> Hi Lawrence,
>
> Schools are high risk lead exposure sites, with no laws governing the exposure. See attached.
> I would not be surprised if you have lead in your water, especially if the fountains were turned off.
>
> To convert mg/L to ppb, you multiply the mg/L number by 1000.
> So 0.015 mg/L = 15 ppb
>
> Some people like to use mg/L because it makes the numbers look lower.

Marc

From: Reynolds, Lawrence [mailto:LawrenceR@mottchc.org]
Sent: Tuesday, October 13, 2015 11:01 AM
To: edwardsm@vt.edu; lsulliva@kettering.edu
Cc: Tomlin, Chris; Willis, Gary
Subject: TIER 1

Good morning Dr. Edwards and Dr. Sullivan .

Dr. Edwards mentioned schools as TIER 1 plumbing site . Can you break down this classification or steer me to the info ?

Mott Children's Health Center is a 4 floor medical /dental facility for children. We have stopped using Flint water shortly after GM did to save our equipment, then covered our water fountains after the city officially announced the advisory. Our lead results are pending .

Does this TIER classification have any meaning for Mott or any similar type / size facility?
Also the state has reported school testing for lead in mg / liter when previous reports were in ppb. I have no knowledge to convert these units for an apples to apples comparison.

From: "Eisner, Jennifer (DHHS)" <EisnerJ@michigan.gov>
Date: October 12, 2015 at 5:14:21 PM EDT
To: "hmcshane@gchd.us" <hmcshane@gchd.us>
Cc: "Wells, Eden (DHHS)" <WellsE3@michigan.gov>, "mvalacak@gchd.us" <mvalacak@gchd.us>
Subject: Lead educational materials

Hi Hilda:

We want to make sure you have the link to our MDHHS educational materials on lead, available at www.michigan.gov/flintwater. Under resources you'll find posted: a parent handout; lead screening & testing information; and blood lead level guide for providers.

I'll be sure to be in touch as more and updated materials become available, but please reach out if you have any questions.

Thanks and best,

Jennifer (Smith) Eisner
Public Information Officer
Michigan Department of Health and Human Services
517-241-2112

From: Wells, Eden (DHHS)
Sent: Tuesday, October 13, 2015 5:50 PM
To: McShane, Hilda
Subject: Re: Genesee County Health Department water filter system daily mass notification - 10.13.15

Very nice!

Sent from my iPhone

On Oct 13, 2015, at 5:24 PM, McShane, Hilda <hmcshane@gchd.us> wrote:

> This is an informational update and the Genesee County Health Department will provide these updates on a daily basis after 4 pm. We are asking all partners included in this email to provide any pertinent updates **DAILY** to Hilda McShane by 2:00pm. If you have nothing new to share, please inform Hilda that you have no updates at this time.
>
> - 20,000 filters + 9,000 replacement filters have been delivered to Genesee County Community Action Resource Department (GCARD) and Michigan Department Health Human Services (MDHHHS).
>
> - We are reminding partners to blackout the barcode on filter boxes before distribution.
>
> - As of 10.13.15 Flint Housing Commission has distributed water filters to all of its housing units.
>
> - Valley Area Agency on Aging (VAAA) is creating a list of homebound seniors. Three (3) state employees and Five (5) GCCARD employees are working through that list and will help with home installation.
>
> - Distribution has been completed at Rosehaven Manor, Court Street Commons, Riverfront Dorms, Job Corp, and University of Michigan-Flint international student population
>
> - Municipalities with residents that receive Flint City water will be contacted and asked to be the distribution point for the water filter system in their area by the City of Flint.
>
> - Eileen Tomasi from Flint Schools has asked to use the elementary schools as water filter distribution points for both staff living in Flint and parents of school children. GCHD is awaiting a follow up conversation with the Flint Community Schools.
>
> - Genesee County Health Department (GCHD) is starting to see an increase in requests for blood lead testing. GCHD Nursing Director, Toni LaRocco, is working with McLaren Health Plan to develop a lead clinic in November. University of Michigan-Flint has offered nursing students to assist at the clinic. Adults can use the Genesee County Health Department's Primary Care Clinic and the Health Department will bill insurance, or go on standing orders.
>
> - Total filters distributed by MDHHS and GCCARD, 8,000. Genesee County Health Department has distributed 4,000 filters, which include approximately 2,700 to the public, 100 to Wellness Services, 100 to GCHD Primary Care Clinic, 100 to WIC, 100 to Reverence, and 375 to Hurley Maternal Infant Health Home Visiting Services.

Hilda McShane
Marketing Specialist
Genesee County Health Department
Phone: 810.341.7661
FAX: 810.257.3147
hmcshane@gchd.us

Genesee County
Health Department

From: Wells, Eden (DHHS)
Sent: Wednesday, October 14, 2015 8:45 AM
To: GJOHNSON@gchd.us;Travis, Rashmi (DHHS);Peeler, Nancy (DHHS);tlarocco@gchd.us
Subject: FW: version with Hurley info
Attachments: Summary - Flint Children Needing Retesting Hurley or not.pdf; ATT00001.htm

FYIY---

From: Peeler, Nancy (DHHS)
Sent: Wednesday, October 14, 2015 8:27 AM
To: Wells, Eden (DHHS); Travis, Rashmi (DHHS)
Subject: Fwd: version with Hurley info

Good morning, Eden and Rashmi, it is 50 and sunny in Atlanta, looking like a beautiful day!

I see we have a 9am call about the follow up testing; I"m forwarding the file that Bob Scott sent me yesterday, that summarizes what is in the lists he compiled for us. Can one of you forward on to the other meeting participants as appropriate? (I"m on my iPad so it is a little harder for me to maneuver the files.). Thanks, talk to you about 9am.

Nancy

Sent from my iPad

Begin forwarded message:

> **From:** "Scott, Robert L. (DHHS)" <ScottR9@michigan.gov>
> **Date:** October 13, 2015 at 12:28:46 PM EDT
> **To:** "Peeler, Nancy (DHHS)" <PeelerN@michigan.gov>
> **Cc:** "Lishinski, Karen (DHHS)" <LishinskiK@michigan.gov>
> **Subject: version with Hurley or not**
>
> Robert L. Scott
> Childhood Lead Poisoning Prevention Program
> Michigan Department of Health & Human Services
> (517) 335-8178
> fax (517) 335-8509

Children less than Six Years of Age, Living in ZIP Codes 48501-48507, with Elevated Blood Lead Levels Since April 1, 2014, Who Currently Require Follow-Up Testing

Among 75 Children Needing Confirmation of Elevated Capillary BLL

	Number	Percentage
Medicaid-eligible	74	98.7
Not Medicaid	1	1.3
BLL 5-14	74	98.7
BLL > 14	1	1.3
Current Age 1-2 years	54	72.0
Current Age 3-6 years	21	28.0
ZIP 48502	1	1.3
ZIP 48503	16	21.3
ZIP 48504	27	36.0
ZIP 48505	12	16.0
ZIP 48506	6	8.0
ZIP 48507	13	17.3
Elevated Capillary is Only Test to Date	58	77.3
Previous Test was < 5	15	20.0
Previous Test was Elevated Capillary	2	2.7
Last Test from Hurley	15	20.0
Last Test from Other Provider	60	80.0

Among 76 Children with Elevated Venous BLL, Needing Retesting

	Number	Percentage
Medicaid-eligible	70	92.1
Not Medicaid	6	7.9
BLL 5-14	70	92.1
BLL > 14	6	7.9
Current Age 1-2 years	28	36.8
Current Age 3-6 years	48	63.2
ZIP 48502	2	2.6
ZIP 48503	18	23.7
ZIP 48504	21	27.6
ZIP 48505	15	19.7
ZIP 48506	13	17.1
ZIP 48507	5	6.6
Currently in Other ZIP	2	2.6
BLL 5-14 Due for Retest	63	82.9
BLL 5-14 Not Due Yet	7	9.2
BLL >14 Due for Retest	6	7.9
Last Test is Follow-up to Previous Elevated Venous	10	13.2
Have Never Had Follow-up Venous Test	66	86.8
Last Test from Hurley	58	76.3
Last Test from Other Provider	18	23.7

October 13, 2015

Source: MDHHS Data Warehouse

This Document is a Non-Responsive Attachment.

From: Wells, Eden (DHHS)
Sent: Wednesday, October 14, 2015 10:12 AM
To: GJOHNSON@gchd.us;Travis, Rashmi (DHHS);Peeler, Nancy (DHHS);tlarocco@gchd.us;Mona Hanna-Attisha
Subject: RE: version with Hurley info
Attachments: Blood Testing Protocol Planning Template.docx

Attached Draft Blood Lead Testing Protocol

From: Peeler, Nancy (DHHS)
Sent: Wednesday, October 14, 2015 8:27 AM
To: Wells, Eden (DHHS); Travis, Rashmi (DHHS)
Subject: Fwd: version with Hurley info

Good morning, Eden and Rashmi, it is 50 and sunny in Atlanta, looking like a beautiful day!

I see we have a 9am call about the follow up testing; I"m forwarding the file that Bob Scott sent me yesterday, that summarizes what is in the lists he compiled for us. Can one of you forward on to the other meeting participants as appropriate? (I"m on my iPad so it is a little harder for me to maneuver the files.). Thanks, talk to you about 9am.

Nancy

Sent from my iPad

Begin forwarded message:

> **From:** "Scott, Robert L. (DHHS)" <ScottR9@michigan.gov>
> **Date:** October 13, 2015 at 12:28:46 PM EDT
> **To:** "Peeler, Nancy (DHHS)" <PeelerN@michigan.gov>
> **Cc:** "Lishinski, Karen (DHHS)" <LishinskiK@michigan.gov>
> **Subject: version with Hurley or not**
>
> Robert L. Scott
> Childhood Lead Poisoning Prevention Program
> Michigan Department of Health & Human Services
> (517) 335-8178
> fax (517) 335-8509

Blood Testing Protocol Planning Template--- Oct 14 9 AM

Toni LaRocco, Nancy Peeler, Rashmi Travis

I. **Prioritization of Testing**
   a. Children <6 already tested positive by capillary since April 2014 (n=75)
      i. Every week GCHD letters go out, educational material is also sent out (nutrition lead sources, etc.)
   b. Retesting of Flint children with EBLL of venous samples- all due for first or subsequent follow-ups
      i. No additional letters to this group—[Toni Note—no funding avail at this time to chase these folks- Medicaid already covered initial]
   c. School children those in the 3 schools identified as having elevated water lead (Freeman, Brunnell, Eisenhower)
   d. Every school facility- prioritization in this order:
      i. 0-5 years age
         1. Daycare
         2. Great Start Readiness Pre-school (funded by MDE)
         3. Early Headstart
         4. Headstart
      ii. 5-12 years of age
         1. Elementary
      iii. >12 years of age
         1. Middle
         2. High

II. **Implementation of Testing**
   a. **Partners**
      i. McLaren Health Plan
         1. McLaren Health Plan is involved with Toni last few weeks. **Nov 5th** is a screening (capillary) event for McLaren clients as well as interested community members. This is a walk-in event-
            a. Online lead registry (HHLPS) could be accessed to check child's status
            b. McLaren has access to MCIR but not HHLPS
         2. McLaren will contact their clients, and test their clients
         3. GCHD will market to whole community, and GCHD WIC staff will draw other community members-cap or venous as indicated
      ii. UM-Flint Nursing students- Toni has been in touch with Nursing school and Licensed (BSN)nursing students may be able to assist Nov 5 and other times possible
      iii. Hurley Pediatrics (Mona)-(Mona on line)- (about n=900)
         1. Mona has all Hurley clinic kids that need a redraw back to April 2014

2. AND a list of all lead labs drawn from the Hurley Lab back to April 2014

iv. Children's Healthcare Access Program-(MHEF and United Way)- target Medicaid groups by 4 clinics (Hamilton, Hurley, Dr. Akpinar and Mott)- they can access the majority of the Medicaid children in Flint and have data-sharing agreements already in place. Has social workers staff and 211 and case management, and filter follow-up
    1. Mott Children's Clinic (Reynolds)
    2. Housed at GFHC!
    3. Meeting tomorrow AM (Mona and Toni will be there)
    4. Hamilton FQHC
v. Molina- Serve largest number of Peds/Medicaid-
vi. GCMS Pete Levine---network information with all providers to get testing protocol information to them
vii. Greater Flint Health Coalition-networking information to providers

b. Sites

i. Emphasize patient centered medical home whenever possible
ii. McLaren (Nov 5, 2015) at Burton Branch GCHD- all day
iii. Farmer's Market (GCHD and Hurley Peds) held on (T, TH, Saturdays)
    1. Hurley staff can draw blood at this site
iv. Molina- TBD (see below)
v. Other health plans- TBD (see below)

III. Handling of Results/messaging

a. CLPP and GCHD currently have protocol lab test result sharing (HHLPSS)
    i. Bob Scott can assist in navigation
b. Secondary prevention messaging for all community
    i. nutrition, good vitamins
    ii. wrap-around services
    iii. positive parenting

IV. Actions and Assignments

a. Toni and CHAP will contact Molina to set up similar program as McLaren
b. Toni will contact all health plans- if issues, contact Wells
c. MDHHS will provide support as requested for any events
d. Hilda at GCHD needs to blast provider information about lead to all providers (blast fax and list serves)
e. FAQ water lead sheet to be sent out today
f. [Consider- Get HEDIS rates at provider level for lead (doesn't address follow-up, though)]
g. Next Call: TBD early next week (of 10/19)
h. Mona and Toni- if there is a need for increased capillary testing machines---advise MDHHS

From: Wells, Eden (DHHS)
Sent: Friday, October 16, 2015 9:53 AM
To: Mona Hanna-Attisha;Lyon, Nick (DHHS)
Subject: Re: Emailing: Lead Presciption

Thanks for the info, Mona!

From: Mona Hanna-Attisha <MHanna1@hurleymc.com>
Sent: Friday, October 16, 2015 8:46 AM
To: Lyon, Nick (DHHS); Wells, Eden (DHHS)
Subject: FW: Emailing: Lead Presciption

And as I mentioned on the phone yesterday, Aug 27 is the first time I brought up the potential issue with the county health dept....

-----Original Message-----
From: Mona Hanna-Attisha
Sent: Thursday, August 27, 2015 1:31 PM
To: 'Johnson, M.D., Gary'; Schacher, Andrew (aschacher@gchd.us); 'Valacak, Mark'
Cc: Hallwood, Dawn; Henry, James
Subject: RE: Emailing: Lead Presciption

It was a pleasure meeting with Andrew today regarding the lead prescription program. As a follow-up:

1) We will work with Andrew and our lab and social worker to create an automatic electronic referral system for all kids with elevated lead levels. The referral will go to Andrew so that he can enroll them in his program.

2) Please use Hurley and MSU as a resource for lead programming, lead research, lead grant-writing, lead education, lead advocacy, lead whatever. Through Hurley, we have the providers, the patient population and the interest to work on pediatric public health issues. We clearly recognize the devastating and life-long impact of this entirely PREVENTABLE condition. Through MSU, we have the additional research capacity and the collaboration with the MSU Public Health Program (potential PH students and/or research hires interested in lead). We are eager to collaborate on this shared goal. Personally, I have a background in environmental health and this topic ideally merges the disciplines of pediatrics and public health.

3) Lastly, this may not be under the health department's jurisdiction; however, I don't' understand why it wouldn't be - I am concerned about the potential for an increase in childhood lead poisoning secondary to the Flint drinking water situation. Flint had Safe Drinking Water Act violations for trihalomethanes after switching water sources. They dramatically increased their chlorine after switching sources. That changes the oxidation reduction potential and allows the metal of the pipe to go into solution. This is strikingly similar to what happened in Washington DC that resulted in significant childhood lead poisonings. It took about 2 years of lead leaching and exposure to result in elevated blood lead levels measured in 2003 as reported by CDC (http://www.cdc.gov/nceh/lead/blood_levels.htm). I have an EPA colleague who worked on the DC issue and is aware/interested in the Flint issue.

Article about Flint's lead levels in water:
http://www.deadlinedetroit.com/articles/12697/scary_leaded_water_and_one_flint_family_s_toxic_nightmare#.Vd8yWVKVP9d

I know this has been a controversial issue, but it would be great if we can collaborate to prevent some of the same issues that happened in DC. Our children already significant pre-existing challenges (toxic stress/adverse childhood events), avoidable lead exposure should not be an additional burden. I would be more than happy to meet to discuss/brainstorm additional solutions.

Thanks again and looking forward to additional collaborations! Mona

Mona Hanna-Attisha MD MPH FAAP
Program Director Pediatric Residency
Hurley Children's Hospital at Hurley Medical Center Michigan State University College of Human Medicine Department of Pediatrics and Human Development Mhanna1@hurleymc.com

-----Original Message-----
From: Johnson, M.D., Gary [mailto:GJOHNSON@gchd.us]
Sent: Friday, August 21, 2015 4:40 PM
To: Mona Hanna-Attisha
Cc: Hallwood, Dawn; Henry, James
Subject: RE: Emailing: Lead Presciption

Thanks Mona!!

-----Original Message-----
From: Mona Hanna-Attisha [mailto:MHanna1@hurleymc.com]
Sent: Friday, August 21, 2015 4:17 PM
To: Johnson, M.D., Gary
Cc: Hallwood, Dawn; Henry, James
Subject: RE: Emailing: Lead Presciption

Thanks Dr Johnson. I will share with all the residents and get some copies printed for the clinic.

Thanks!

-----Original Message-----
From: Johnson, M.D., Gary [mailto:GJOHNSON@gchd.us]
Sent: Friday, August 21, 2015 2:04 PM
To: Mona Hanna-Attisha
Cc: Hallwood, Dawn; Henry, James
Subject: FW: Emailing: Lead Presciption

<<Lead Presciption.pdf>> Mona--
Please read over the attached letter with the prescription. We sent you a similar letter on May 5th, hoping the pediatric residents would participate in the community outreach portion of this grant funded Childhood Lead Poisoning program.

Please re-consider having the pediatric residents participate in this community prescription program for children whose venous lead levels are between 5-14 as stated in the letter.

Please contact Dawn Hallwood via e-mail or phone letter as stated in the letter.

We would greatly appreciate your participation and the resident's participation.

Thank you very much.

Gary Johnson

-----Original Message-----
From: Henry, James
Sent: Friday, August 21, 2015 1:40 PM
To: 'GJOHNSON@gchd.us'
Cc: Hallwood, Dawn
Subject: Emailing: Lead Presciption

Dr. J

This is from Dawn, her email stopped working

Jim

Your message is ready to be sent with the following file or link
attachments:

Lead Presciption

Note: To protect against computer viruses, e-mail programs may prevent sending or receiving certain types of file attachments. Check your e-mail security settings to determine how attachments are handled.

From: Wells, Eden (DHHS)
Sent: Tuesday, October 20, 2015 2:51 PM
To: Laura Carravallah;Laura Carravallah
Cc: Valacak, Mark
Subject: Fw: NSF certified water pitchers for copper reduction

Good afternoon, Dr. Carravallah,

We will keep looking, but our chief toxicologist affirmed my concern about filters for copper being able to reduce low enough for Wilson's and unfortunately they do not appear
to be able to reduce lead.

Eden

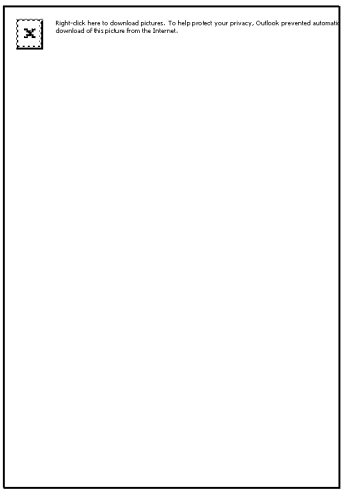
Eden V. Wells, MD, MPH, FACPM
Chief Medical Executive
Michigan Department of Health and Human Services
201 Townsend Street, 5th Floor CVB
Lansing, MI 48913
Phone: 517-335-8011
wellse3@michigan.gov

From: Wells, Eden (DHHS)
Sent: Tuesday, October 20, 2015 2:49 PM
To: Dykema, Linda D. (DHHS); Quiggle, Lisa (DHHS)
Subject: Re: NSF certified water pitchers for copper reduction

You are SO great, thank, you---that WAS my suspicion!

From: Dykema, Linda D. (DHHS)
Sent: Tuesday, October 20, 2015 2:49 PM
To: Wells, Eden (DHHS); Quiggle, Lisa (DHHS)
Subject: RE: NSF certified water pitchers for copper reduction

http://www.nsf.org/consumer-resources/what-is-nsf-certification/water-filters-treatment-certification/contaminant-testing-procedures



Contaminant Testing Procedures - NSF International

Water treatment products must reduce a specific amount of a contaminant effectively in order to earn NSF certification for that purpose. The table below shows the ...

Read more...

NSF info at this page indicates that filters certified for copper reduction can take a 3 ppm or 3000 ppb level down to 1300 ppb. Not good enough for people with Wilson Disease who need copper <100. None of the filters certified to remove copper that I can see are also certified to remove lead.

Lisa is at a meeting in WI. She can confirm if she's able to see her e-mail.

From: Wells, Eden (DHHS)
Sent: Tuesday, October 20, 2015 2:10 PM
To: Dykema, Linda D. (DHHS); Quiggle, Lisa (DHHS)
Subject: Re: NSF certified water pitchers for copper reduction

Linda and Lisa---Just following up. Do the filters that I send you in lat evenings email for Dr. C reduce copper to below 100 PPB, and if so, are they NSF certified to m=remove lead also? I promised Dr. C I would follow up with her about this---even though I am concerned about need to directly link with the providers.

Eden

From: Wells, Eden (DHHS)
Sent: Monday, October 19, 2015 8:52 PM
To: Dykema, Linda D. (DHHS); Quiggle, Lisa (DHHS)
Subject: Fwd: NSF certified water pitchers for copper reduction

The copper issue is really going to be one for a few individuals if any, and copper removal would babe an issue for them pre and post river switch- per my other email I am trying to caution making recommendations we are not qualified to make...

Sent from my iPhone

Begin forwarded message:

From: Laura Carravallah <Laura.Carravallah@hc.msu.edu>
Date: October 16, 2015 at 11:10:20 AM EDT
To: "'Valacak, Mark'" <MVALACAK@gchd.us>, "Wells, Eden (DHHS)" <WellsE3@michigan.gov>
Cc: "Henry, James" <jhenry@gchd.us>
Subject: RE: NSF certified water pitchers for copper reduction

Will these filters (listed below) also remove lead? If so, can just recommend those filters to the patients (I am working with Pete to estimate how many there may be) and that may be our solution. They would need to meet the recommendations of the Wilson's Disease Society that Eden sent.

Pete said he can send out email on Monday.

Do you have recommendations as to how to proceed Mark?

From: Valacak, Mark [mailto:MVALACAK@gchd.us]
Sent: Friday, October 16, 2015 11:04 AM
To: Laura Carravallah; Wells, Eden (DHHS)
Cc: Henry, James
Subject: FW: NSF certified water pitchers for copper reduction

I asked Jim Henry of my environmental health staff to research the copper filter reduction issue and talk to the people at NSF. His findings are below. I had a friend who used to work at NSF but is long retired. I remembered from a conversation that often manufactures get products certified for particular chemicals and there is a cost increase with each particular additional certification. So they limit the testing based upon what makes economic sense for them. In this example, it does not mean that the filters we are distributing do not reduce copper but more likely that they did not pay for that certification test to be run. If that test was not run they cannot claim to be "certified by NSF". Oddly Brita does advertise that their filter reduces copper but it is not listed on the sheet in the box as certified by NSF for that.

NSF did supply the filters list certified for copper reduction, which is included below for your information.

Mark Valacak, MPH, Health Officer
Genesee County Health Department,
630 S. Saginaw St. Suite 4 Flint, MI 48502-1540
Phone 810-257-3588 Fax 810 257-3147
E-mail mvalacak@gchd.us

Public Health
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From: Henry, James
Sent: Friday, October 16, 2015 10:23 AM

To: 'MVALACAK@gchd.us'
Subject: NSF certified water pitchers for copper reduction

Mark,

I spoke with NSF. They reviewed their records and the filters being distributed below are not certified for copper reduction. NSF informed me that they should reduce copper (because they reduce lead), but they will not make that statement.

The email below has a link to NSF certified filters for copper removal, which may be beneficial for those with copper sensitivities. I saw that Dr. Carravallah spoke with Mark Edwards regarding copper levels. He may be able to provide more (unofficial) information regarding the filters' capability to remove copper.

- Brita Faucet Filtration System, model number SAFF-100
- PUR Faucet Mount, model number FM-3700B
- Zero Technologies Water Treatment Pour Through Pitcher, model number ZD-018

Jim Henry RS, MBA
Environmental Health Supervisor
Genesee County Health Department www.gchd.us
630 S. Saginaw St., Suite 4
Flint, MI 48502-1540
Phone (810) 257-3618 Fax (810) 257-3125
E-mail jhenry@gchd.us

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Jim

From: Costello, Mindy [mailto:mcostello@nsf.org]
Sent: Friday, October 16, 2015 9:43 AM
To: Henry, James
Subject: NSF certified water pitchers for copper reduction

http://info.nsf.org/Certified/DWTU/Listings.asp?ProductFunction=053%7CCopper+Reduction&ProductType=Pour+Through&submit2=Search

If you need additional information or have further questions, please let me know.
Thank you for your inquiry.

Kind regards,
Mindy Costello RS MS

Consumer Information NSF International

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Twitter: @LiveSafer_NSF
Facebook: NSF International
Website: www.nsfconsumer.org

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This Document is a Non-Responsive Attachment.

From: Wells, Eden (DHHS)
Sent: Tuesday, October 20, 2015 2:57 PM
To: Laura Carravallah;Laura Carravallah
Cc: Valacak, Mark;'plevine@gcms.org';'Kay Doerr'
Subject: Re: NSF certified water pitchers for copper reduction

Great thought about the ophthalmology! Keep me in touch---we are going to advise OB-Gyns about the importance of counseling their pregnant patients as well. Materials forthcoming.

Eden

From: Laura Carravallah <Laura.Carravallah@hc.msu.edu>
Sent: Tuesday, October 20, 2015 2:55 PM
To: Wells, Eden (DHHS); Laura Carravallah
Cc: Valacak, Mark; 'plevine@gcms.org'; 'Kay Doerr'
Subject: RE: NSF certified water pitchers for copper reduction

Thank you, Eden. I have put calls to the Hepatology departments for both UM and Henry Ford, and am awaiting their calls back. Pete Levine from our medical society has also sent out emails to all of our gastroenterologists and ophthalmologists (who would find Kayser-Fleischer rings in the iris) to see if we can get an estimate of how many patients we may have.

I will send an email as soon as I hear from any of them.

Laura

From: Wells, Eden (DHHS) [mailto:WellsE3@michigan.gov]
Sent: Tuesday, October 20, 2015 2:51 PM
To: Laura Carravallah; Laura Carravallah
Cc: Valacak, Mark
Subject: Fw: NSF certified water pitchers for copper reduction

Good afternoon, Dr. Carravallah,

We will keep looking, but our chief toxicologist affirmed my concern about filters for copper being able to reduce low enough for Wilson's and unfortunately they do not appear
to be able to reduce lead.

Eden

Eden V. Wells, MD, MPH, FACPM
Chief Medical Executive
Michigan Department of Health and Human Services
201 Townsend Street, 5th Floor CVB
Lansing, MI 48913

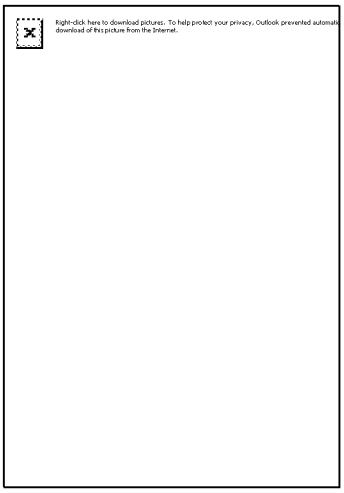
Phone: 517-335-8011
wellse3@michigan.gov

From: Wells, Eden (DHHS)
Sent: Tuesday, October 20, 2015 2:49 PM
To: Dykema, Linda D. (DHHS); Quiggle, Lisa (DHHS)
Subject: Re: NSF certified water pitchers for copper reduction

You are SO great, thank, you---that WAS my suspicion!

From: Dykema, Linda D. (DHHS)
Sent: Tuesday, October 20, 2015 2:49 PM
To: Wells, Eden (DHHS); Quiggle, Lisa (DHHS)
Subject: RE: NSF certified water pitchers for copper reduction

http://www.nsf.org/consumer-resources/what-is-nsf-certification/water-filters-treatment-certification/contaminant-testing-procedures



Contaminant Testing Procedures - NSF International

Water treatment products must reduce a specific amount of a contaminant effectively in order to earn NSF certification for that purpose. The table below shows the ...

Read more...

NSF info at this page indicates that filters certified for copper reduction can take a 3 ppm or 3000 ppb level down to 1300 ppb. Not good enough for people with Wilson Disease who need copper <100. None of the filters certified to remove copper that I can see are also certified to remove lead.

Lisa is at a meeting in WI. She can confirm if she's able to see her e-mail.

From: Wells, Eden (DHHS)
Sent: Tuesday, October 20, 2015 2:10 PM
To: Dykema, Linda D. (DHHS); Quiggle, Lisa (DHHS)
Subject: Re: NSF certified water pitchers for copper reduction

Linda and Lisa---Just following up. Do the filters that I send you in lat evenings email for Dr. C reduce copper to below 100 PPB, and if so, are they NSF certified to m=remove lead also? I promised Dr. C I would follow up with her about this---even though I am concerned about need to directly link with the providers.

Eden

From: Wells, Eden (DHHS)
Sent: Monday, October 19, 2015 8:52 PM
To: Dykema, Linda D. (DHHS); Quiggle, Lisa (DHHS)
Subject: Fwd: NSF certified water pitchers for copper reduction

The copper issue is really going to be one for a few individuals if any, and copper removal would babe an issue for them pre and post river switch- per my other email I am trying to caution making recommendations we are not qualified to make...

Sent from my iPhone

Begin forwarded message:

> **From:** Laura Carravallah <Laura.Carravallah@hc.msu.edu>
> **Date:** October 16, 2015 at 11:10:20 AM EDT
> **To:** "'Valacak, Mark'" <MVALACAK@gchd.us>, "Wells, Eden (DHHS)" <WellsE3@michigan.gov>
> **Cc:** "Henry, James" <jhenry@gchd.us>
> **Subject: RE: NSF certified water pitchers for copper reduction**
>
> Will these filters (listed below) also remove lead? If so, can just recommend those filters to the patients (I am working with Pete to estimate how many there may be) and that may be our solution. They would need to meet the recommendations of the Wilson's Disease Society that Eden sent.
>
> Pete said he can send out email on Monday.
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>
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> **Sent:** Friday, October 16, 2015 11:04 AM
> **To:** Laura Carravallah; Wells, Eden (DHHS)
> **Cc:** Henry, James
> **Subject:** FW: NSF certified water pitchers for copper reduction
>
> I asked Jim Henry of my environmental health staff to research the copper filter reduction issue and talk to the people at NSF. His findings are below. I had a friend who used to work at NSF but is long retired. I remembered from a conversation that often manufactures get products certified for particular chemicals and there is a cost increase with each particular additional certification. So they limit the testing based upon what makes economic sense for them. In this example, it does not mean that the filters we are distributing do not reduce copper but more likely that they did not pay for that certification test to be run. If that test was not run they cannot claim to be "certified by NSF". Oddly Brita does advertise that their filter reduces copper but it is not listed on the sheet in the box as certified by NSF for that.

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From: Henry, James
Sent: Friday, October 16, 2015 10:23 AM
To: 'MVALACAK@gchd.us'
Subject: NSF certified water pitchers for copper reduction

Mark,

I spoke with NSF. They reviewed their records and the filters being distributed below are not certified for copper reduction. NSF informed me that they should reduce copper (because they reduce lead), but they will not make that statement.

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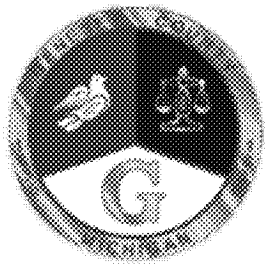

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Jim

From: Costello, Mindy [mailto:mcostello@nsf.org]
Sent: Friday, October 16, 2015 9:43 AM
To: Henry, James
Subject: NSF certified water pitchers for copper reduction

http://info.nsf.org/Certified/DWTU/Listings.asp?ProductFunction=053%7CCopper+Reduction&ProductType=Pour+Through&submit2=Search

If you need additional information or have further questions, please let me know.
Thank you for your inquiry.

Kind regards,
Mindy Costello RS MS
Consumer Information NSF International

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Twitter: @LiveSafer_NSF
Facebook: NSF International
Website: www.nsfconsumer.org

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This Document is a Non-Responsive Attachment.

From: Wells, Eden (DHHS)
Sent: Tuesday, October 20, 2015 3:04 PM
To: Peeler, Nancy (DHHS)
Subject: Re: CDC response about BLLs for adults

COOL!

From: Peeler, Nancy (DHHS)
Sent: Tuesday, October 20, 2015 3:03 PM
To: Wells, Eden (DHHS)
Subject: RE: CDC response about BLLs for adults

We sat with her last week and talked about Flint...

From: Wells, Eden (DHHS)
Sent: Tuesday, October 20, 2015 2:54 PM
To: Mona Hanna-Attisha; Travis, Rashmi (DHHS); LaRocco, Toni; Peeler, Nancy (DHHS)
Subject: Re: CDC response about BLLs for adults

I agree--- with caveat's CDC jsut provided---we can't do much but to ensure that they are not drinking the water (and ingesting any other sources of lead).

FYI, that was the FASTEST response I have ever gotten out of CDC!!!

E

From: Mona Hanna-Attisha <MHanna1@hurleymc.com>
Sent: Tuesday, October 20, 2015 2:50 PM
To: Wells, Eden (DHHS); Travis, Rashmi (DHHS); LaRocco, Toni; Peeler, Nancy (DHHS)
Subject: RE: CDC response about BLLs for adults

Great article. In box 1, lead in water is a risk factor and "blood lead testing should be performed if a single risk factor is identified at the earliest contact." So I would take this at first contact with OB, blood lead should be done and education on nutrition and vitamins, etc.

Our OB's don't know this. This need to be shared.

From: Wells, Eden (DHHS) [mailto:WellsE3@michigan.gov]
Sent: Tuesday, October 20, 2015 2:19 PM
To: Mona Hanna-Attisha; Travis, Rashmi (DHHS); LaRocco, Toni; Peeler, Nancy (DHHS)
Subject: Re: CDC response about BLLs for adults

That is for sure, and using clean sources of water and filters...I have asked ATSDR though-

Here is the 2012 ACOG paper

From: Mona Hanna-Attisha <MHanna1@hurleymc.com>
Sent: Tuesday, October 20, 2015 2:10 PM
To: Wells, Eden (DHHS); Travis, Rashmi (DHHS); LaRocco, Toni; Peeler, Nancy (DHHS)
Subject: RE: CDC response about BLLs for adults

I was thinking the same thing re medical removal – I can't imagine it has much efficacy – I would guess need to super emphasize prenatal vitamins with iron??

From: Wells, Eden (DHHS) [mailto:WellsE3@michigan.gov]
Sent: Tuesday, October 20, 2015 2:07 PM
To: Mona Hanna-Attisha; Travis, Rashmi (DHHS); LaRocco, Toni; Peeler, Nancy (DHHS)
Subject: Re: CDC response about BLLs for adults

Let me check with our ATSDR doc, Mark Johnson (Boy there are a lot of Marks...)---because I wonder if the concerns for Flint beg the question. However, I have no idea what the medical removal for lead is for a pregnant women, is that chelation, and is it the same as a child? Anyway, I will follow up with him now.

E

From: Mona Hanna-Attisha <MHanna1@hurleymc.com>
Sent: Tuesday, October 20, 2015 1:59 PM
To: Wells, Eden (DHHS); Travis, Rashmi (DHHS); LaRocco, Toni; Peeler, Nancy (DHHS)
Subject: RE: CDC response about BLLs for adults

I don't think anyone knows to test pregnant women.
Should we develop a separate communication to OB's?

As a secondary research project, we will be tested maternal lead at delivery and cord blood lead. But the above sounds like it should be a recommended screening???

From: Wells, Eden (DHHS) [mailto:WellsE3@michigan.gov]
Sent: Tuesday, October 20, 2015 1:55 PM
To: Mona Hanna-Attisha; Travis, Rashmi (DHHS); LaRocco, Toni; Peeler, Nancy (DHHS)
Subject: Re: CDC response about BLLs for adults

Any lead test and level gets sent into the CLPP, from my understanding. Nancy, have you seen any uptick in pregnant women being tested out of Flint?

Eden

From: Mona Hanna-Attisha <MHanna1@hurleymc.com>
Sent: Tuesday, October 20, 2015 1:50 PM
To: Wells, Eden (DHHS); Travis, Rashmi (DHHS); LaRocco, Toni; Peeler, Nancy (DHHS)
Subject: RE: CDC response about BLLs for adults

Should recommend lead screening at prenatal visits? How will we know a pregnant woman's lead level? With pregnancy causing an iron deficiency state, they are more likely to absorb lead.

From: Wells, Eden (DHHS) [mailto:WellsE3@michigan.gov]
Sent: Tuesday, October 20, 2015 12:46 PM
To: Travis, Rashmi (DHHS); LaRocco, Toni; Mona Hanna-Attisha; Peeler, Nancy (DHHS)
Subject: Fw: CDC response about BLLs for adults

Per below, for our next iteration of the protocol for adult BLL follow-up- OSHA (using Biologic Exposure indices- level is 30 for NIOSH)--

---

From: Dykema, Linda D. (DHHS)
Sent: Tuesday, October 20, 2015 11:27 AM
To: Wells, Eden (DHHS)
Subject: FW: CDC response about BLLs for adults

Mark says hi.

From: Johnson, Mark [mailto:johnson.mark@epa.gov]
Sent: Tuesday, October 20, 2015 11:09 AM
To: Dykema, Linda D. (DHHS)
Subject: CDC response about BLLs for adults

Linda

Here is the response from CDC regarding adult BLLs:

The CDC value for blood lead in pregnancy is below 5, with medical removal protection for pregnant women with levels >=10 with their doctor's recommendation. (citation: http://www.cdc.gov/nceh/lead/publications/leadandpregnancy
For other adults the level depends on whether the individual is exposed at work which uses the OSHA standards.

Mark

Mark D. Johnson, PhD, DABT
Regional Director/Toxicologist
Agency for Toxic Substances and Disease Registry (ATSDR)
77 W. Jackson Blvd.
Chicago, IL 60604
Office: 312-353-3436
Email: mdjohnson@cdc.gov

From: Wells, Eden (DHHS)
Sent: Tuesday, October 20, 2015 3:29 PM
To: Mona Hanna-Attisha
Subject: Re: Lead in Flint water supply

HA!

From: Mona Hanna-Attisha <MHanna1@hurleymc.com>
Sent: Tuesday, October 20, 2015 3:07 PM
To: Wells, Eden (DHHS)
Subject: FW: Lead in Flint water supply

We found the answer.... Cilantro....

From: Apparao Mukkamala [AMukkam1@hurleymc.com]
Sent: Tuesday, October 20, 2015 12:56 PM
To: Mona Hanna-Attisha
Subject: Fwd: Lead in Flint water supply

Dear Mona,
Greetings!
Keep up the good work .
Please see below from a friend of mine.
Worth trying?

Sent from my iPhone

Begin forwarded message:

> **From:** Manu Bhatt <manubhatt09@gmail.com>
> **Date:** October 20, 2015 at 9:46:43 AM EDT
> **To:** <amukkam1@hurleymc.com>
> **Subject: Lead in Flint water supply**
>
> Dear Apparao,
>
> A few days ago, I heard on NPR that the water supply in Flint is contaminated with lead. I heard a pediatrician from the Hurley Medical Center talking about the grave dangers to the public.
>
> This story is of interest to me for two reasons: I am an environmental engineer with specialization in water treatment and my wife was diagnosed with very high levels of lead in her blood and urine two years ago after we returned from India.
>
> Two years ago, my wife and I returned from India and, during a blood and urine test for some other health problem, she was diagnosed as having lead

concentration in her blood exceeding 100 times the maximum admissible by FDA (?) and in her urine exceeding 500 times the admissible value. I was worried about that and asked my family physician what could be done about it. He told me that over about 8 to 12 months the lead concentration will dissipate. I was worried about the effect of lead on brain and did not want to wait that long. I wrote an email to a naturopath friend in Ahmedabad, India. He asked me to boil half an ounce of cilantro every day in the morning in one cup of water for about 15-20 minutes, strain the water and drink the strained water. Continue this for 30 days. My wife did it for 4 weeks. The lead concentration in blood became normal.

I am writing this to you for whatever it is worth. I do not have your phone number so could not call you. If you need more information, please call me.

Manu Bhatt

PPI

From: Wells, Eden (DHHS)
Sent: Tuesday, October 20, 2015 6:52 PM
To: Peeler, Nancy (DHHS)
Subject: Re: Lead Issue in Flint - TEST RESULTS ARE IN

517-YesA sorry for the delay- u was in the phone with Detroit. Her number is - PPI

Sent from my iPhone

On Oct 20, 2015, at 6:25 PM, Peeler, Nancy (DHHS) <PeelerN@michigan.gov> wrote:

> HI Eden, we don't have a phone number for the family, couldn't find it with an internet search. Do you have Linda's phone number that I call and can see if she has it, or could you check with Linda?
>
> Nancy
>
> Sent from my iPad
>
> On Oct 20, 2015, at 6:10 PM, Wells, Eden (DHHS) <WellsE3@michigan.gov> wrote:
>
> > Hi Nancy – just talked with Linda. Please have your program nurse call if you can this evening, if you think that will work out. Thanks so much for working so late.
> > Eden
> >
> > Sent from my iPhone
> >
> > On Oct 20, 2015, at 6:04 PM, Peeler, Nancy (DHHS) <PeelerN@michigan.gov> wrote:
> >
> > > I have also been thinking about the family, and that they would probably want to know the results tonight. Can we make a call to them tonight? I don't know if Linda will see this tonight. Linda, did you make a plan to call them back, or do you want our program nurse to make that call?
> > >
> > > Nancy
> > >
> > > Sent from my iPhone
> > >
> > > On Oct 20, 2015, at 5:38 PM, Wells, Eden (DHHS) <WellsE3@michigan.gov> wrote:
> > >
> > > > Outstanding!!!! Plan to have someone contact the family tomorrow morning, perhaps?
> > > >
> > > > Sent from my iPhone

On Oct 20, 2015, at 5:28 PM, Peeler, Nancy (DHHS) <PeelerN@michigan.gov> wrote:

Good afternoon – we have received test results from the lab for the family whose situation we discussed at 8:30am. Both parents and all 4 children have levels < 3 based on venous testing (basically, < 3 means below the detectible limit). Good news for all!

Nancy

-----Original Appointment-----
From: Miller, Mark (DHHS)
Sent: Monday, October 19, 2015 5:29 PM
To: Miller, Mark (DHHS); Dykema, Linda D. (DHHS); Priem, Wesley F. (DHHS); Peeler, Nancy (DHHS); Moran, Susan (DHHS); Wells, Eden (DHHS)
Subject: Lead Issue in Flint
When: Tuesday, October 20, 2015 8:30 AM-9:00 AM (UTC-05:00) Eastern Time (US & Canada).
Where: Conference Call

Can we have a conference call on Tuesday, Oct. 20th, from 8:30 to 9:00 AM, to discuss the below situation in Flint?

For folks in CV, you can come up to my office on the 6th floor if you'd like……..

PPI

xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

From Linda Dykema:

I just spoke with the dog's owner and have his contact information.

They live in 48503 and they are on Flint water.

They have a 2-year old male dog who lost a lot of weight in a short period of time and they sought vet care. The dog's blood tested at a level of 409...not sure of the units, but the owner read from a vet report that said anything over 350 was considered lead toxicosis. They also have a 4-year old female dog who previously had 2 successful liters, but who delivered a single still born pup this morning (they would like the pup tested/autopsied but cannot afford the cost).

The adult female in the house is pregnant (1st trimester) and there are children <6 years living there as well. Father says he called GCHD a week and a half ago and was told to 1) see their family Dr., and 2) GCHD would call them back. To date no call back. All family members had venous draw today for lead testing. Dr. has told them to not use the water for bathing.

They received a filter from city of Flint. They sent a filtered water sample to a lab somewhere (man wasn't sure where) and the results indicate the filter doesn't work (man did not recall the lead level found).

Linda

From: Moran, Susan (DHHS)
Sent: Monday, October 19, 2015 4:53 PM
To: Signs, Kimberly (DHHS); Stobierski, Mary Grace (DHHS); Miller, Corinne (DHHS); Miller, Mark (DHHS)
Cc: Wells, Eden (DHHS); Dykema, Linda D. (DHHS)
Subject: RE: Call-Lead Toxicity in a Dog

Ok- so who does the follow up with family—is that us(MDHHS) or the health dept?

From: Signs, Kimberly (DHHS)
Sent: Monday, October 19, 2015 4:49 PM
To: Stobierski, Mary Grace (DHHS); Miller, Corinne (DHHS); Moran, Susan (DHHS); Miller, Mark (DHHS)
Cc: Wells, Eden (DHHS); Dykema, Linda D. (DHHS)
Subject: Call-Lead Toxicity in a Dog

MDHHS has been notified this afternoon of a family from the Flint area whose dog was diagnosed with lead toxicity. I received a voice message from Dr. Michele Schalow with MDARD about this case, and Eden Wells was contacted by Linda Dykema, who was also informed of this case. At this time, I don't have any information about the dog or why it was tested, but information is that the testing was performed at MSU's Diagnostic Center for Population and Animal Health. Eden is getting ready to board a plane, so asked me to notify everyone. The family of the dog includes children and a pregnant woman. Her thought is that the family needs to be tested asap. Kim

Kimberly Signs, DVM
Emerging and Zoonotic Infectious Disease Section
Bureau of Disease Control, Prevention, and Epidemiology
Michigan Department of Health and Human Services
201 Townsend St., Capitol View Building, 5th Floor, Lansing, MI, 48913
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immediately and destroy any and all copies of the original message.

From: Wells, Eden (DHHS)
Sent: Wednesday, October 21, 2015 12:11 PM
To: Dykema, Linda D. (DHHS)
Subject: Re: Lead Issue in Flint - TEST RESULTS ARE IN

Call me-

Sent from my iPhone

On Oct 21, 2015, at 12:01 PM, Dykema, Linda D. (DHHS) <DykemaL@michigan.gov> wrote:

> Please call
>
> ---
>
> **From:** Wells, Eden (DHHS)
> **Sent:** Wednesday, October 21, 2015 11:38 AM
> **To:** Dykema, Linda D. (DHHS); Signs, Kimberly (DHHS)
> **Cc:** Robinson, Mikelle (DHHS); Stobierski, Mary Grace (DHHS); Miller, Corinne (DHHS); Peeler, Nancy (DHHS)
> **Subject:** RE: Lead Issue in Flint - TEST RESULTS ARE IN
>
> I looped in James Averill in another email----
>
> ---
>
> **From:** Dykema, Linda D. (DHHS)
> **Sent:** Wednesday, October 21, 2015 10:23 AM
> **To:** Signs, Kimberly (DHHS); Wells, Eden (DHHS)
> **Cc:** Robinson, Mikelle (DHHS); Stobierski, Mary Grace (DHHS); Miller, Corinne (DHHS); Peeler, Nancy (DHHS)
> **Subject:** RE: Lead Issue in Flint - TEST RESULTS ARE IN
>
> It was MDARD. I just had a lengthy call with the Mr.
>
> ---
>
> **From:** Signs, Kimberly (DHHS)
> **Sent:** Wednesday, October 21, 2015 10:06 AM
> **To:** Wells, Eden (DHHS); Dykema, Linda D. (DHHS)
> **Cc:** Robinson, Mikelle (DHHS); Stobierski, Mary Grace (DHHS); Miller, Corinne (DHHS); Peeler, Nancy (DHHS)
> **Subject:** RE: Lead Issue in Flint - TEST RESULTS ARE IN
>
> Neither myself or Mary Grace has talked with the family. Kim
>
> ---
>
> **From:** Wells, Eden (DHHS)
> **Sent:** Wednesday, October 21, 2015 9:54 AM
> **To:** Dykema, Linda D. (DHHS)
> **Cc:** Robinson, Mikelle (DHHS); Signs, Kimberly (DHHS); Stobierski, Mary Grace (DHHS); Miller, Corinne (DHHS); Peeler, Nancy (DHHS)
> **Subject:** Re: Lead Issue in Flint - TEST RESULTS ARE IN
>
> Kim and Mary Grace- note below---were there any calls by you or Ag to family about the dogs chewing on wood? The family may have misinterpreted-- I ran into this myself when talking about tother sources of lead in households to the general public and media- the community is

high;y sensitized to issues of water, even if there may have been another source---makes it hard to investigate the dog issue,I know. Linda seems to have the best relationship with the family at this point, so she has been our primary spokesperson with them.

Eden

Eden V. Wells, MD, MPH, FACPM
MDHHS
Sent from my iPad

On Oct 21, 2015, at 9:18 AM, Dykema, Linda D. (DHHS) <DykemaL@michigan.gov> wrote:

> Karen Lishinski and I just spoke with the mother and conveyed the family's test results. It's uncertain at this time if we'll be doing any sampling at their home. Apparently PHI had a conversation yesterday with someone that made him (and her) very angry. Not sure who, but I've checked here and it was not anyone in DEH. The implication was that the family, wife, kids and dogs were all chewing on the woodwork. Family is feeling that the state is just looking to lay blame for the lead poisoning anywhere but the water. I've asked PHI to 1) talk with their Dr. about their test results, 2) talk to her husband about testing the house and water, and 3) talk directly to me if they have concerns or question.
>
> ---
>
> **From:** Wells, Eden (DHHS)
> **Sent:** Tuesday, October 20, 2015 6:10 PM
> **To:** Peeler, Nancy (DHHS)
> **Cc:** Miller, Mark (DHHS); Dykema, Linda D. (DHHS); Priem, Wesley F. (DHHS); Moran, Susan (DHHS); Robinson, Mikelle (DHHS); Travis, Rashmi (DHHS); Fink, Brenda (DHHS)
> **Subject:** Re: Lead Issue in Flint - TEST RESULTS ARE IN
>
> Hi Nancy – just talked with Linda. Please have your program nurse call if you can this evening, if you think that will work out. Thanks so much for working so late.
> Eden
>
> Sent from my iPhone
>
> On Oct 20, 2015, at 6:04 PM, Peeler, Nancy (DHHS) <PeelerN@michigan.gov> wrote:
>
> > I have also been thinking about the family, and that they would probably want to know the results tonight. Can we make a call to them tonight? I don't know if Linda will see this tonight. Linda, did you make a plan to call them back, or do you want our program nurse to make that call?
> >
> > Nancy
> >
> > Sent from my iPhone

On Oct 20, 2015, at 5:38 PM, Wells, Eden (DHHS) <WellsE3@michigan.gov> wrote:

> Outstanding!!!! Plan to have someone contact the family tomorrow morning, perhaps?
>
> Sent from my iPhone
>
> On Oct 20, 2015, at 5:28 PM, Peeler, Nancy (DHHS) <PeelerN@michigan.gov> wrote:
>
> > Good afternoon – we have received test results from the lab for the family whose situation we discussed at 8:30am. Both parents and all 4 children have levels < 3 based on venous testing (basically, < 3 means below the detectible limit). Good news for all!
> >
> > Nancy
> >
> > -----Original Appointment-----
> > **From:** Miller, Mark (DHHS)
> > **Sent:** Monday, October 19, 2015 5:29 PM
> > **To:** Miller, Mark (DHHS); Dykema, Linda D. (DHHS); Priem, Wesley F. (DHHS); Peeler, Nancy (DHHS); Moran, Susan (DHHS); Wells, Eden (DHHS)
> > **Subject:** Lead Issue in Flint
> > **When:** Tuesday, October 20, 2015 8:30 AM-9:00 AM (UTC-05:00) Eastern Time (US & Canada).
> > **Where:** Conference Call
> >
> > Can we have a conference call on Tuesday, Oct. 20th, from 8:30 to 9:00 AM, to discuss the below situation in Flint?
> >
> > For folks in CV, you can come up to my office on the 6th floor if you'd like.....
> >
> > **PPI**
> >
> > xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
> > xxxx

From Linda Dykema:

I just spoke with the dog's owner and have his contact information.

They live in [PHI] and they are on Flint water.

They have a 2-year old male dog who lost a lot of weight in a short period of time and they sought vet care. The dog's blood tested at a level of 409…not sure of the units, but the owner read from a vet report that said anything over 350 was considered lead toxicosis. They also have a 4-year old female dog who previously had 2 successful liters, but who delivered a single still born pup this morning (they would like the pup tested/autopsied but cannot afford the cost).

The adult female in the house is pregnant (1st trimester) and there are children <6 years living there as well. Father says he called GCHD a week and a half ago and was told to 1) see their family Dr., and 2) GCHD would call them back. To date no call back. All family members had venous draw today for lead testing. Dr. has told them to not use the water for bathing.

They received a filter from city of Flint. They sent a filtered water sample to a lab somewhere (man wasn't sure where) and the results indicate the filter doesn't work (man did not recall the lead level found).

Linda

From: Moran, Susan (DHHS)
Sent: Monday, October 19, 2015 4:53 PM
To: Signs, Kimberly (DHHS); Stobierski, Mary Grace (DHHS); Miller, Corinne

(DHHS); Miller, Mark (DHHS)
Cc: Wells, Eden (DHHS); Dykema, Linda D. (DHHS)
Subject: RE: Call-Lead Toxicity in a Dog

Ok- so who does the follow up with family—is that us(MDHHS) or the health dept?

From: Signs, Kimberly (DHHS)
Sent: Monday, October 19, 2015 4:49 PM
To: Stobierski, Mary Grace (DHHS); Miller, Corinne (DHHS); Moran, Susan (DHHS); Miller, Mark (DHHS)
Cc: Wells, Eden (DHHS); Dykema, Linda D. (DHHS)
Subject: Call-Lead Toxicity in a Dog

MDHHS has been notified this afternoon of a family from the Flint area whose dog was diagnosed with lead toxicity. I received a voice message from Dr. Michele Schalow with MDARD about this case, and Eden Wells was contacted by Linda Dykema, who was also informed of this case. At this time, I don't have any information about the dog or why it was tested, but information is that the testing was performed at MSU's Diagnostic Center for Population and Animal Health. Eden is getting ready to board a plane, so asked me to notify everyone. The family of the dog includes children and a pregnant woman. Her thought is that the family needs to be tested asap. Kim

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From: Wells, Eden (DHHS)
Sent: Wednesday, October 21, 2015 1:43 PM
To: Mona Hanna-Attisha;LaRocco, Toni;Peeler, Nancy (DHHS);Travis, Rashmi (DHHS)
Subject: RE: SCHOOL TESTING_ ALERT

I do

From: Mona Hanna-Attisha [mailto:MHanna1@hurleymc.com]
Sent: Wednesday, October 21, 2015 1:40 PM
To: Wells, Eden (DHHS); LaRocco, Toni; Peeler, Nancy (DHHS); Travis, Rashmi (DHHS)
Subject: RE: SCHOOL TESTING_ ALERT

Do you have his direct number?

From: Wells, Eden (DHHS) [mailto:WellsE3@michigan.gov]
Sent: Wednesday, October 21, 2015 1:39 PM
To: Mona Hanna-Attisha; LaRocco, Toni; Peeler, Nancy (DHHS); Travis, Rashmi (DHHS)
Subject: RE: SCHOOL TESTING_ ALERT

Yes, and Nick doesn't disagree, but getting out there and testing may be the need to deal with high levels of community stress----did you ever get to talk to Tawwab? He did not respond to my call---

---

From: Mona Hanna-Attisha [mailto:MHanna1@hurleymc.com]
Sent: Wednesday, October 21, 2015 1:21 PM
To: Wells, Eden (DHHS); LaRocco, Toni; Peeler, Nancy (DHHS); Travis, Rashmi (DHHS)
Subject: RE: SCHOOL TESTING_ ALERT

Interesting.

Do these people understand that the half-life of lead in blood is only 1-2 months? What is the purpose of having these kids testing -- normal levels may be falsely reassuring and it's highly unlikely that we will pick up many EBLLS in this school age population.

There are also issues of consents, release of info to PMDs, follow-up, etc.

But people want something done, and they want something done fast. People are understandably mad. I'm just not sure if this is the best option, but there may be no choice.

From: Wells, Eden (DHHS) [mailto:WellsE3@michigan.gov]
Sent: Wednesday, October 21, 2015 12:53 PM
To: LaRocco, Toni; Peeler, Nancy (DHHS); Travis, Rashmi (DHHS); Mona Hanna-Attisha
Subject: SCHOOL TESTING_ ALERT
Importance: High

Folks,
Got off the phone with our Director. He is pushing to have on-site lead testing at schools, particularly the 3, in addition to getting primary care providers involved. Pushing to have that done SOON. Imagine sending home permission slips on a Monday and attesting on a Thursday. Could get mass volunteers to help. His words!

I will need to get on the phone with a few politicians early this afternoon bout this as well. I will get back to you all.

From: LaRocco, Toni [mailto:tlarocco@gchd.us]
Sent: Wednesday, October 21, 2015 11:48 AM
To: Peeler, Nancy (DHHS); Travis, Rashmi (DHHS); Wells, Eden (DHHS); Mona Hanna-Attisha
Cc: Bruneau, Michelle (DHHS)
Subject: FW: Logo with name

From: Wells, Eden (DHHS)
Sent: Wednesday, October 21, 2015 1:44 PM
To: LaRocco, Toni
Subject: RE: SCHOOL TESTING_ ALERT

Will do what I can

From: LaRocco, Toni [mailto:tlarocco@gchd.us]
Sent: Wednesday, October 21, 2015 1:41 PM
To: Wells, Eden (DHHS); Mona Hanna-Attisha; Peeler, Nancy (DHHS); Travis, Rashmi (DHHS)
Subject: RE: SCHOOL TESTING_ ALERT

I think that we are being responsive and we need to work hard to educate all concerned. There are clinics that are an option as well as the medical home. This is a knee jerk reaction.

From: Wells, Eden (DHHS) [mailto:WellsE3@michigan.gov]
Sent: Wednesday, October 21, 2015 1:39 PM
To: Mona Hanna-Attisha; LaRocco, Toni; Peeler, Nancy (DHHS); Travis, Rashmi (DHHS)
Subject: RE: SCHOOL TESTING_ ALERT

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To: Peeler, Nancy (DHHS); Travis, Rashmi (DHHS); Wells, Eden (DHHS); Mona Hanna-Attisha
Cc: Bruneau, Michelle (DHHS)
Subject: FW: Logo with name

From: Wells, Eden (DHHS)
Sent: Wednesday, October 21, 2015 2:46 PM
To: Mona Hanna-Attisha
Subject: RE: From the Governor.

Well, at least Lawrence and Matt 2 of them....

£

From: Mona Hanna-Attisha [mailto:MHanna1@hurleymc.com]
Sent: Wednesday, October 21, 2015 2:44 PM
To: Wells, Eden (DHHS)
Subject: FW: From the Governor.

5 men..... a little disturbing....

From: "Murray, David (GOV)" <MurrayD1@michigan.gov>
Date: October 21, 2015 at 1:57:27 PM EDT
Subject: Flint water release

Gov. Rick Snyder announces Flint Water Task Force to review state, federal and municipal actions, offer recommendations

Experts in public health, water management, environmental protection to focus on steps to protect residents

LANSING, Mich. – Gov. Rick Snyder today announced the creation of an independent advisory task force charged with reviewing actions regarding water use and testing in Flint and offer recommendations for future guidelines to protect the health and safety of all state residents.

Task force members include experts in public health and medicine, water management, and environmental protection from both sides of the aisle, and will be co-chaired by Ken Sikkema of Public Sector Consultants and Chris Kolb, of the Michigan Environmental Council. Also serving will be Dr. Matthew Davis of the University of Michigan Health System, Eric Rothstein, of the Galardi Rothstein Group and Dr. Lawrence Reynolds of Mott Children's Health Center in Flint.

"Transitioning back to the Detroit Water and Sewerage Department-Great Lakes Water Authority is a good first step to protecting public health in Flint, but it's not the last step," Snyder said. "Bringing in outside experts to evaluate our actions and help monitor and advise on potential changes to law, procedures and practices will be key to continuing work on the comprehensive action plan and ensuring safe drinking water for all the residents in Flint and all of Michigan."

Snyder said the administration will fully cooperate with task force members, saying he wants an unbiased report focusing on steps taken in the past and recommendations that could improve practices to ensure all residents have access to safe, clean water.

Ken Sikkema is a senior policy fellow at Public Sector Consultants, where he specializes in public finance, environment, and energy policy. Prior to joining the firm, Sikkema served in both the Michigan House and Senate, culminating with four years as Senate majority leader. He has also served as both an adjunct and visiting professor at Grand Valley State University.

Chris Kolb is president of the Michigan Environmental Council, a statewide coalition of 70 environmental, public health and faith-based nonprofit groups. Before joining the MEC, Kolb represented Ann Arbor in the state House for six years and served six years on the Ann Arbor City Council. He has been president of the MEC for six years.

Matthew Davis, M.D., M.A.P.P., is professor of pediatrics and internal medicine at the University of Michigan Health System and professor of public policy at the Gerald R. Ford School at the University of Michigan, having joined the faculty in 2000. Davis also is a professor of health management and policy at the School of Public Health. He previously served as the chief medical executive of the Michigan Department of Community Health/Department of Health and Human Services.

Eric Rothstein is a national water issues consultant and principal at the Galardi Rothstein Group. He served as an independent advisor on the creation of the Great Lakes Water Authority. Rothstein also has served as Jefferson County, Alabama's rate consultant and municipal adviser for litigation related to the county's bankruptcy and issuance of $1.7 billion in sewer warrants and led strategic financial planning for the City of Atlanta's Department of Watershed Management. He has more than 30 years of experience in water, wastewater and stormwater utility finance and rate-making assessments.

Lawrence Reynolds, M.D., is a pediatrician in Flint who serves as president of the Mott Children's Health Center. He received his medical degree from Howard University College of Medicine and has been in practice for 36 years. He has served as president of the Genesee County Medical Society and the Michigan Chapter of the American Academy of Pediatrics. He has been honored for his humanitarian and advocacy efforts on behalf of children from the Community Foundation of Greater Flint.

Snyder has said reconnecting with the authority is a critical step to resolving water quality issues and addressing related health concerns. It will not immediately resolve the city's problem with lead service lines or aging infrastructure. It will take time for pipes in Flint to become coated with the phosphate corrosion control.

To best protect public health, state and local authorities will continue to carry out steps outlined on Oct. 2 in a comprehensive action plan, including continued testing, the use of faucet filters and providing residents with accurate information about steps to eliminate lead exposure. The Michigan Departments of Environmental Quality and Health and Human Services are continuing to provide free water filters, free lead testing through the state laboratory for Flint water customers, and hiring additional staff to conduct health exposure monitoring for lead in drinking water.

####

From: Wells, Eden (DHHS)
Sent: Wednesday, October 21, 2015 4:04 PM
To: Lasher, Geralyn (DHHS);Hertel, Elizabeth (DHHS);Eisner, Jennifer (DHHS)
Subject: Fwd: Notes from Lead Testing Protocol V 7
Attachments: Blood Testing Protocol Planning Template Meeting 10-21-15 V7.docx; ATT00001.htm

Sent from my iPhone

Begin forwarded message:

From: "Travis, Rashmi (DHHS)" <TravisR@michigan.gov>
Date: October 21, 2015 at 11:05:32 AM EDT
To: "LaRocco, Toni" <tlarocco@gchd.us>, "Peeler, Nancy (DHHS)" <PeelerN@michigan.gov>, "Wells, Eden (DHHS)" <WellsE3@michigan.gov>, Mona Hanna-Attisha <MHanna1@hurleymc.com>, "Toni Larocco tlarocco@gchd.us" <tlarocco@gchd.us>
Subject: Notes from Lead Testing Protocol V 7

Hi all,
Notes from our call this AM.
Thanks,
Rashmi

Rashmi Travis, MPH, CHES
Bureau Director of Family, Maternal, and Child Health
Michigan Department of Health & Human Services
Population Health and Community Services
Capitol View Building, 6th Floor
Lansing, MI 48913
Phone: 517-335-8922
Fax: 517-335-9032

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Blood Testing/Case Management Protocol Planning Template

Oct 21, 2015 v7

GCHD, Hurley Pediatrics, and MDHHS

Toni LaRocco, Nancy Peeler, Rashmi Travis, Eden Wells , Mona Hanna-Attisha

I. Prioritization of Testing

A. Children <6 already tested positive by capillary since April 2014 (n=75)
   1. Every week GCHD letters go out, educational material is also sent out (nutrition lead sources, etc.)
   2. Sending letters at 5ug/dL (new; previously doing at 10 ug/dL)- Letter includes in bold to follow up with PCP
   3. 10 ug/dL: making phone call (or sending letter if unable to reach) offering an office visit where clients are given a lead kit which includes: vacuum with hepa filter, mop, simple green and soon will include NSF water filter, gloves and Swiffer. Education regarding use of above, nutrition and medical follow up guidance to return to PCP.; vacuum of HEPA Filter—if don't have specifications of HEPA filter—will not pick up lead particles—Toni will get clarification on who recommended this and Nancy will ask Bob Scott to check into this as well. Confirmed (10/21) that GCHD will not be giving HEPA filters until check with EH.
   4. 20 ug/dL: two visits with nurse and sanitarian with a referral to MDHHS Lead Safe Homes

B. Retesting of Flint children with EBLL of venous samples- all due for first or subsequent follow-ups

C. All children under 6 yrs of age

D. School children those in the 3 schools identified as having elevated water lead (Freeman, Brunnell, Eisenhower)

E. Every school facility- prioritization in this order:
   1. 0-5 years age
      a. Daycare
      b. Great Start Readiness Pre-school (funded by MDE)
      c. Early Headstart
      d. Headstart
   2. 5-12 years of age
      a. Elementary
   3. >12 years of age
      a. Middle
      b. High

II. Implementation of Testing

A. **Payment for adults and child testing** covered by:

1. Medicaid
2. Insurance
3. Local Health Department, if no Medicaid or insurance

B. Partners

1. McLaren Health Plan
    a. **Nov 5th** is a screening (capillary) event for McLaren clients as well as interested community members. This is a walk-in event-
    b. Online lead registry (HHLPS) could be accessed to check child's status
        a. McLaren has access to MCIR but not HHLPS
    c. McLaren will contact their clients, and test their clients
    d. GCHD will market to whole community, and GCHD WIC staff will draw other community members-cap or venous as indicated
    e. GCHD will look up kids prior to drawing.....if ever drawn and elevated GCHD will do a venous draw instead.
2. UM-Flint Nursing students- Toni has been in touch with Nursing school and Licensed (BSN)nursing students may be able to assist Nov 5 and other times possible
3. Hurley Pediatrics (Mona)-(n=900)
    a. Dr. Hanna- Attisha has all Hurley clinic kids that need a redraw back to April 2014
    b. Also have list of all lead labs drawn from Hurley Lab back to April 2014
        a. Dr. Hanna Attisha looked at all the Hurley lab-processed lead levels, specifically all EBLLs geocoded to the city of Flint after April 2014
        b. As expected, they come from the following providers in decreasing order of frequency. This matches with the CHAP data in regards to providers who see the most Medicaid patients in the county:
            i. Hurley Children's Clinic
            ii. Hamilton Health Center (FQHC) - multiple clinics
            iii. Mott Children's Health Center
            iv. Solo Private Practices - M Akpinar, N Ali
    c. Children's Healthcare Access Program-(CHAP) - target Medicaid groups by 4 clinics (Hamilton, Hurley, Dr. Akpinar, Mott Children's Clinic (Dr. Reynolds)
        a. Can access majority of Medicaid children in Flint and have data-sharing agreements already in place.
        b. Has social workers staff and 211 and case management, filter follow-up
        c. Housed at GFHC
        d. CHAP- GCHD Toni LaRocco spoke with Susan from CHAP 10/14

i. they are paid from a grant through the Health Endowment Fund
ii. Contracted (not signed yet but will be) to run Medicaid Match through GCHD.
iii. Doing things like arranging transportation to get lead levels drawn good role for them as it is reimbursable with Medicaid Outreach.

d. Hamilton FQHC

4. Molina- Serve largest number of Peds/Medicaid-
5. GCMS Pete Levine---network information with all providers to get testing protocol information to them
6. Greater Flint Health Coalition-networking information to providers

II A & B are more for planning purposes—not to be included

III. Sites for Testing

A. Patient Centered Medical Home- Use primary providers whenever possible! Very important. Getting tests done outside of the medical home creates lack of continuity and lack of follow-up. Encourage as much as possible to "go see your doctor".
   a. Which then means that we need to educate the doctors with direct messaging about who to test, when to test, what is follow-up, available resources (211), premade patient education flyers, etc. Focus should be on lead in water education info.

B. GCHD
   1. GCHD (Toni LaRocco) Meeting with PIO and UMFlint Nursing in order to get assistance with Lead testing clinics.
   2. GCHD (Toni LaRocco) will be contacting other Medicaid Health Plans to try and have clinic with them at the Farmers Market

C. McLaren- at Burton Branch GCHD- all day- confirmed Nov 5, 2015
D. McLaren-(**Nov 5, 2015**) at Burton Branch GCHD- all day
E. Farmer's Market (GCHD and Hurley Peds) held on (T, TH, Saturdays)
   1. Hurley staff can draw blood at this site
F. Molina-TBD
G. Other health plans- Being contacted
H. Schools- request Friday October 16 from Flint Community Schools Superintendent Bilal Tawwab for testing to occur at schools.
   - Try to contact him Superintendent – Mona will do this to let him know what our plan is.
   - What is the purpose of this? It goes against the face of creating the primary care home, also signing a release is a challenge; it is natural way of place for kids to go to

Comment [EW1]: This could impact ole of primary care provider—thoughts? I need to respond to him.

- Have lowest school nurses to students—very minimal capacity to do this.
- Resolution with the Dept of Education
- Go to Primary Care doctor first
- Education with Primary Care doctors Testing

1. Daycare, Early Head Start and Head Start are priority. Two letters will be formulated to provide information to the following groups Letter for Flint area parents with children in daycare, EHS/HS, GSRP, and schools
2. Letter for primary care providers serving children from the Flint area

-
- Work with ISD and Flint Schools to give them education piece to work with them in the classroom—1.) elementary and secondary school education children to limit exposure – Faculty of school education—city of Flint schools and through ISD (U of M Flint schools); GISD controls Early Start and Head Start and GCARD—between these 2 resources may be able to get information out soon.
- Work with Office of Great Start for licensed daycares—Toni can get to those groups through immunizations and through Nancy can work with Office of Great Start
- Limit risk, great nutrition, doctor
- Pushing for a WIC person in each clinic
- MSU Education pushing for nutrition education—lead-exposed diet
- go to one of 4 clinics can get children in
- Pharmacy looking for formula for Iron, Calcium, and Vitamin C—Vitamin D supporting absorption of calcium
- Who will get the information: Genessee Medical Society, Greater Flint Health Coalition. and Pediatrics groups that work through Hurley.

-What information will go to providers:
-Cover letter
- Make sure it is of the literacy level 4th grade level
-Nutrition
-Basics of how to get a filter
-211 and connection other wraparound services

-Basic Prevention Strategies
-Testing—4 sites
-Nancy can check about putting Share Point site—to establish a central site—by noon today and get folder where we can all access the materials prior to their release.
-It is likely that this information could go to the Lead nurse, Karen Lishinski—send Share point address and email by noon.
-The protocol team will Review materials and what goes with letter
-Nancy and her team will draft a cover letter for review
-Cover Letter could go out with Dr Wells, Dr. Johnson, and Dr. Mona Hanna-Attish signatures?
-Dr. Hanna-Attish is working with pharmacies on providing a vitamin rich in iron, calcium, vitamin C, and vitamin D
-MSU Extension in Genesesse County is also pushing out educational materials on nutrition education
-for Early On – for every family of 5 and above– – not going to see it right away—established criteria is 10 Ug/dcl—most of the time with them aren't seen – can you make referrals to home visiting programs—primary care providers track and see; centralized home visiting hub—take a referral and send to other—GCHD to have a conversation with Dawn (in charge of Home Visiting Hub); If Hub can serve as single point of referral
-At home services—trauma informed systems of care collaborative—toxic stress exposures—some resources in CMH, parenting resources—conversation with Dawn and GCHD—a good portion can get information through CHAP on lead issues
-Most of the Hurley kids have been followed up to reach levels below 5 or recommend follow-up testing.

-Try to contact him Superintendent –Dr. Hanna-Attish will do this to let him know what our plan is.

If the Superintendent's call came through to Eden, she can connect with him as well to explain rationale and importance getting information out to providers.

III. Is more for Planning purposes—for protocol refer back to Primary Care Providers

IV. Registration of lead testing clients

A. HEALTH BLOOD LEAD ANALYSIS REPORTING (By authority conferred on the department of community health by 1978 PA 368, MCL 333.5111(1) and (2)(f), 333.5474(1)(c), and 333.20531; 1978 PA 312, MCL 325.72(a)(i), MCL 325.78; and Executive Reorganization Order No. 1996-1, MCL 330.3101):

1. All clients drawn will sign a release allowing result to be shared with primary provider
2. Upon initiating a request for blood lead analysis, the physician/provider or user ordering the blood lead analysis shall collect the following information:

(a) All of the following information with respect to the individual tested:

(i) Name.

(ii) Sex

(iii) The individual's ethnicity including either of the following:

(a) Hispanic or Latino/Latina.

(b) Not Hispanic of Latino/Latina.

(iv) The individual's race, noting the following:

(a) American Indian or Alaska Native.

(b) Asian.

(c) Black or African American.

(d) Native Hawaiian or Other Pacific Islander.

(e) White or Caucasian.

(v) Birthdate.

(vi) Address, including county, and, to the extent available, whether the residence or property is owned or rented.

(vii) Telephone number.

(viii) Social security number and Medicaid number, if applicable.

(ix) If the individual is a minor, the name of a parent or guardian.

(x) If the individual is an adult, the name of his or her employer.

(xi) A secondary contact for the individual tested or, if the individual is a minor, a secondary contact for the individual's parent or guardian, including, to the extent available, name and phone number of the secondary contact.

(b) The date of the sample collection.

(c) The type of sample (capillary or venous).

(d) The physician's/provider's or user's name, name of practice (if applicable), telephone number, fax number, email address, and mailing address.

IV All above is included on the form—not to be included on protocol

V. Handling of Results/messaging

A. CLPP and GCHD currently have protocol lab test result sharing (HHLPSS)

1. Bob Scott can assist in navigation
2. MDHHS Bureau of Labs can provide surge capacity for lab testing if needed

B. Secondary prevention messaging for all community

1. nutrition, good vitamins

2. wrap-around services
3. Breastfeeding, breastfeeding, breastfeeding – breastfeeding is protective for lead in water! Increase number of LC's, support breastfeeding peer programs, etc. Flint has low breastfeeding rate.
4. positive parenting/nurse family partnership, infant support services
5. WIC enrollment
6. SNAP double bucks enrollment

V Include on protocol—CLPPP receives lab; GCHD gets results from CLPPP; GCHD sends result to Primary Care Provider if testing done at GCHD.

Comments on letters:

-Parent—HV referral program; bolster 211 program- make it a one stop resource and access resource; Toni talked to Dawn about the LLG; Mona talked to Dawn about HV program there are so many program, access info through 211 or Hub—confirmed that Hub no longer exists, trying to work with 211; Mona will follow- up to getting those things up to date; in parent letter that every kid recommended to be tested—should we put an upper age limit on it—include under 6 yrs of age; should I get a lead test—speak to your doctor

-Include info on Lead Safe Home—it is too much info—before referral goes to EBL Investigation; other issue of it coming from the doctor—required reporting information—keep flyer about program; do not include flyer as part of case management.

Documents for Parent:

All documents send to Share point site. Once finalized—send through approval with Communications.

-FAQ DEQ one—(approved—need logo)

-Is your Child Safe from Lead

-Fight Lead Poisoning with a Healthy Diet (EPA)—keeps pages on nutrition info and condense to 2 pages; add 211, Health Dept number, WIC number, SNAP number, Double Bucks number

Documents for Provider:

-Handout Blood Level Quick Reference Primary Care Providers

-Handout Pregnant and Nursing Mothers Lead

-Is your Child Safe from Lead

-Fight Lead Poisoning with Healthy Diet (EPA)

-FAQ DEQ one

Distribution to all OB doctors; through Medical Society Genessee County

Signatures—Dr. Johnson, Dr. Mona Hanna-Attish, Dr. Eden Wells

Get comments on letters by 11AM (Oct 21) to Nancy. Nancy will post final one.

Karen Lishinski will work on condensing protocol based on recommended sections to include by 12PM.

EBL Investigations/Case Management Protocol

A. Payment for EBL Investigations:

1. Budgeted currently for 250 EBL investigations (to include water testing) for every child with elevated blood lead > 5mcg/dl.
2. The U.S. Department of Health and Human Services recommends that BLLs among all adults be reduced to <10 µg/d- so follow-up for adults will be at levels >10 mcg/dl (http://www.cdc.gov/niosh/topics/ables/description.html)
3. Medicaid will pay for 2 nursing visits following up for their clients

Comment [EW2]: ????sound OK?

B. **EBL Investigation Implementation**

EBL Investigations not to include in testing protocol

I. **Actions and Assignments for Week of October 19, 2015 (Highlighted red is complete)**

A. GCHD/Toni LaRocco and CHAP will contact Molina and other health plans to set up similar program as McLaren; CHAP is not going to be able help—can only help transportation for testing, but not screening , but can help for transportation to providers; GCHD PIO has contacted mass transit

B. GCHD/Toni la Rocco will contact all health plans- if issues, contact Wells

C. MDHHS will provide support as requested for any events

D. Hilda at GCHD needs to blast provider information about lead to all providers (blast fax and list serves)

[redacted]

F. Dr. Hanna- Attisha and GCHD-If need for increased capillary testing machines---advise MDHHS

G. Activities/follow up by Nancy/Bob

1. Work with Communications to support linkage to other early childhood/school state partners at MDE that we already work with that were listed in the plan - Office of Great Start is the link to child care providers (related to subsidy payments and to their subcontract to ECIC to run regional child care resource/TA centers); they are also the state liaison to Head Start/Early Head Start and the Great Start Readiness at-risk preschools. And of course their School Health office.

2. Access to HHLPSS data system - currently only GCHD has access - Bob thinks that 2 staff there have been trained to use the system, but we need to confirm when we are back at the office. As I referenced above, we are looking at lead privacy laws to see who else (besides GCHD) might be able to have access to the CLPPP data about follow-up testing.

[redacted]

4. Regarding CLPPP sending our list of children needing follow-up to Hurley (when we think there is a Hurley provider), we are also confirming that we can do that based on privacy laws.

5. We will follow up to make sure that the new CLPPP toolkit materials for providers get out to all of you - our Provider Quick Reference document, and the video Eden referenced is coming soon

6. Exploring legal issues around access to the data.

H. Wells will get back with Flint City Superintendent regarding issues of school clinics depending upon October 19 meeting

I. ALL- Develop messaging for all healthcare providers in Flint regarding testing, getting their clients in for testing, and using an approved form that requests required reporting information.

J. MDHHS Wes Priem-Develop form for blood test registration/required information

K. ALL - Disseminate form

Questions from Nancy/Bob –October 14

- Medicaid will pay for 2 nursing visits. Toni, I wanted to double check, at what levels is GCHD currently sending out nurses to follow up on elevated blood lead levels (even if only 2 visits) ? And I wasn't sure if I understood on the call - is GCHD billing Medicaid for those visits for children enrolled in Medicaid? Are billing for those visits
- We agree that CHAP could be a good resource that could try to find kids and help get them connected for testing/follow-up testing. Are they paid by health plans/clinics to carry out activities, e.g. that is who their direction comes from (I know that was the model in Kent County)? I ask that related to our thinking about who the CLPPP data (e.g. access to the HHLPSS data system) could go to - we have to explore the privacy laws for the lead data.
- We concur about using Lead Care machines, but only if there is a better protocol to ensure that children with an elevated capillary test get back for venous testing.

-McLaren doing filter paper –if show up at GCHD doing Lead care machine—can get results that day—elevated capillary—nutrition information, send results with all of that regardless of elevated

-Release signed at Nov 5th event—mailing letter to family and letter to doctor.

-Other clinics—Toni has connected Molina, Meridian, and McLaren; Total HealthCare has small % of clients—looking at HEDIS results and looking to those kids of who haven't been tested; biggest offer is transportation—CHAP can help arrange for transportation—for Medicaid outreach.—include same phone number for school letter.

Next Call – Wed morning 10/21 9AM to finalize documents for distribution to providers and schools

This Document is a Non-Responsive Attachment.

From: Wells, Eden (DHHS)
Sent: Wednesday, October 21, 2015 4:27 PM
To: LaRocco, Toni;Mona Hanna-Attisha;Peeler, Nancy (DHHS);Travis, Rashmi (DHHS)
Subject: RE: SCHOOL TESTING_ ALERT

HI folks,

All on the state-local call today were vociferous that testing should not be on the school sites. Mark V will be asking the Flint City Schools super and Rep Neeley to get on a call with him and I and Mona to discuss this stance.

E

From: LaRocco, Toni [mailto:tlarocco@gchd.us]
Sent: Wednesday, October 21, 2015 1:41 PM
To: Wells, Eden (DHHS); Mona Hanna-Attisha; Peeler, Nancy (DHHS); Travis, Rashmi (DHHS)
Subject: RE: SCHOOL TESTING_ ALERT

I think that we are being responsive and we need to work hard to educate all concerned. There are clinics that are an option as well as the medical home. This is a knee jerk reaction.

From: Wells, Eden (DHHS) [mailto:WellsE3@michigan.gov]
Sent: Wednesday, October 21, 2015 1:39 PM
To: Mona Hanna-Attisha; LaRocco, Toni; Peeler, Nancy (DHHS); Travis, Rashmi (DHHS)
Subject: RE: SCHOOL TESTING_ ALERT

Yes, and Nick doesn't disagree, but getting out there and testing may be the need to deal with high levels of community stress----did you ever get to talk to Tawwab? He did not respond to my call---

---

From: Mona Hanna-Attisha [mailto:MHanna1@hurleymc.com]
Sent: Wednesday, October 21, 2015 1:21 PM
To: Wells, Eden (DHHS); LaRocco, Toni; Peeler, Nancy (DHHS); Travis, Rashmi (DHHS)
Subject: RE: SCHOOL TESTING_ ALERT

Interesting.

Do these people understand that the half-life of lead in blood is only 1-2 months? What is the purpose of having these kids testing – normal levels may be falsely reassuring and it's highly unlikely that we will pick up many EBLLS in this school age population.

There are also issues of consents, release of info to PMDs, follow-up, etc.

But people want something done, and they want something done fast. People are understandably mad. I'm just not sure if this is the best option, but there may be no choice.

From: Wells, Eden (DHHS) [mailto:WellsE3@michigan.gov]
Sent: Wednesday, October 21, 2015 12:53 PM
To: LaRocco, Toni; Peeler, Nancy (DHHS); Travis, Rashmi (DHHS); Mona Hanna-Attisha

Subject: SCHOOL TESTING_ ALERT
Importance: High

Folks,
Got off the phone with our Director. He is pushing to have on-site lead testing at schools, particularly the 3, in addition to getting primary care providers involved. Pushing to have that done SOON. Imagine sending home permission slips on a Monday and attesting on a Thursday. Could get mass volunteers to help. His words!

I will need to get on the phone with a few politicians early this afternoon bout this as well. I will get back to you all.

From: LaRocco, Toni [mailto:tlarocco@gchd.us]
Sent: Wednesday, October 21, 2015 11:48 AM
To: Peeler, Nancy (DHHS); Travis, Rashmi (DHHS); Wells, Eden (DHHS); Mona Hanna-Attisha
Cc: Bruneau, Michelle (DHHS)
Subject: FW: Logo with name

From: Wells, Eden (DHHS)
Sent: Wednesday, October 21, 2015 6:50 PM
To: Peeler, Nancy (DHHS)
Subject: Re: Blood Testing Call

Excellent!!!!!

Sent from my iPhone

On Oct 21, 2015, at 6:45 PM, Peeler, Nancy (DHHS) <PeelerN@michigan.gov> wrote:

> I should have added that Kathy Stiffler reminded them that Medicaid had sent out an email to health plans who currently cover patients in Flint, that the GCHD is still interested in working with them to set up testing clinics, and that McLaren is already scheduled. Good reminder.
>
> Sent from my iPad
>
> On Oct 21, 2015, at 5:33 PM, Wells, Eden (DHHS) <WellsE3@michigan.gov> wrote:
>
> > YAY!!
> >
> > ---
> > **From:** Peeler, Nancy (DHHS)
> > **Sent:** Wednesday, October 21, 2015 5:10 PM
> > **To:** Wells, Eden (DHHS)
> > **Subject:** RE: Blood Testing Call
> >
> > Yes, you did, clearly! No questions at CAC about Flint. Sorry, I should have just stopped and had you speak before you had to hang up. Good discussion and questions, they want a special workgroup to work on health plans and lead -- which is great news, excited to see how we can start to change and improve to new approaches!
> >
> > ---
> > **From:** Wells, Eden (DHHS)
> > **Sent:** Wednesday, October 21, 2015 4:57 PM
> > **To:** Peeler, Nancy (DHHS)
> > **Subject:** RE: Blood Testing Call
> >
> > Great---Sorry about having to skip out of CAC---anything come up? You can see that the school thing was something I need to go jump on,
> >
> > E
> >
> > ---
> > **From:** Peeler, Nancy (DHHS)
> > **Sent:** Wednesday, October 21, 2015 4:23 PM
> > **To:** Rockefeller, Cheryl (DHHS); Wells, Eden (DHHS); Toni Larocco tlarocco@gchd.us;

Mona Hanna-Attisha (MHanna1@hurleymc.com); Travis, Rashmi (DHHS)
Cc: Colston, Leslie (DHHS); Krisztian, George (DEQ); Eisner, Jennifer (DHHS)
Subject: RE: Blood Testing Call

Hi all – wanted to send a quick update, and thanks for all the quick work on the Parent and Provider letters. We reviewed all of the edits, some conflicting, and had to make some choices for what to include or not. The edited documents are now on our program Sharepoint site:

www.midpop.org/
On the blue navigation bar, go to Workgroups & Toolkits
Click on FLINT WORKGROUP
Click on Draft 2 documents – and look for the specific folder.

Jennifer Eisner from our Communications office is copied on this email, and is reviewing the materials now for approval.

Nancy

-----Original Appointment-----
From: Rockefeller, Cheryl (DHHS)
Sent: Monday, October 19, 2015 10:37 AM
To: Rockefeller, Cheryl (DHHS); Wells, Eden (DHHS); Peeler, Nancy (DHHS); Toni Larocco tlarocco@gchd.us; Mona Hanna-Attisha (MHanna1@hurleymc.com); Travis, Rashmi (DHHS)
Cc: Colston, Leslie (DHHS)
Subject: Blood Testing Call
When: Wednesday, October 21, 2015 9:00 AM-10:00 AM (UTC-05:00) Eastern Time (US & Canada).
Where: **PPI**

CONFERENCE LINE:

PPI

Rashmi will be host for the call.

Cheryl Rockefeller, Executive Assistant
Dr. Eden Wells, Chief Medical Executive
Mikelle Robinson, Administrative Deputy Director and
Director, Bureau of Local Health and Administrative Services
Mark Miller, Director, Division of Local Health Services
Michigan Department of Health and Human Services
Lansing MI 48913
Telephone: (517) 335-8011
Fax: (517) 335-9032
Email: RockefellerC@michigan.gov

From: Wells, Eden (DHHS)
Sent: Wednesday, October 21, 2015 7:24 PM
To: Emily Houk
Cc: Travis, Rashmi (DHHS);Peeler, Nancy (DHHS);Lishinski, Karen (DHHS)
Subject: Re: Testing protocol table

Yes-- much better- in priority 3, daycare and head start and preschool all should be in first paragraph-- all same level. Question- they should be priority 2 - leaving "all other children..." As priority 3?

Sent from my iPhone

On Oct 21, 2015, at 7:17 PM, Emily Houk <emily@r2pconsultants.com> wrote:

> Ok...Nancy and I did our best to interpret the comments...
>
> Eden/Rashmi--is this more what you had in mind? (Happy to wordsmith as necessary).
>
> --
> Emily Houk, President and Chief Mischief Maker
> Research to Practice Consulting, LLC
> 216 North Chestnut
> Lansing, Michigan 48933
> 517-896-2712
> r2pconsultants.com
>
> <Flint Blood Lead level Testing Protocol table.v2.docx>

From: Wells, Eden (DHHS)
Sent: Wednesday, October 21, 2015 8:47 PM
To: Peeler, Nancy (DHHS)
Subject: Fwd: Blood Testing-Version 4 Call
Attachments: Parent Letter_DRAFT_October 202015 MHArev.docx; ATT00001.htm

Sent from my iPhone

Begin forwarded message:

From: Mona Hanna-Attisha <MHanna1@hurleymc.com>
Date: October 21, 2015 at 8:08:13 AM EDT
To: "Peeler, Nancy (DHHS)" <PeelerN@michigan.gov>, "Rockefeller, Cheryl (DHHS)" <RockefellerC@michigan.gov>, "Wells, Eden (DHHS)" <WellsE3@michigan.gov>, "Toni Larocco tlarocco@gchd.us" <tlarocco@gchd.us>, "Krisztian, George (DEQ)" <krisztiang@michigan.gov>
Cc: "Travis, Rashmi (DHHS)" <TravisR@michigan.gov>
Subject: RE: Blood Testing-Version 4 Call

I don't know if the "Tips for Flint Residents" is finalized, and I'm not even sure if I was supposed to look at it, but I have a few edits. Sorry, I'm totally OCD. Under #2, people can also just call 211 to get a filter (this can be added to all handouts for filter access). I'm not sure if it was literacy tested - some big words like accumulate, precautions, etc. Fine print at bottom is same as #1, can just add email to #1. I would also reword sentence under title to "Lead plumbing is common throughout Flint and in all homes built before 1986. Always follow the below steps to ensure safe drinking water."

Attached are my revisions to the parent letter. I tried to simplify and consolidate – it's in markup mode. I have a 8:15 meeting, but will try to take a stab at provider letter as well before 9am meeting

Mona Hanna-Attisha MD MPH

Director, Pediatric Residency Program

Hurley Children's Hospital at Hurley Medical Center

Assistant Professor, Department of Pediatrics and Human Development

Michigan State University College of Human Medicine

Office: 810-262-7257

mhanna1@hurleymc.com

From: Peeler, Nancy (DHHS) [PeelerN@michigan.gov]
Sent: Tuesday, October 20, 2015 3:10 PM
To: Rockefeller, Cheryl (DHHS); Wells, Eden (DHHS); Toni Larocco tlarocco@gchd.us; Mona Hanna-Attisha; Krisztian, George (DEQ)
Cc: Travis, Rashmi (DHHS)
Subject: RE: Blood Testing-Version 4 Call

HI all – draft letters for Providers and for Parents in Flint are posted in our Sharepoint folder called Flint Workgroup. We put them in both Word and .pdf formats, to assure you can open them. They are rough drafts, so please do add/suggest language where there are placeholders.

Appreciate if you can review and make comments/suggest edits. To find the letters:

Navigate to www.miclppp.org
On the dark blue navigation bar, click on Workgroups & Toolkits
Click on the FLINT WORKGROUP folder

Nancy

From: Peeler, Nancy (DHHS)
Sent: Monday, October 19, 2015 11:59 AM
To: Rockefeller, Cheryl (DHHS); Wells, Eden (DHHS); Toni Larocco tlarocco@gchd.us; Mona Hanna-Attisha (MHanna1@hurleymc.com)
Cc: Travis, Rashmi (DHHS)
Subject: RE: Blood Testing-Version 4 Call
Importance: High

Hi everyone – per our morning conversation, we have created a folder on our Sharepoint site where we can upload documents that we might want to attach to the letters we discussed this morning:

1. Letter for Flint area parents with children in daycare, EHS/HS, GSRP, schools
2. Letter for primary care providers serving children from the Flint area

Please send any materials you think could be good attachments to Emily Houk (HoukE@michigan.gov). Emily is standing by to upload the documents to the folder.

To access the folder, please go to www.miclppp.org
On the dark blue navigation bar, click on Workgroups & Toolkits
Click on the FLINT WORKGROUP folder – which is where we will post these materials

We agreed to review materials by Wednesday morning, 10am, to try to finalize the letters at that point.

We are drafting the letters now, will put the draft letters in the same folder, and I will email you once they are posted for your review and comment.

Thanks – let me know if you have questions or problems accessing the folder.

Nancy

-----Original Appointment-----
From: Rockefeller, Cheryl (DHHS)
Sent: Friday, October 16, 2015 8:50 AM
To: Rockefeller, Cheryl (DHHS); Wells, Eden (DHHS); Peeler, Nancy (DHHS); Toni Larocco tlarocco@gchd.us; Mona Hanna-Attisha (MHanna1@hurleymc.com)
Subject: Blood Testing-Version 4 Call
When: Monday, October 19, 2015 9:00 AM-9:30 AM (UTC-05:00) Eastern Time (US & Canada).
Where: PPI

CONFERENCE LINE:

PPI

OK folks, 9 AM Monday morning. Same Conference line- we will send it out,
Eden

From: Peeler, Nancy (DHHS)
Sent: Thursday, October 15, 2015 4:56 PM
To: Wells, Eden (DHHS)
Cc: Travis, Rashmi (DHHS); Mona Hanna-Attisha; LaRocco, Toni; Scott, Robert L. (DHHS)
Subject: RE: Blood testing- version4 October 15

Looks like Bob is out of the office on Monday. So we can go with 9am.

From: Wells, Eden (DHHS)
Sent: Thursday, October 15, 2015 4:36 PM
To: Peeler, Nancy (DHHS)
Cc: Travis, Rashmi (DHHS); Mona Hanna-Attisha; LaRocco, Toni; Scott, Robert L. (DHHS)
Subject: Re: Blood testing- version4 October 15

Thanks!

From: Peeler, Nancy (DHHS)
Sent: Thursday, October 15, 2015 4:31 PM
To: Wells, Eden (DHHS)
Cc: Travis, Rashmi (DHHS); Mona Hanna-Attisha; LaRocco, Toni; Scott, Robert L. (DHHS)
Subject: Re: Blood testing- version4 October 15

We're head home tomorrow afternoon. I'll ask Bob, or he may see this email before I get a chance to ask him.

Sent from my iPad

On Oct 15, 2015, at 4:03 PM, Wells, Eden (DHHS) <WellsE3@michigan.gov> wrote:
Do you think you can do 9? Are you both back already?

So sorry....
<OutlookEmoji-☹.png>

From: Peeler, Nancy (DHHS)
Sent: Thursday, October 15, 2015 3:59 PM
To: Wells, Eden (DHHS)
Cc: Travis, Rashmi (DHHS); Mona Hanna-Attisha; LaRocco, Toni; Scott, Robert L. (DHHS)
Subject: Re: Blood testing- version4 October 15

8am is open for me, but I can try to shuffle things to make 9am work.

Sent from my iPad

On Oct 15, 2015, at 3:57 PM, Wells, Eden (DHHS) <WellsE3@michigan.gov> wrote:
Sorry I-- for 9

Sent from my iPhone

On Oct 15, 2015, at 3:54 PM, Travis, Rashmi (DHHS) <TravisR@michigan.gov> wrote:
Eden
I am sorry but I have meetings at 8 and 9
Am. But it is more important that Nancy and Bob be available for the call along with others.
Rashmi

Sent from my iPhone

On Oct 15, 2015, at 3:50 PM, Wells, Eden (DHHS) <WellsE3@michigan.gov> wrote:
HI folks,

I thought I sent an email, but cannot find it. Toni and I can meet Monday morning by phone---**-8 or 9 is better for Toni , she is busy at 10.** Need to follow up on the testing plan and begin to talk about case management, How about you all???

Eden

From: Wells, Eden (DHHS)
Sent: Thursday, October 15, 2015 8:36 AM
To: Mona Hanna-Attisha; Peeler, Nancy (DHHS); Travis, Rashmi (DHHS); GJOHNSON@gchd.us; LaRocco, Toni
Cc: Moran, Susan (DHHS); Miller, Corinne (DHHS); Miller, Mark (DHHS); Scott, Robert L. (DHHS); Scott, Linda (DHHS); Scott, Jackie (DHHS); Shah, Sandip (DHHS); Dykema, Linda D. (DHHS); Priem, Wesley F. (DHHS); Lasher, Geralyn (DHHS); Hertel, Elizabeth (DHHS)
Subject: Fwd: Blood testing- version4 October 15

Today's draft- early next week the primary group will meet to plan case management planning. We will work on Nancy and Bob's questions in interim.

Wes- please advise as to exactly what information you would want to collect on any child getting a blood test/ in the event further case management or abatement is required-

Eden.

Begin forwarded message:
From: Eden <ewells@umich.edu>
Date: October 15, 2015 at 8:31:46 AM EDT
To: "Eden V. Wells" <wellse3@michigan.gov>
Subject: Fwd: Blood testing- version4 October 15

Sent from my iPhone- I apologize for typos and brevity

Begin forwarded message:
From: "Wells, Eden (DHHS)" <WellsE3@michigan.gov>
Date: October 14, 2015 at 4:29:58 PM EDT
To: "ewells@umich.edu" <ewells@umich.edu>, "Wells, Eden (DHHS)" <WellsE3@michigan.gov>
Subject: Blood testing- send out in AM 10/15

Eden V. Wells, MD, MPH, FACPM
Chief Medical Executive
Michigan Department of Health and Human Services
201 Townsend St., 5th Floor CVB
Lansing, MI 48913

DRAFT PARENT LETTER FOR PARTNER REVIEW v.1
October 20, 2015

Dear Parent,

~~As you may have heard in recent news reports, lead has been found in the City of Flint's water system.~~

To help make sure the children of Flint are safe from lead exposure, ~~this serious health hazard,~~ the Michigan Department of Health and Human Services, with partners at the City of Flint, Genesee County Health Department, Genesee Intermediate School District and Hurley ~~Health Systems~~Children's Hospital want to help ~~parents and caregivers~~you understand ~~to~~:

- Where does lead come from?
- What can I do to protect my family?
- ~~Understand more about lead poisoning and how to protect your family;~~
- Should I get my child tested for lead?~~Learn how to get your child tested~~
- ~~Understand how to get their~~your household water tested
- ~~Know how to get help if your~~a child has been exposed to lead.Where can I find more information about lead?

Where does lead come from? ~~Understanding Lead Poisoning~~

~~Where does lead come from?~~ Lead is a serious health hazard, especially for small children who become lead poisoned when they eat, drink or breathe lead. Elevated levels of lead have been found in the drinking water in the City of Flint. Kids can also be exposed to lead from old lead paint, soil, pottery, cosmetics and toys, and some home remedies. Adult jobs and hobbies, like auto repair, stained glass, jewelry making, and ammunitions handling can also put children at risk if they touch clothing or play in areas where lead is found.

~~Protect Your Family~~What can I do to protect my family?

Protecting your family from Lead in the Water ~~and Obtaining Water Filters~~.

- Get your water testing for lead. It's free. Just call …..
- ~~Testing of the water in your home is recommended and is free. If you live in Flint, use a NSF/ANSI 53 water filter in your home. Water filters are easy to install and available for free.Call 211 for a free water filter, or x.y.z.~~
- If you do not have a water filter, use bottled water for drinking and mixing formula.
- When cooking or washing dishes in tap water, run the water for at least five minutes before you use it.
- Use cold water.

Comment [1]: May also need to add Flint Community Schools - not always part of GISD

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DRAFT PARENT LETTER FOR PARTNER REVIEW v.1
October 20, 2015

~~**Lead in the Home.** Lead is a serious health hazard, especially for small children who become lead poisoned when they eat, drink or breathe lead. The most common cause of lead poisoning is lead paint. However, lead is also found in drinking water, soil, pottery, cosmetics and toys, and some home remedies. Adult jobs and hobbies, like auto repair, stained glass, jewelry making, and ammunitions handling can also put children at risk if they touch clothing or play in areas where lead is found.~~

~~**Lead in the Water and Obtaining Water Filters.** Elevated levels of lead have been found in the water in the City of Flint. Testing of the water in your home is recommended and is free. If you live in Flint, use a NSF/ANSI 53 water filter in your home. Water filters are easy to install and available for free at x,y,z. If you do not have a water filter, use bottled water for drinking and mixing formula. When cooking or washing dishes in tap water, run the water for at least five minutes before you use it.~~

~~**Protect Your Family**~~

~~**Nutrition Matters.** Some foods will help keep lead from being stored in a child's body. Foods with calcium like milk, cheese, yogurt, and tofu are helpful, as are green leafy vegetables like spinach and cabbage. Iron rich foods also help reduce lead from being stored. Iron is in beans, lean meats like fish and chicken, whole grain cereals and peanut butter. Foods with Vitamin C will also help protect your child. These are foods like oranges, orange juice, grapefruits, tomatoes and green peppers. Avoid fatty foods, like cookies, cakes, pizza, bacon, potato chips, french fries and hot dogs. GTalk to your pediatrician about giving your child a multivitamin every day.ive your child a Multivitamin each day.~~

Protecting your family from other lead sources:

Safe Cleaning is Important. Keeping your home clean and safe from lead hazards will help to protect your family.

- Keep children away from lead paint and dust.
- Use wet paper towels to clean up lead dust. Be sure to clean around windows, play areas and floors.
- Wash hands and toys often, using soap and water.

Nutrition Matters! Some foods will help keep lead from being stored in a child's body, especially foods with a lot of calcium, iron and vitamin C. Calcium containing foods include milk, cheese, yogurt, and tofu are helpful, as are green leafy vegetables like spinach and cabbage. Iron is in beans, lean meats like fish and chicken, whole grain cereals and peanut butter. Foods with a lot of Vitamin C include oranges, orange juice, grapefruits, tomatoes and green peppers. ~~Avoid fatty foods, like cookies, cakes, pizza, bacon, potato chips, french fries and hot dogs.~~ If you are concerned about your child's diet, talk with your pediatrician who may also recommend a daily multivitamin.

Comment [2]: avoidance of fatty foods is no longer recommended for lead. Concern about limiting fatty foods for kids with developing brains (less than 2yr)

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Comment [3]: avoidance of fatty foods is no longer recommended for lead. Concern about limiting fatty foods for kids with developing brains (less than 2yr)

WIC and SNAP provide assistance to parents and children who need fresh and healthy foods. Contact the Genesee County WIC office at (810) 237-4537 to learn more. SNAP also offers a Double Bucks program to purchase even more healthy food for no additional costs.

~~When Testing is Necessary~~Should my child get a blood lead test?

Children who live in the City of Flint or attend school, childcare or often spend time with a caregiver in the City of Flint should be tested for lead poisoning. ~~Pregnant and breastfeeding women living, working or attending school in Flint should also be tested.[2]~~

~~Where should I go to get a blood lead test for my child?~~

~~The best place to get your child's blood lead test is at your pediatrician's office. Your pediatrician will be able to follow up on the labs and provide you with the needed medical and preventative care. If you are unable to go to your doctor, you can also go to the Genesee County Health Department (phone number….).~~

~~What is a lead test? Testing for lead poisoning is a blood test and is most often done with a quick finger prick. Contact your doctor or the Genesee County Health Department to request a lead test.~~

Understanding your child's lead test result.

- Lead only stays in your blood for about one to two months, so the blood lead level that is done will only reflect recent exposure.
- A lead level below 5 mcg/dl means there is very little lead in your child's blood. You doctor ~~will probably~~may suggest retesting your child within the next 12 months to make sure the level is not going up.
- A lead level of 5-14 mcg/dl means that child has had some exposure to lead. Work with your doctor and local health department for further guidance on how to ~~make your home safe~~limit your lead exposure. Your doctor ~~will probably~~may ~~want to~~ retest your child in 1-3 months to make sure the level is not going up.
- Children with very high levels of lead (over 40) may require treatment at the hospital.

~~Follow-up testing. If your child has been exposed to lead, it is very important that they have follow-up testing to make sure the lead level is going down. Children with very high levels of lead (over 40) may require treatment at the hospital.~~

Transportation. If you need help with transportation to have your child tested at your doctor or health department, please call 211.

Where Can I get more information on lead? ~~to Find Help~~

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- Website for MDHSS lead stuff
- CDC
- County health dept, etc

Blood Testing. Contact your doctor or the Genesee County Health Department to get a lead test.

Water Testing. Water testing is free at the X,Y,Z. Contact ABC to find how to have your water tested.

WIC and SNAP. WIC and SNAP provide assistance to parents and children who need fresh and healthy foods. Contact the Genesee County WIC office at (810) 237-4537 to learn more.

Child Development. If you have concerns about your child's growth, development or learning contact the ABC to learn about an Early Childhood Home Visiting Program in your area.

DR

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This Document is a Non-Responsive Attachment.

From: Wells, Eden (DHHS)
Sent: Wednesday, October 21, 2015 8:53 PM
To: Peeler, Nancy (DHHS)
Subject: Re: Blood Testing Call

Hear you- thanks-

Sent from my iPhone

On Oct 21, 2015, at 8:51 PM, Peeler, Nancy (DHHS) <PeelerN@michigan.gov> wrote:

> I am verifying that our communications person did have Mona's edits. I am pretty sure I sent them to her...but checking.
>
> I think in some instances, we couldn't use everyone's edits as they contradicted each other, or were solely focused on water (didn't reference other source of lead), or framed in a way inconsistent with how we have been doing messaging in our other materials. Complicated.
>
> So, as we get Jennifer Eisner's comments back and do another round of editing, we can certainly look at Mona's edits (again)? If you feel that we are in a position where we must use her edits regardless of other considerations, please tell us.
>
> ---
>
> **From:** Wells, Eden (DHHS)
> **Sent:** Wednesday, October 21, 2015 8:42 PM
> **To:** Peeler, Nancy (DHHS)
> **Subject:** Fwd: Blood Testing Call
>
> ???
>
> Sent from my iPhone
>
> Begin forwarded message:
>
> > **From:** Mona Hanna-Attisha <MHanna1@hurleymc.com>
> > **Date:** October 21, 2015 at 8:31:16 PM EDT
> > **To:** "Peeler, Nancy (DHHS)" <PeelerN@michigan.gov>, "Rockefeller, Cheryl (DHHS)" <RockefellerC@michigan.gov>, "Wells, Eden (DHHS)" <WellsE3@michigan.gov>, "Toni Larocco tlarocco@gchd.us" <tlarocco@gchd.us>, "Travis, Rashmi (DHHS)" <TravisR@michigan.gov>
> > **Cc:** "Colston, Leslie (DHHS)" <ColstonL@michigan.gov>, "Krisztian, George (DEQ)" <krisztiang@michigan.gov>, "Eisner, Jennifer (DHHS)" <EisnerJ@michigan.gov>
> > **Subject: RE: Blood Testing Call**
> >
> > I didn't see any of my edits on the parent letter - I think they only captured Toni's edits? I sent those edits in the early am.

In the provider letter, everything on page 3 is redundant (all already stated above in the letter), except the info on how to get water tested, but that info is in one of the attachments.

Mona Hanna-Attisha MD MPH

Director, Pediatric Residency Program

Hurley Children's Hospital at Hurley Medical Center

Assistant Professor, Department of Pediatrics and Human Development

Michigan State University College of Human Medicine

Office: 810-262-7257

mhanna1@hurleymc.com

From: Peeler, Nancy (DHHS) [PeelerN@michigan.gov]
Sent: Wednesday, October 21, 2015 4:23 PM
To: Rockefeller, Cheryl (DHHS); Wells, Eden (DHHS); Toni Larocco tlarocco@gchd.us; Mona Hanna-Attisha; Travis, Rashmi (DHHS)
Cc: Colston, Leslie (DHHS); Krisztian, George (DEQ); Eisner, Jennifer (DHHS)
Subject: RE: Blood Testing Call

Hi all – wanted to send a quick update, and thanks for all the quick work on the Parent and Provider letters. We reviewed all of the edits, some conflicting, and had to make some choices for what to include or not. The edited documents are now on our program Sharepoint site:

www.miclppp.org/
On the blue navigation bar, go to Workgroups & Toolkits
Click on FLINT WORKGROUP
Click on Draft 2 documents – and look for the specific folder.

Jennifer Eisner from our Communications office is copied on this email, and is reviewing the materials now for approval.

Nancy

-----Original Appointment-----
From: Rockefeller, Cheryl (DHHS)
Sent: Monday, October 19, 2015 10:37 AM
To: Rockefeller, Cheryl (DHHS); Wells, Eden (DHHS); Peeler, Nancy (DHHS); Toni Larocco tlarocco@gchd.us; Mona Hanna-Attisha (MHanna1@hurleymc.com); Travis, Rashmi (DHHS)
Cc: Colston, Leslie (DHHS)
Subject: Blood Testing Call
When: Wednesday, October 21, 2015 9:00 AM-10:00 AM (UTC-05:00) Eastern Time (US

& Canada).
Where: PPI

CONFERENCE LINE:

PPI

Rashmi will be host for the call.

Cheryl Rockefeller, Executive Assistant
Dr. Eden Wells, Chief Medical Executive
Mikelle Robinson, Administrative Deputy Director and
Director, Bureau of Local Health and Administrative Services
Mark Miller, Director, Division of Local Health Services
Michigan Department of Health and Human Services
Lansing MI 48913
Telephone: (517) 335-8011
Fax: (517) 335-9032
Email: RockefellerC@michigan.gov

From: Wells, Eden (DHHS)
Sent: Thursday, October 22, 2015 9:40 AM
To: Houk, Emily (DHHS);Peeler, Nancy (DHHS);Travis, Rashmi (DHHS);Mhanna1@hurleymc.com;tlarocco@gchd.us;Lasher, Geralyn (DHHS)
Cc: Colston, Leslie (DHHS);Eisner, Jennifer (DHHS)
Subject: Re: URGENT:

A clarification – Geralyn will also provide the her input on the drafts that were set up on the letters last evening and I just center the updated testing protocol that Emily did. Thanks so things are moving!

Sent from my iPhone

On Oct 22, 2015, at 9:31 AM, Wells, Eden (DHHS) <WellsE3@michigan.gov> wrote:

> HI folks,
>
> On phone with Geralyn, our Communications-
>
> She feels the letters need a time component "The week of----, we will...". At least a loose time frame. SO providers and parents know that they should be approaching this now, not later.
>
> Also---
>
> TOni, how fast can you turn the provider letters/resources around and get them out on your listservs? To whom can MDHHS send (we think we would send to our Health Plans, etc) that would help GCHD ensure we hit all providers?
>
> Also, Does GCHD have a list of parents---How do we reach the parents of head starts, early starts, day cares, etc??? Will schools be sending out these letters too? We may be able to get lists from MDE....
>
> **From:** Houk, Emily (DHHS)
> **Sent:** Thursday, October 22, 2015 9:10 AM
> **To:** Peeler, Nancy (DHHS); Travis, Rashmi (DHHS); Wells, Eden (DHHS); Mhanna1@hurleymc.com;

tlarocco@gchd.us
Cc: Krisztian, George (DEQ); Colston, Leslie (DHHS); Eisner, Jennifer (DHHS)
Subject: New Flint workgroup documents on CLPPP Sharepoint

Good morning,

Several new documents have been added to the **Draft 2 Folder** in the Flint workgroup sharepoint.

Parent letter: DRAFT VERSION 3 of parent letter has been added to the folder. I apologize, but for now it is in the Draft 2 folder.

Testing Protocol. A new testing protocol document has also been added to the draft 2 folder for review.

If you have questions, please feel free to contact me.

Emily

Emily Houk, Communications Consultant
Michigan Department of Community Health
517-896-2712

From: Wells, Eden (DHHS)
Sent: Thursday, October 22, 2015 10:39 AM
To: Laura Carravallah
Cc: Mark Valacak;Kay Doerr
Subject: Re: Drafted Letter to Gastroenterologists (for input/approval)

This is great- thank you!!!

Sent from my iPhone

On Oct 22, 2015, at 10:35 AM, Laura Carravallah <Laura.Carravallah@hc.msu.edu> wrote:

> Dear Eden, Mark and Kay,
>
> I am attaching a draft letter from the medical society that will likely go out today and also my commentary relating to the conversations I have had with the liver services at Henry Ford and UM Ann Arbor.
>
> ---
>
> I think the letter is good. I would suggest adding a paragraph - see below.
>
> I was able to talk to a Dr. Segovia with Henry Ford hepatology (recommended by Dr. Kim Brown, Director of their Liver Transplant service), and also the nurse of Dr. Askari at UM, the Director of the Wilson Disease clinic there.
>
> Dr. Segovia did not have any specific suggestions - they just tell their patients to get their water tested and act accordingly. She was interested in what we find. Dr. Askari's nurse said they tell their patients to use either DISTILLED water (not bottled - for instance they said Dasani actually has rather high levels of copper) OR get a reverse osmosis system. I found some of these systems online and they ranged in price with some around $150 or so. I don't know which ones are good.
>
> Dr. Segovia said they may have 1-2 patients with Wilson Disease at the most. Dr. Askari's nurse thought there may be 10 or less in the clinic at UM (they ask them back for annual checks when stable). She said all of their patients get the above advice.
>
> I would propose that we add a paragraph that says:
>
> "The UM Wilson Disease clinic director, Dr. Askari, recommends that all Wilson Disease patients use either specifically distilled water (not all bottled water is

distilled), or a reverse osmosis system. We are hoping to get a reasonably accurate number of patients who may be affected so that we can get the information to them (through you, or through an outside referral clinic) and also see if it is possible to get funding for those who may have difficulty obtaining the necessary water or system, particularly during the next year when the water is still considered more corrosive than average. It is also important to note that copper pipes tend to be more common in newer homes, so the distribution of high concentrations of copper in water may be different than that for lead."

I am also going to send this information to Eden Wells at MDHHS at her request.

When I spoke to Dr. Marc Edwards on the phone, he did send a list of all the other metals for which he tested and none were over the action limit. As may have been mentioned earlier, he also said that there were no samples which had copper over the action limit, but that is not the appropriate limit for patients with copper storage disease. This problem is clearly much less widespread than the lead problem, but after being surprised once, I don't want for us to leave anything else out this time around.

Laura

Begin forwarded message:

From: Laura Carravallah <lcarrav1@yahoo.com>
Date: October 22, 2015 at 10:24:21 AM EDT
To: Laura Carravallah <laura.carravallah@hc.msu.edu>
Subject: Fwd: Drafted Letter to Gastroenterologists (for input/approval)

Begin forwarded message:

From: Sherry Smith <ssmith@gcms.org>
Date: October 21, 2015 at 2:02:10 PM EDT
To: "Laura Carravallah M.D." <lcarrav1@yahoo.com>, "Gerald Natzke, Jr., D.O." <GDN2@aol.com>, "Deborah Duncan, M.D." <drdebd@fentonmedical.com>
Cc: Pete Levine <plevine@gcms.org>
Subject: Drafted Letter to Gastroenterologists (for input/approval)

Good afternoon!

At the request of Peter Levine, please find a draft letter attached for your review.

After you have taken a moment to review this letter, please respond with your comments regarding additions/edits, or with your approval.

Thank you in advance for your attention and response.

Respectfully,

Sherry Smith

Executive Secretary

4438 Oak Bridge Drive, Suite B
Flint, MI 48532
Phone: (810) 733-9923
Fax: (810) 230-3737
Please note: GCMS is *closed every Friday*.

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<DRAFT - 2015_10_20 - Letter to GCMS Gastroenterologists re. Copper in Flint Water.pdf>

From: Wells, Eden (DHHS)
Sent: Thursday, October 22, 2015 7:52 PM
To: Gray, Jennifer (DHHS)
Cc: Dykema, Linda D. (DHHS);Groetsch, Kory J. (DHHS)
Subject: Re: DRAFT DELIBERATIVE; NOT SUBJECT TO FOIA - drinking water lead level

Thanks much!!

Sent from my iPhone

On Oct 22, 2015, at 6:21 PM, Gray, Jennifer (DHHS) <GrayJ@michigan.gov> wrote:

> Linda and Eden,
>
> Here is the document describing the recommendations for lead levels in school and daycare drinking water.
>
> Jennifer
>
> Jennifer Gray, Ph.D.
> Toxicologist
> Toxicology and Response Section
> Division of Environmental Health
> Michigan Department of Health and Human Services
> 201 Townsend St, 4th Floor
> Lansing, MI 48913
> Phone: (517) 373-7672
> Email: grayj@michigan.gov
>
> ---
>
> **From:** Dykema, Linda D. (DHHS)
> **Sent:** Monday, October 19, 2015 11:48:31 AM
> **To:** Wells, Eden (DHHS); Moran, Susan (DHHS)
> **Cc:** Groetsch, Kory J. (DHHS); Gray, Jennifer (DHHS); Priem, Wesley F. (DHHS); Miller, Corinne (DHHS); Miller, Mark (DHHS); Robinson, Mikelle (DHHS)
> **Subject:** FW: DRAFT DELIBERATIVE; NOT SUBJECT TO FOIA - drinking water lead level
>
> Eden and Sue,
>
> The attached provides the draft justification for screening values to be used to evaluate the results of drinking water sampling efforts at Flint schools.
>
> HHS Division of Environmental Health toxicologist Jennifer Gray conducted the modeling and drafted the justification along with Toxicology and Response Section manager Kory Groetsch. They met with a select group of DEQ toxicologists, incorporated their comments and

suggestions, the obtained concurrence on the appropriateness of the inputs and the conclusions. DEQ Dept. Dir. Jim Sygo has also been provided with the draft justification.

A risk management decision is now needed and there are 2 options: a single screening value of 2 ppb that would apply to all schools including daycares and elementary schools OR a 2-tier approach in which 2 ppb would apply only where children 0-12 months are present, but a higher concentration of 11 ppb would be used to protect children up to 7 years.

Linda

<draft deliberative TSG Subcommittee drinking water lead levels 10-16-2015.pdf>

From: Wells, Eden (DHHS)
Sent: Friday, October 23, 2015 8:26 AM
To: Dykema, Linda D. (DHHS)
Subject: Re: briefing for Nick

See you in flint

Sent from my iPhone

On Oct 23, 2015, at 8:15 AM, Dykema, Linda D. (DHHS) <DykemaL@michigan.gov> wrote:

> What time do you plan to compile briefing items each day? I'm heading to Flint this morning for the weekly meeting re testing of water in Flint schools, which will include a tour of the water treatment facility. Please let me know what time you need an update. Thanks
>
> *Linda D. Dykema, Ph.D.*
> Environmental Public Health Director
> Division of Environmental Health
> Michigan Department of Health & Human Services
> 517.335.8566
> dykemal@michigan.gov

From: Moran, Susan (DHHS)
Sent: Friday, October 23, 2015 6:09 AM
To: Dykema, Linda D. (DHHS); Eisner, Jennifer (DHHS); Hertel, Elizabeth (DHHS); Lasher, Geralyn (DHHS); Miller, Mark (DHHS); Peeler, Nancy (DHHS); Robinson, Mikelle (DHHS); Schoenow, Kris (DHHS); Thompson, Sheryl D. (DHHS); Travis, Rashmi (DHHS); Wells, Eden (DHHS); Grijalva, Nancy (DHHS)
Cc: Anderson, Paula (DHHS); Rockefeller, Cheryl (DHHS)
Subject: RE: briefing for Nick

This is final version based on group's edits. Please use this version as discussion guide for today's 12:30 call (I will be off site, unable to join call).

From: Moran, Susan (DHHS)
Sent: Thursday, October 22, 2015 2:19 PM
To: Dykema, Linda D. (DHHS); Eisner, Jennifer (DHHS); Hertel, Elizabeth (DHHS); Lasher, Geralyn (DHHS); Miller, Mark (DHHS); Peeler, Nancy (DHHS); Robinson, Mikelle (DHHS); Schoenow, Kris (DHHS); Thompson, Sheryl D. (DHHS); Travis, Rashmi (DHHS); Wells, Eden (DHHS)
Cc: Anderson, Paula (DHHS); Rockefeller, Cheryl (DHHS)
Subject: briefing for Nick
Importance: High

Hello all- Nick has asked for a daily briefing summarizing MDHHS actions in response to Flint water situation, please see attached draft. NEED COMMENTS BY 5PM TODAY.

Susan Moran MPH, Senior Deputy Director
Population Health and Community Services Administration

Capitol View Building
201 Townsend St 6th Floor
Lansing, MI
48913
Phone: 517 335 8024
Fax: 517 335 9032
morans@michigan.gov

From: Wells, Eden (DHHS)
Sent: Friday, October 23, 2015 9:02 AM
To: Peeler, Nancy (DHHS)
Subject: Re: another question- re: leadcare machiens

Thanks- I do recall this- and much appreciated!
E

Sent from my iPhone

> On Oct 23, 2015, at 8:52 AM, Peeler, Nancy (DHHS) <PeelerN@michigan.gov> wrote:
>
> Hi Eden - at one point in the discussions about Flint, someone had asked a question about Leadcare machines - Bob and Karen (our nurse) found this information, but since that discussion seemed to disappear, I'm not sure if it is still helpful to forward it on to you. Sharing now just in case.
>
> Nancy
>
> -----Original Message-----
> From: Scott, Robert L. (DHHS)
> Sent: Tuesday, October 13, 2015 1:03 PM
> To: Peeler, Nancy (DHHS)
> Cc: Lishinski, Karen (DHHS)
> Subject: RE: another question- re: leadcare machiens
>
> One more time, without the troublesome extension.
>
> -----Original Message-----
> From: Scott, Robert L. (DHHS)
> Sent: Tuesday, October 13, 2015 12:53 PM
> To: Peeler, Nancy (DHHS) <PeelerN@michigan.gov>
> Subject: RE: another question- re: leadcare machiens
>
> Not my area of expertise, so I'm sending as is, hope it's helpful.
>
> Here is the URL for the same document:
> http://www.leadcare2.com/getmedia/dba92d69-a213-45ed-9699-771f899c5920/70-6869-Package-Insert,-LeadCare-II-v1-05-Rev-03.pdf.aspx
>
>
> -----Original Message-----
> From: Peeler, Nancy (DHHS)
> Sent: Tuesday, October 13, 2015 12:38 PM
> To: Scott, Robert L. (DHHS) <ScottR9@michigan.gov>
> Subject: Re: another question- re: leadcare machiens
>
> Thanks! I think Sandip from the lab is also looking for this info.
>
> Sent from my iPad

>
>> On Oct 13, 2015, at 12:36 PM, Scott, Robert L. (DHHS) <ScottR9@michigan.gov> wrote:
>>
>> That's a great question, but I don't know. Will look on Magellan website to see if I can find something.
>>
>> -----Original Message-----
>> From: Peeler, Nancy (DHHS)
>> Sent: Tuesday, October 13, 2015 12:35 PM
>> To: Lishinski, Karen (DHHS) <LishinskiK@michigan.gov>; Scott, Robert L. (DHHS) <ScottR9@michigan.gov>
>> Subject: another question- re: leadcare machiens
>>
>> What is the +/- confidence range on capillary tests run on a lead care machine (detection limit is 3.3)?
>>
>> Sent from my iPad
> <70-6869-Package-Insert,-LeadCare-II-v1-05-Rev-03.pdf>

From: Wells, Eden (DHHS)
Sent: Friday, October 23, 2015 4:08 PM
To: LaRocco, Toni;Valacak, Mark;Peeler, Nancy (DHHS);Lishinski, Karen (DHHS);Travis, Rashmi (DHHS)
Subject: STAT:,Review and Approve or edit UPDATED Letters and Press Release
Attachments: GCHD MDHHS Letters PR DRAFT 4.docx; ATT00001.htm; Parent Letter_Draft 6 _October 22.docx; ATT00002.htm; Provider letter_DRAFT3_edited.docx; ATT00003.htm

Please let me know ASSp as we aligned the language of FAQ and press release and parents letter

Sent from my iPhone

Begin forwarded message:

From: "Minicuci, Angela (DHHS)" <MinicuciA@michigan.gov>
Date: October 23, 2015 at 4:05:26 PM EDT
To: "Wells, Eden (DHHS)" <WellsE3@michigan.gov>
Cc: "Lasher, Geralyn (DHHS)" <lasherg@michigan.gov>, "Eisner, Jennifer (DHHS)" <EisnerJ@michigan.gov>
Subject: RE: UPDATED Letters and Press Release

RESENDING -

Hi Eden,

As we discussed, attached is the current draft of the letters (provider and UPDATED parent), and the updated press release, to reflect the changes to the parent letter. Please circulate this with those on the 3pm call.

Thank you,

Angela Minicuci
Office of External Relations and Communications
Michigan Department of Health and Human Services
Office: (517) 241-2112
Mobile: PPI
minicuciA@michigan.gov
www.michigan.gov/mdhhs

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<GCHD MDHHS Letters PR DRAFT 4.docx>

<Parent Letter_Draft 6_October 22.docx>

<Provider letter_DRAFT3_edited.docx>

FOR IMMEDIATE RELEASE – DRAFT
GCHD CONTACT:
MDHHS CONTACT: Jennifer Eisner, (517) 241-2112, EisnerJ@michigan.gov

GCHD and MDHHS Partner to Issue Guidance to Flint Parents, Providers

FLINT, Mich. – In a joint effort to continue education within the community around lead exposure, the Genesee County Health Department (GCHD) and Michigan Department of Health and Human Services (MDHHS) today issued letters to parents and the provider community in Flint to assist in providing guidance to support families.

In response to the elevated blood lead levels found in some Flint children, GCHD and MDHHS have worked together closely to develop guidance for families and providers.

GCHD QUOTE

Parents are being provided information regarding lead testing, how to reduce lead exposure for your family, where lead comes from, and community and state resources for more information. Children can be exposed to lead from drinking water in lead pipes, old lead paint, soil, pottery, cosmetics and toys and some home remedies. Adult jobs and hobbies, like auto repair, stained glass and jewelry making, and ammunitions handling can also put children at risk if they touch clothing or play in areas where lead is found.

"As we continue to find ways to educate and guide the Flint community towards reducing lead exposures, we are appreciate of the collaboration with Genesee County Health Department," said Dr. Eden Wells, Chief Medical Executive with MDHHS. "Parents and providers can take a number of steps to help reduce exposure, identify signs of lead poisoning, and begin follow up care as needed. Working together we can all help to protect the health of families in Flint."

Primary care providers can assist in helping to ensure that children and families exposed to lead receive the care and resources they need to manage the potential health impacts of lead poisoning. MDHHS and GCHD worked with Dr. Mona Hanna-Attisha of the Hurley Medical Center to develop testing protocols and guidance regarding identification of lead poisoning, management of elevated blood lead levels, follow-up care, and community and state resources.

GCHD and MDHHS issued the following recommendations for parents:

- Families who live in the City of Flint and are on the Flint water system or who attend school, childcare, or spend time with a caregiver in the City of Flint, are encouraged to get their children tested for lead poisoning at their doctor's office or GCHD.
- Families can get their water tested for lead for free. Call 810-787-6537 for details about how.
- Families are encouraged to use a water filter in their home, and free filters are still available. Call 2-1-1 for information about where to pick up a free filter.
- Use filtered tap water for drinking (including making coffee, drink mixes, juice, baby formula), and cooking (even if you boil the water, the lead will stay in the water and food). Always use cold water when cooking.
- You can use unfiltered tap water for washing your hands, and washing dishes. If using unfiltered water, run the water for at least five minutes before you use it.
- Safe cleaning can also reduce the risk of lead exposure in the home. You can use unfiltered tap water for the following wiping down countertops, mopping floors, and washing clothes.

- Keep children away from lead paint and dust; use wet paper towels to clean up lead dust around windows, play areas and floors; and wash hands and toys often, using soap and water
- Lastly, always wash fruits with filtered water. Some foods help keep lead from being stored in the child's body, such as Calcium rich foods, Iron rich foods, and foods with Vitamin C.

GCHD and MDHHS will continue to provide more information to the community regarding reducing lead exposure and protecting the health of Flint residents. For more information, visit www.michigan.gov/lead.

# # #

This Document is a Non-Responsive Attachment.

October 22, 2015

Dear Parent,

To help make sure the children of Flint are safe from lead exposure, the Genesee County Health Department and the Michigan Department of Health and Human Services want to help you understand:

- Where does lead come from?
- What can I do to protect my family?
- Should I get my child tested for lead?
- Where can I find more information about lead?

Where does lead come from?

Lead is a serious health hazard, especially for small children who become lead poisoned when they eat, drink or breathe lead. Elevated levels of lead have been found in the drinking water from lead pipes in the City of Flint. Kids can also be exposed to lead from old lead paint, soil, pottery, cosmetics and toys and some home remedies. Adult jobs and hobbies, like auto repair, stained glass, jewelry making and ammunitions handling can also put children at risk if they touch clothing or play in areas where lead is found.

Should my child get a blood lead test?

Children who live in the City of Flint, live in a home using City of Flint water, or who attend school, childcare or often spend time with a caregiver in the City of Flint should be tested for lead poisoning. *This should be done as soon as possible.*

Where should I go to get a blood lead test for my child?

The best place to get your child's blood lead test is your doctor's office. Your pediatrician will follow up with you on lab tests and provide you with information on what to do next. You can also have a lead test at the Genesee County Health Department. If you need transportation, contact 2-1-1 for help.

Understanding your child's lead test result.

A lead level below 5 means there is little or no lead in your child's blood. Use the tips below to help keep your child safe. Your doctor may suggest retesting your child within the next 12 months to make sure the level does not go up.

A lead level of 5-14 means that your child has had some exposure to lead. Work with your doctor and local health department for further guidance on how to limit your lead exposure. Your doctor may retest your child in 1-3 months to make sure the level does not go up.

Children with very high levels of lead **(over 40)** may require treatment at the hospital.

What Can I Do to Keep My Family Safe?
The following steps should be taken right away to help protect you and your child.

Protecting your family from lead in the water:

- Get your water tested for lead. It's free. Call 810-787-6537 to learn more.
- Use a water filter in your home. Call 2-1-1 for information on free water filters.
- If you do not have a water filter, use bottled water for drinking and mixing formula.
- Use filtered tap water for drinking (including making coffee, drink mixes, juice, baby formula), and cooking (even if you boil the water, the lead will stay in the water and food). Always use cold water when cooking.
- You can use unfiltered tap water for washing your hands, and washing dishes. If using unfiltered water, run the water for at least five minutes before you use it.

Safe cleaning:

Safe Cleaning is important. Keeping your home clean and safe from lead hazards will help to protect your family.

- You can use unfiltered tap water for the following wiping down countertops, mopping floors, and washing clothes.
- Keep children away from lead paint and dust.
- Use wet paper towels to clean up lead dust. Be sure to clean around windows, play areas and floors.
- Wash hands and toys often, using soap and water.

Good nutrition:
Some foods will help keep lead from being stored in a child's body. These are foods with a lot of calcium, iron and vitamin C. These foods include:

Calcium Rich Foods	Iron Rich Foods	Foods with Vitamin C

- Milk
- Cheese
- Yogurt
- Tofu
- Spinach
- Beans
- Lean meats like fish and chicken
- Whole grain cereals
- Peanut butter
- Oranges
- Orange juice
- Grapefruits
- Tomatoes
- Green peppers

Always wash your fruits with filtered water. If you are concerned about your child's diet, talk with your pediatrician who may also recommend a daily multivitamin.

WIC and SNAP provide assistance to parents and children who need fresh and healthy foods. Contact the **Genesee County WIC office at (810) 237-4537** to learn more. SNAP also offers a Double Bucks program to purchase even more healthy food for no additional costs.

Where can I get more information on lead?

- Genesee County Health Department Lead Program
  (810) 287-3833
- Michigan Department of Health and Human Services Childhood Lead Poisoning Prevention Program
  (888) 322-4453
  www.michigan.gov/lead
- United States Environmental Protection Agency
  www.epa.gov/lead
- U.S. Centers for Disease Control and Prevention (CDC) Web site
  www.cdc.gov/nceh/lead

This Document is a Non-Responsive Attachment.

PROVIDER DRAFT LETTER V.2
October 22, 2015
LoRocco Edits,Travis Edits,Attisha Edits, Peeler Edits
Cross checked with parent letter

Dear Provider:

As you may be aware from recent news reports, elevated levels of lead have been found in the City of Flint's water system.

To help protect the children of Flint from the current lead in water exposure, the Genesee County Health Department and Michigan Department of Health and Human Services are contacting you to assist you in providing guidance to support your families.

Children can be exposed to lead from drinking water in lead pipes, old lead paint, soil, pottery, cosmetics and toys and some home remedies. Adult jobs and hobbies, like auto repair, stained glass and jewelry making, and ammunitions handling can also put children at risk if they touch clothing or play in areas where lead is found.

As a primary care provider, you play a critical role in helping to ensure that children and families exposed to lead receive the care and reassurances they need to manage the potential health impacts of lead poisoning.

Identification. Children suffering from lead poisoning often fail to present outward symptoms. However, early clinical symptoms can include anemia, anorexia, abdominal pain and constipation. Lead is a neuro-toxin, and exposure can result in violent and aggressive behaviors, lead to learning disorders, may cause Attention Deficit Hyperactivity Disorder (ADHD) and has been known to reduce IQ by as many as 5-8 points with levels as low as 10 ug/dL. Lead is metabolized through the gastrointestinal system similar to iron and calcium, with uptake rates depending on the size and weight of the child. The blood half-life of lead is short (approximately 1 month) but the bone half-life can extend into decades.

Due to multiple risk factors facing many residents in the City of Flint (including aging housing conditions and water quality), we recommend that all children under age 6 living in the City of Flint or living in homes that use Flint water, attending school or childcare in Flint, or who spend time with a caregiver in the City of Flint, receive a blood lead test. Blood lead testing should be done through a child's primary care doctor to ensure adequate short-term and long-term follow-up. ***Families should be encouraged to have their children tested immediately either at their doctor's office or the Genesee County Health Department***.

PROVIDER DRAFT LETTER V.2
October 22, 2015
LoRocco Edits,Travis Edits,Attisha Edits, Peeler Edits
Cross checked with parent letter

Management of Blood Lead Levels. The following guidance is provided for management of childhood blood lead levels:

- **BLL < 5 ug/dL**
  - A lead level of less than 5 mcg/dL is not typically cause for concern.
  - Provide education and anticipatory guidance to ensure that lead levels do not rise.
  - Consider retesting in 12 months based on risk factors or concerns.
- **BLL >5 ug/dL**
  - **Children with capillary results of 5 ug/dL and higher must have a confirmatory venous blood draw.**
  - Families should receive anticipatory guidance, nutrition counseling, instruction on safe cleaning techniques and appropriate follow-up care from their primary care provider.
  - In-home services including case management and environmental investigations are available for all children with lead levels greater than 5 ug/dL. Refer patients to the Genesee County Health Department for this service.
  - Children with confirmed venous testing results greater than 5ug/dL within the past 18 months must be retested based on Medicaid policy and AAP guidelines. (See attached "Provider Quick Reference). If a child has not been retested within these timeframes, retesting is recommended as soon as possible.
- **BLL > 44 ug/dL.**
  - **Children with capillary results of 5 ug/dL and higher must have a confirmatory venous blood draw.**
  - Lead levels over 44 ug/dL may require hospitalization. Consult with an expert at the Children's Hospital of Michigan in Detroit for additional guidance.
  - Families should receive anticipatory guidance, nutrition counseling, instruction on safe cleaning techniques and appropriate follow-up care from their primary care provider.
  - In-home services including case management and environmental investigations are available for all children with lead levels greater than 5 ug/dL. Refer patients to the Genesee County Health Department for this service.
  - Children with confirmed venous testing results greater than 5ug/dL within the past 18 months must be retested based on Medicaid policy and AAP guidelines. (See attached "Provider Quick Reference). If a child has not been retested within these timeframes, retesting is recommended as soon as possible.

Reminder: All children covered by Medicaid must be tested at age 1 and 2.

PROVIDER DRAFT LETTER V.2
October 22, 2015
LoRocco Edits,Travis Edits,Attisha Edits, Peeler Edits
Cross checked with parent letter

Follow-up Care. As providers, there are steps you can take to help support your families:

1. Continue to educate families regarding lead risks and preventative steps that they can take to minimize their risks.
2. Encourage your families to use filtered water for drinking, mixing formula and washing dishes. Families can contact 2-1-1 for information on free water filters.
3. Healthy nutrition is critical for lead-exposed children. Make sure your patients are consuming balanced diets high in iron, calcium and Vitamin C. If you have concerns about their nutrition, consider recommending a multivitamin with iron. WIC and SNAP provide assistance to parents and children who need fresh and healthy foods. Contact the Genesee County WIC office at (810) 237-4537 to learn more. In addition, SNAP offers a Double Bucks program that can provide healthy foods for less.
4. Breastfeeding is highly protective and encouraged. However, if the mother's blood lead level rises above 40ug/dL or her level is greater than 20 ug/dL and the baby has a level above 5 ug/dL breastfeeding is not recommended.
5. Because lead is a neuro-toxin, children with lead poisoning need longitudinal follow-up and may require developmental and behavioral health intervention services. Continue monitoring your patients' development at every visit.
6. Consider additional wrap-around and support services that will benefit your patients such as early childhood home visiting programs, early head start and head start. Call 2-1-1 for more information.

Local Resources. Several local resources are available to you and your patients:

- Blood Testing. Patients are encouraged to contact their primary care provider for testing. The Genesee County Health Department also administers lead tests. Patients in need of transportation should contact 2-1-1 for assistance.
- Water Testing. Water testing is free through the City of Flint Water Testing Plant. Patients can call 810-787-6537 to learn more.
- WIC and SNAP provide assistance to parents and children who need fresh and healthy foods. Contact the Genesee County WIC office at (810) 237-4537 to learn more.
- Child Development. If you have concerns about a child's growth, development or learning contact 2-1-1 for a Home Visiting Program in your area.

Websites and contact information.

- Genesee County Health Department Lead Program
  (810) 287-3833

- Michigan Department of Health and Human Services Childhood Lead Poisoning Prevention Program
  (888) 322-4453

- Michigan Department of Health and Human Services Lead Poisoning Prevention Video for Primary Care Providers on Youtube at /www.youtube.com/watch?v=AnkjCW_yGaU&feature=youtu.be.

PROVIDER DRAFT LETTER V.2
October 22, 2015
LoRocco Edits,Travis Edits,Attisha Edits, Peeler Edits
Cross checked with parent letter

- www.michigan.gov/lead
  United States Environmental Protection Agency
  www.epa.gov/lead

- U.S. Centers for Disease Control and Prevention (CDC) Web site
  www.cdc.gov/nceh/lead

This Document is a Non-Responsive Attachment.

From: Wells, Eden (DHHS)
Sent: Friday, October 23, 2015 4:27 PM
To: Peeler, Nancy (DHHS)
Cc: Lasher, Geralyn (DHHS);Lishinski, Karen (DHHS);LaRocco, Toni;Moran, Susan (DHHS);Emily Houk R2P (emily@r2pconsultants.com)
Subject: Re: Time sensitive!!!!Number of pages that need to be printed for parental letter

Cool! Thanks! And some can be printed front and back to decrease page count, Geralyn-numbers 1 and 2

Sent from my iPhone

> On Oct 23, 2015, at 4:14 PM, Peeler, Nancy (DHHS) <PeelerN@michigan.gov> wrote:
>
> I believe there were 3 attachments for the Parent letter, total of 6 pages for the attachments.
>
> 1. Parent handout - is Your Child Safe from Lead Poisoning? (2
> pages)
> http://www.michigan.gov/documents/deq/Parent_Handout_Sept2015_501830_7
> .pdf 2. Lead in Flint Water - Frequently Asked Questions (2 pages)
> http://www.michigan.gov/documents/deq/deq-2015-10-14_-_Lead_-_Flint_Wa
> ter_Fact_Sheet_02_503394_7.pdf 3. The third was created by request of
> the group - 2 pages from an EPA document about Nutrition. Emily Houk did that work, and I don't have the final version. Emily, can you please send the Nutrition 2-pager?
>
> Nancy
>
>
> -----Original Message-----
> From: Lasher, Geralyn (DHHS)
> Sent: Friday, October 23, 2015 3:27 PM
> To: Wells, Eden (DHHS); Lishinski, Karen (DHHS); Peeler, Nancy (DHHS);
> LaRocco, Toni
> Cc: Moran, Susan (DHHS)
> Subject: RE: Time sensitive!!!!Number of pages that need to be printed
> for parental letter
>
> And if you can itemize what the materials are please.
>
> -----Original Message-----
> From: Wells, Eden (DHHS)
> Sent: Friday, October 23, 2015 3:26 PM
> To: Lishinski, Karen (DHHS) <LishinskiK@michigan.gov>; Peeler, Nancy
> (DHHS) <PeelerN@michigan.gov>; LaRocco, Toni <tlarocco@gchd.us>
> Cc: Lasher, Geralyn (DHHS) <lasherg@michigan.gov>; Moran, Susan (DHHS)
> <MoranS@michigan.gov>
> Subject: Time sensitive!!!!Number of pages that need to be printed for
> parental letter
>

> Need exact number of pages of resources that will be attached to the
> parents letter (which itself is one page)
>
> Sent from my iPhone

From: Wells, Eden (DHHS)
Sent: Friday, October 23, 2015 4:28 PM
To: Travis, Rashmi (DHHS)
Subject: Fwd: Time sensitive!!!!Number of pages that need to be printed for parental letter

Nancy got it to us, thanks!!!

Eden V. Wells, MD, MPH, FACPM
MDHHS
Sent from my iPad

Begin forwarded message:

> **From:** "Peeler, Nancy (DHHS)" <PeelerN@michigan.gov>
> **Date:** October 23, 2015 at 4:14:03 PM EDT
> **To:** "Lasher, Geralyn (DHHS)" <lasherg@michigan.gov>, "Wells, Eden (DHHS)" <WellsE3@michigan.gov>, "Lishinski, Karen (DHHS)" <LishinskiK@michigan.gov>, "LaRocco, Toni" <tlarocco@gchd.us>
> **Cc:** "Moran, Susan (DHHS)" <MoranS@michigan.gov>, "Emily Houk R2P (emily@r2pconsultants.com)" <emily@r2pconsultants.com>
> **Subject: RE: Time sensitive!!!!Number of pages that need to be printed for parental letter**
>
> I believe there were 3 attachments for the Parent letter, total of 6 pages for the attachments.
>
> 1. Parent handout - is Your Child Safe from Lead Poisoning? (2 pages) http://www.michigan.gov/documents/deq/Parent_Handout_Sept2015_501830_7.pdf
> 2. Lead in Flint Water - Frequently Asked Questions (2 pages) http://www.michigan.gov/documents/deq/deq-2015-10-14_-_Lead_-_Flint_Water_Fact_Sheet_02_503394_7.pdf
> 3. The third was created by request of the group - 2 pages from an EPA document about Nutrition. Emily Houk did that work, and I don't have the final version. Emily, can you please send the Nutrition 2-pager?
>
> Nancy
>
> -----Original Message-----
> From: Lasher, Geralyn (DHHS)
> Sent: Friday, October 23, 2015 3:27 PM
> To: Wells, Eden (DHHS); Lishinski, Karen (DHHS); Peeler, Nancy (DHHS); LaRocco, Toni
> Cc: Moran, Susan (DHHS)
> Subject: RE: Time sensitive!!!!Number of pages that need to be printed for parental letter
>
> And if you can itemize what the materials are please.
>
> -----Original Message-----
> From: Wells, Eden (DHHS)

Sent: Friday, October 23, 2015 3:26 PM
To: Lishinski, Karen (DHHS) <LishinskiK@michigan.gov>; Peeler, Nancy (DHHS) <PeelerN@michigan.gov>; LaRocco, Toni <tlarocco@gchd.us>
Cc: Lasher, Geralyn (DHHS) <lasherg@michigan.gov>; Moran, Susan (DHHS) <MoranS@michigan.gov>
Subject: Time sensitive!!!!Number of pages that need to be printed for parental letter

Need exact number of pages of resources that will be attached to the parents letter (which itself is one page)

Sent from my iPhone

From: Wells, Eden (DHHS)
Sent: Friday, October 23, 2015 4:33 PM
To: hmcshane@gchd.us
Subject: Fwd: STAT:,Review and Approve or edit UPDATED Letters and Press Release
Attachments: GCHD MDHHS Letters PR DRAFT 4.docx; ATT00001.htm; Parent Letter_Draft 6 _October 22.docx; ATT00002.htm; Provider letter_DRAFT3_edited.docx; ATT00003.htm

FI--
E

Eden V. Wells, MD, MPH, FACPM
MDHHS
Sent from my iPad

Begin forwarded message:

> **From:** "Wells, Eden (DHHS)" <WellsE3@michigan.gov>
> **Date:** October 23, 2015 at 4:08:16 PM EDT
> **To:** "LaRocco, Toni" <tlarocco@gchd.us>, "Valacak, Mark" <MVALACAK@gchd.us>, "Peeler, Nancy (DHHS)" <PeelerN@michigan.gov>, "Lishinski, Karen (DHHS)" <LishinskiK@michigan.gov>, "Travis, Rashmi (DHHS)" <TravisR@michigan.gov>
> **Subject: STAT:,Review and Approve or edit UPDATED Letters and Press Release**
>
> Please let me know ASSp as we aligned the language of FAQ and press release and parents letter
>
> Sent from my iPhone
>
> Begin forwarded message:
>
> > **From:** "Minicuci, Angela (DHHS)" <MinicuciA@michigan.gov>
> > **Date:** October 23, 2015 at 4:05:26 PM EDT
> > **To:** "Wells, Eden (DHHS)" <WellsE3@michigan.gov>
> > **Cc:** "Lasher, Geralyn (DHHS)" <lasherg@michigan.gov>, "Eisner, Jennifer (DHHS)" <EisnerJ@michigan.gov>
> > **Subject: RE: UPDATED Letters and Press Release**
> >
> > RESENDING -
> >
> > Hi Eden,
> >
> > As we discussed, attached is the current draft of the letters (provider and UPDATED parent), and the updated press release, to reflect the changes to the parent letter. Please circulate this with those on the 3pm call.
> >
> > Thank you,
> >
> > **Angela Minicuci**
> > Office of External Relations and Communications

Michigan Department of Health and Human Services
Office: (517) 241-2112
Mobile: PPI
minicucia@michigan.gov
www.michigan.gov/mdhhs

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<GCHD MDHHS Letters PR DRAFT 4.docx>

<Parent Letter_Draft 6_October 22.docx>

<Provider letter_DRAFT3_edited.docx>

FOR IMMEDIATE RELEASE – DRAFT
GCHD CONTACT:
MDHHS CONTACT: Jennifer Eisner, (517) 241-2112, EisnerJ@michigan.gov

GCHD and MDHHS Partner to Issue Guidance to Flint Parents, Providers

FLINT, Mich. – In a joint effort to continue education within the community around lead exposure, the Genesee County Health Department (GCHD) and Michigan Department of Health and Human Services (MDHHS) today issued letters to parents and the provider community in Flint to assist in providing guidance to support families.

In response to the elevated blood lead levels found in some Flint children, GCHD and MDHHS have worked together closely to develop guidance for families and providers.

GCHD QUOTE

Parents are being provided information regarding lead testing, how to reduce lead exposure for your family, where lead comes from, and community and state resources for more information. Children can be exposed to lead from drinking water in lead pipes, old lead paint, soil, pottery, cosmetics and toys and some home remedies. Adult jobs and hobbies, like auto repair, stained glass and jewelry making, and ammunitions handling can also put children at risk if they touch clothing or play in areas where lead is found.

"As we continue to find ways to educate and guide the Flint community towards reducing lead exposures, we are appreciate of the collaboration with Genesee County Health Department," said Dr. Eden Wells, Chief Medical Executive with MDHHS. "Parents and providers can take a number of steps to help reduce exposure, identify signs of lead poisoning, and begin follow up care as needed. Working together we can all help to protect the health of families in Flint."

Primary care providers can assist in helping to ensure that children and families exposed to lead receive the care and resources they need to manage the potential health impacts of lead poisoning. MDHHS and GCHD worked with Dr. Mona Hanna-Attisha of the Hurley Medical Center to develop testing protocols and guidance regarding identification of lead poisoning, management of elevated blood lead levels, follow-up care, and community and state resources.

GCHD and MDHHS issued the following recommendations for parents:

- Families who live in the City of Flint and are on the Flint water system or who attend school, childcare, or spend time with a caregiver in the City of Flint, are encouraged to get their children tested for lead poisoning at their doctor's office or GCHD.
- Families can get their water tested for lead for free. Call 810-787-6537 for details about how.
- Families are encouraged to use a water filter in their home, and free filters are still available. Call 2-1-1 for information about where to pick up a free filter.
- Use filtered tap water for drinking (including making coffee, drink mixes, juice, baby formula), and cooking (even if you boil the water, the lead will stay in the water and food). Always use cold water when cooking.
- You can use unfiltered tap water for washing your hands, and washing dishes. If using unfiltered water, run the water for at least five minutes before you use it.
- Safe cleaning can also reduce the risk of lead exposure in the home. You can use unfiltered tap water for the following wiping down countertops, mopping floors, and washing clothes.

- Keep children away from lead paint and dust; use wet paper towels to clean up lead dust around windows, play areas and floors; and wash hands and toys often, using soap and water
- Lastly, always wash fruits with filtered water. Some foods help keep lead from being stored in the child's body, such as Calcium rich foods, Iron rich foods, and foods with Vitamin C.

GCHD and MDHHS will continue to provide more information to the community regarding reducing lead exposure and protecting the health of Flint residents. For more information, visit www.michigan.gov/lead.

# # #

This Document is a Non-Responsive Attachment.

October 22, 2015

Dear Parent,

To help make sure the children of Flint are safe from lead exposure, the Genesee County Health Department and the Michigan Department of Health and Human Services want to help you understand:

- Where does lead come from?
- What can I do to protect my family?
- Should I get my child tested for lead?
- Where can I find more information about lead?

Where does lead come from?

Lead is a serious health hazard, especially for small children who become lead poisoned when they eat, drink or breathe lead. Elevated levels of lead have been found in the drinking water from lead pipes in the City of Flint. Kids can also be exposed to lead from old lead paint, soil, pottery, cosmetics and toys and some home remedies. Adult jobs and hobbies, like auto repair, stained glass, jewelry making and ammunitions handling can also put children at risk if they touch clothing or play in areas where lead is found.

Should my child get a blood lead test?

Children who live in the City of Flint, live in a home using City of Flint water, or who attend school, childcare or often spend time with a caregiver in the City of Flint should be tested for lead poisoning. *This should be done as soon as possible.*

Where should I go to get a blood lead test for my child?

The best place to get your child's blood lead test is your doctor's office. Your pediatrician will follow up with you on lab tests and provide you with information on what to do next. You can also have a lead test at the Genesee County Health Department. If you need transportation, contact 2-1-1 for help.

Understanding your child's lead test result.

A lead level below 5 means there is little or no lead in your child's blood. Use the tips below to help keep your child safe. Your doctor may suggest retesting your child within the next 12 months to make sure the level does not go up.

A lead level of 5-14 means that your child has had some exposure to lead. Work with your doctor and local health department for further guidance on how to limit your lead exposure. Your doctor may retest your child in 1-3 months to make sure the level does not go up.

Children with very high levels of lead **(over 40)** may require treatment at the hospital.

What Can I Do to Keep My Family Safe?

The following steps should be taken right away to help protect you and your child.

Protecting your family from lead in the water:

- Get your water tested for lead. It's free. Call 810-787-6537 to learn more.
- Use a water filter in your home. Call 2-1-1 for information on free water filters.
- If you do not have a water filter, use bottled water for drinking and mixing formula.
- Use filtered tap water for drinking (including making coffee, drink mixes, juice, baby formula), and cooking (even if you boil the water, the lead will stay in the water and food). Always use cold water when cooking.
- You can use unfiltered tap water for washing your hands, and washing dishes. If using unfiltered water, run the water for at least five minutes before you use it.

Safe cleaning:

Safe Cleaning is important. Keeping your home clean and safe from lead hazards will help to protect your family.

- You can use unfiltered tap water for the following wiping down countertops, mopping floors, and washing clothes.
- Keep children away from lead paint and dust.
- Use wet paper towels to clean up lead dust. Be sure to clean around windows, play areas and floors.
- Wash hands and toys often, using soap and water.

Good nutrition:

Some foods will help keep lead from being stored in a child's body. These are foods with a lot of calcium, iron and vitamin C. These foods include:

Calcium Rich Foods	Iron Rich Foods	Foods with Vitamin C

Draft

- Milk
- Cheese
- Yogurt
- Tofu
- Spinach
- Beans
- Lean meats like fish and chicken
- Whole grain cereals
- Peanut butter
- Oranges
- Orange juice
- Grapefruits
- Tomatoes
- Green peppers

Always wash your fruits with filtered water. If you are concerned about your child's diet, talk with your pediatrician who may also recommend a daily multivitamin.

WIC and SNAP provide assistance to parents and children who need fresh and healthy foods. Contact the **Genesee County WIC office at (810) 237-4537** to learn more. SNAP also offers a Double Bucks program to purchase even more healthy food for no additional costs.

Where can I get more information on lead?

- Genesee County Health Department Lead Program
  (810) 287-3833
- Michigan Department of Health and Human Services Childhood Lead Poisoning Prevention Program
  (888) 322-4453
  www.michigan.gov/lead
- United States Environmental Protection Agency
  www.epa.gov/lead
- U.S. Centers for Disease Control and Prevention (CDC) Web site
  www.cdc.gov/nceh/lead

Draft

This Document is a Non-Responsive Attachment.

PROVIDER DRAFT LETTER V.2
October 22, 2015
LoRocco Edits,Travis Edits,Attisha Edits, Peeler Edits
Cross checked with parent letter

Dear Provider:

As you may be aware from recent news reports, elevated levels of lead have been found in the City of Flint's water system.

To help protect the children of Flint from the current lead in water exposure, the Genesee County Health Department and Michigan Department of Health and Human Services are contacting you to assist you in providing guidance to support your families.

Children can be exposed to lead from drinking water in lead pipes, old lead paint, soil, pottery, cosmetics and toys and some home remedies. Adult jobs and hobbies, like auto repair, stained glass and jewelry making, and ammunitions handling can also put children at risk if they touch clothing or play in areas where lead is found.

As a primary care provider, you play a critical role in helping to ensure that children and families exposed to lead receive the care and reassurances they need to manage the potential health impacts of lead poisoning.

Identification. Children suffering from lead poisoning often fail to present outward symptoms. However, early clinical symptoms can include anemia, anorexia, abdominal pain and constipation. Lead is a neuro-toxin, and exposure can result in violent and aggressive behaviors, lead to learning disorders, may cause Attention Deficit Hyperactivity Disorder (ADHD) and has been known to reduce IQ by as many as 5-8 points with levels as low as 10 ug/dL. Lead is metabolized through the gastrointestinal system similar to iron and calcium, with uptake rates depending on the size and weight of the child. The blood half-life of lead is short (approximately 1 month) but the bone half-life can extend into decades.

Due to multiple risk factors facing many residents in the City of Flint (including aging housing conditions and water quality), we recommend that all children under age 6 living in the City of Flint or living in homes that use Flint water, attending school or childcare in Flint, or who spend time with a caregiver in the City of Flint, receive a blood lead test. Blood lead testing should be done through a child's primary care doctor to ensure adequate short-term and long-term follow-up. ***Families should be encouraged to have their children tested immediately either at their doctor's office or the Genesee County Health Department***.

PROVIDER DRAFT LETTER V.2
October 22, 2015
LoRocco Edits,Travis Edits,Attisha Edits, Peeler Edits
Cross checked with parent letter

Management of Blood Lead Levels. The following guidance is provided for management of childhood blood lead levels:

- **BLL < 5 ug/dL**
  - A lead level of less than 5 mcg/dL is not typically cause for concern.
  - Provide education and anticipatory guidance to ensure that lead levels do not rise.
  - Consider retesting in 12 months based on risk factors or concerns.
- **BLL >5 ug/dL**
  - **Children with capillary results of 5 ug/dL and higher must have a confirmatory venous blood draw.**
  - Families should receive anticipatory guidance, nutrition counseling, instruction on safe cleaning techniques and appropriate follow-up care from their primary care provider.
  - In-home services including case management and environmental investigations are available for all children with lead levels greater than 5 ug/dL. Refer patients to the Genesee County Health Department for this service.
  - Children with confirmed venous testing results greater than 5ug/dL within the past 18 months must be retested based on Medicaid policy and AAP guidelines. (See attached "Provider Quick Reference). If a child has not been retested within these timeframes, retesting is recommended as soon as possible.
- **BLL > 44 ug/dL.**
  - **Children with capillary results of 5 ug/dL and higher must have a confirmatory venous blood draw.**
  - Lead levels over 44 ug/dL may require hospitalization. Consult with an expert at the Children's Hospital of Michigan in Detroit for additional guidance.
  - Families should receive anticipatory guidance, nutrition counseling, instruction on safe cleaning techniques and appropriate follow-up care from their primary care provider.
  - In-home services including case management and environmental investigations are available for all children with lead levels greater than 5 ug/dL. Refer patients to the Genesee County Health Department for this service.
  - Children with confirmed venous testing results greater than 5ug/dL within the past 18 months must be retested based on Medicaid policy and AAP guidelines. (See attached "Provider Quick Reference). If a child has not been retested within these timeframes, retesting is recommended as soon as possible.

Reminder: All children covered by Medicaid must be tested at age 1 and 2.

PROVIDER DRAFT LETTER V.2
October 22, 2015
LoRocco Edits,Travis Edits,Attisha Edits, Peeler Edits
Cross checked with parent letter

Follow-up Care. As providers, there are steps you can take to help support your families:

1. Continue to educate families regarding lead risks and preventative steps that they can take to minimize their risks.
2. Encourage your families to use filtered water for drinking, mixing formula and washing dishes. Families can contact 2-1-1 for information on free water filters.
3. Healthy nutrition is critical for lead-exposed children. Make sure your patients are consuming balanced diets high in iron, calcium and Vitamin C. If you have concerns about their nutrition, consider recommending a multivitamin with iron. WIC and SNAP provide assistance to parents and children who need fresh and healthy foods. Contact the Genesee County WIC office at (810) 237-4537 to learn more. In addition, SNAP offers a Double Bucks program that can provide healthy foods for less.
4. Breastfeeding is highly protective and encouraged. However, if the mother's blood lead level rises above 40ug/dL or her level is greater than 20 ug/dL and the baby has a level above 5 ug/dL breastfeeding is not recommended.
5. Because lead is a neuro-toxin, children with lead poisoning need longitudinal follow-up and may require developmental and behavioral health intervention services. Continue monitoring your patients' development at every visit.
6. Consider additional wrap-around and support services that will benefit your patients such as early childhood home visiting programs, early head start and head start. Call 2-1-1 for more information.

Local Resources. Several local resources are available to you and your patients:

- Blood Testing. Patients are encouraged to contact their primary care provider for testing. The Genesee County Health Department also administers lead tests. Patients in need of transportation should contact 2-1-1 for assistance.
- Water Testing. Water testing is free through the City of Flint Water Testing Plant. Patients can call 810-787-6537 to learn more.
- WIC and SNAP provide assistance to parents and children who need fresh and healthy foods. Contact the Genesee County WIC office at (810) 237-4537 to learn more.
- Child Development. If you have concerns about a child's growth, development or learning contact 2-1-1 for a Home Visiting Program in your area.

Websites and contact information.

- Genesee County Health Department Lead Program
  (810) 287-3833

- Michigan Department of Health and Human Services Childhood Lead Poisoning Prevention Program
  (888) 322-4453

- Michigan Department of Health and Human Services Lead Poisoning Prevention Video for Primary Care Providers on Youtube at /www.youtube.com/watch?v=AnkjCW_yGaU&feature=youtu.be.

PROVIDER DRAFT LETTER V.2
October 22, 2015
LoRocco Edits,Travis Edits,Attisha Edits, Peeler Edits
Cross checked with parent letter

- www.michigan.gov/lead
  United States Environmental Protection Agency
  www.epa.gov/lead

- U.S. Centers for Disease Control and Prevention (CDC) Web site
  www.cdc.gov/nceh/lead

This Document is a Non-Responsive Attachment.

From: Wells, Eden (DHHS)
Sent: Friday, October 23, 2015 4:37 PM
To: Emily Houk
Cc: Peeler, Nancy (DHHS);Lasher, Geralyn (DHHS);Lishinski, Karen (DHHS);LaRocco, Toni;Moran, Susan (DHHS)
Subject: Re: Time sensitive!!!!Number of pages that need to be printed for parental letter

for interagency site as well?

Eden V. Wells, MD, MPH, FACPM
MDHHS
Sent from my iPad

On Oct 23, 2015, at 4:35 PM, Emily Houk <emily@r2pconsultants.com> wrote:

> Here is the nutrition document.
>
> On Fri, Oct 23, 2015 at 4:14 PM, Peeler, Nancy (DHHS) <PeelerN@michigan.gov> wrote:
> I believe there were 3 attachments for the Parent letter, total of 6 pages for the attachments.
>
> 1. Parent handout - is Your Child Safe from Lead Poisoning? (2 pages) http://www.michigan.gov/documents/deq/Parent_Handout_Sept2015_501830_7.pdf
> 2. Lead in Flint Water - Frequently Asked Questions (2 pages) http://www.michigan.gov/documents/deq/deq-2015-10-14_-_Lead_-_Flint_Water_Fact_Sheet_02_503394_7.pdf
> 3. The third was created by request of the group - 2 pages from an EPA document about Nutrition. Emily Houk did that work, and I don't have the final version. Emily, can you please send the Nutrition 2-pager?
>
> Nancy
>
> -----Original Message-----
> From: Lasher, Geralyn (DHHS)
> Sent: Friday, October 23, 2015 3:27 PM
> To: Wells, Eden (DHHS); Lishinski, Karen (DHHS); Peeler, Nancy (DHHS); LaRocco, Toni
> Cc: Moran, Susan (DHHS)
> Subject: RE: Time sensitive!!!!Number of pages that need to be printed for parental letter
>
> And if you can itemize what the materials are please.
>
> -----Original Message-----
> From: Wells, Eden (DHHS)
> Sent: Friday, October 23, 2015 3:26 PM
> To: Lishinski, Karen (DHHS) <LishinskiK@michigan.gov>; Peeler, Nancy (DHHS) <PeelerN@michigan.gov>; LaRocco, Toni <tlarocco@gchd.us>
> Cc: Lasher, Geralyn (DHHS) <lasherg@michigan.gov>; Moran, Susan (DHHS)

<MoranS@michigan.gov>
Subject: Time sensitive!!!!Number of pages that need to be printed for parental letter

Need exact number of pages of resources that will be attached to the parents letter (which itself is one page)

Sent from my iPhone

--
Emily Houk, President and Chief Mischief Maker
Research to Practice Consulting, LLC
216 North Chestnut
Lansing, Michigan 48933
517-896-2712
r2pconsultants.com

<FightLead_HealthyDiet.pdf>

From: Wells, Eden (DHHS)
Sent: Friday, October 23, 2015 6:15 PM
To: Moran, Susan (DHHS)
Subject: Re: From the Governor.

No clue- something from Mona to Marc I bet-

Sent from my iPhone

On Oct 23, 2015, at 5:57 PM, Moran, Susan (DHHS) <MoranS@michigan.gov> wrote:

> What was the message from the Governor?
>
> Sent from my iPhone
>
> On Oct 23, 2015, at 5:55 PM, Wells, Eden (DHHS) <WellsE3@michigan.gov> wrote:
>
> > FYI only
> >
> > Sent from my iPhone
> >
> > Begin forwarded message:
> >
> > **From:** Mona Hanna-Attisha <MHanna1@hurleymc.com>
> > **Date:** October 23, 2015 at 5:39:41 PM EDT
> > **To:** "lrey52@gmail.com" <lrey52@gmail.com>, Toni LaRocco <tlarocco@gchd.us>, "mvalacak@gchd.us" <mvalacak@gchd.us>, 'Kirk Smith' <ksmith@flint.org>, Jamie Gaskin <jgaskin@unitedwaygenesee.org>, "wellse3@michigan.gov" <wellse3@michigan.gov>, "neeleyrep34@gmail.com" <neeleyrep34@gmail.com>, Peter Levine <plevine@gcms.org>
> > **Subject: Fwd: From the Governor.**
> >
> > As I keep saying, these mass blood lead testing events are a bad idea. False sense of reassurance. It should not be the focus.
> >
> > Prof Edwards also agrees below.
> >
> > Mona Hanna-Attisha MD MPH FAAP
> > Director, Pediatric Residency Program
> > Hurley Children's Hospital
> > Michigan State University
> >
> > Begin forwarded message:
> >
> > > **From:** Marc Edwards <edwardsm@vt.edu>
> > > **Date:** October 23, 2015 at 5:33:40 PM EDT

To: 'Elin Betanzo' <ebetanzo@nemw.org>, 'Mona Hanna-Attisha' <MHanna1@hurleymc.com>, "Dickinson, Jordan" <Jordan.Dickinson@mail.house.gov>, Andrew Leavitt <ALeavitt@senate.michigan.gov>
Subject: RE: From the Governor.

Is this a joke? ABC reports County is offering free blood lead testing November 5th?

Nearly complete waste of time given a half life of 20 days.

Designed to make the parent feel great?

Marc

From: Wells, Eden (DHHS)
Sent: Saturday, October 24, 2015 7:36 AM
To: Grijalva, Nancy (DHHS)
Subject: Re: From the Governor.

▪

Sent from my iPhone

On Oct 24, 2015, at 7:19 AM, Grijalva, Nancy (DHHS) <GrijalvaN@michigan.gov> wrote:

You hit the nail on the head Dr. E!! Now, if only we could teach this to everyone in our Dept. ��

Sent from my iPad

On Oct 23, 2015, at 9:12 PM, Wells, Eden (DHHS) <WellsE3@michigan.gov> wrote:

This is why public health can't be the pure scientific evidence- based approach-people's perceptions are critical.

Sent from my iPhone

On Oct 23, 2015, at 9:08 PM, Lyon, Nick (DHHS) <LyonN2@michigan.gov> wrote:

If I were a parent I would want to know.

On Oct 23, 2015, at 7:08 PM, Becker, Timothy (DHHS) <beckert1@michigan.gov> wrote:

Well, Marc is more vinegar than honey.

Sent from my iPhone

On Oct 23, 2015, at 5:55 PM, Wells, Eden (DHHS) <WellsE3@michigan.gov> wrote:

FYI only

Sent from my iPhone

Begin forwarded message:

From: Mona Hanna-Attisha <MHanna1@burleymc.com>
Date: October 23, 2015 at 5:39:41 PM EDT
To: "lrey52@gmail.com" <lrey52@gmail.com>, Toni LaRocco <tlarocco@gchd.us>, "mvalacak@gchd.us" <mvalacak@gchd.us>, 'Kirk Smith' <ksmith@flint.org>, Jamie Gaskin <jgaskin@unitedwaygenesee.org>, "wellse3@michigan.gov" <wellse3@michigan.gov>, "neeleyrep34@gmail.com" <neeleyrep34@gmail.com>,

Peter Levine <plevine@gcms.org>
Subject: Fwd: From the Governor.

As I keep saying, these mass blood lead testing events are a bad idea. False sense of reassurance. It should not be the focus.

Prof Edwards also agrees below.

Mona Hanna-Attisha MD MPH FAAP
Director, Pediatric Residency Program
Hurley Children's Hospital
Michigan State University

Begin forwarded message:

From: Marc Edwards <edwardsm@vt.edu>
Date: October 23, 2015 at 5:33:40 PM EDT
To: 'Elin Betanzo' <ebetanzo@nemw.org>, 'Mona Hanna-Attisha' <MHanna1@hurleymc.com>, "Dickinson, Jordan" <Jordan.Dickinson@mail.house.gov>, Andrew Leavitt <ALeavitt@senate.michigan.gov>
Subject: RE: From the Governor.

Is this a joke? ABC reports County is offering free blood lead testing November 5th?

Nearly complete waste of time given a half life of 20 days.

Designed to make the parent feel great?

Marc

From: Wells, Eden (DHHS)
Sent: Saturday, October 24, 2015 7:38 AM
To: Mona Hanna-Attisha
Cc: LaRocco, Toni;Valacak, Mark;neeleyrep34@gmail.com;Eileen Tomasi
Subject: Re: Flint Schools Meeting

I remember you sending this, Mona! It is a vetted program-

Sent from my iPhone

On Oct 24, 2015, at 6:14 AM, Mona Hanna-Attisha <MHanna1@hurleymc.com> wrote:

> FYI attached is a model school-based water in lead intervention and testing program. It's from EPA region 2. It's called the 3T's and if focuses on water testing and long term fixes. It has lots of great resources in it.
>
> <0A423C7E-DDC6-48C8-A9CA-ACEB79C9AFBE2000U1XC.pdf>
>
> Mona Hanna-Attisha MD MPH FAAP
> Director, Pediatric Residency Program
> Hurley Children's Hospital
> Michigan State University
>
> On Oct 23, 2015, at 3:58 PM, LaRocco, Toni <tlarocco@gchd.us> wrote:
>
> > Hi all,
> >
> > We are planning to meet on Monday at 10:30 at the following address:
> >
> > Flint Community Schools
> > Administration Building
> > Health Services
> > 923 E. Kearsley St.
> > Flint, MI 48503
> >
> > Upon arrival please ask the receptionist for the location of the meeting.
> >
> > Toni L LaRocco MS, RN
> > Director of Nursing Services
> > Genesee County Health Department
> > 810.237.4544
> > tlarocco@gchd.us

"Gratitude unlocks the fullness of life. It turns what we have into enough, and more, It turns denial into acceptance, chaos to order, confusion to clarity. It can turn a meal into a feast, a house into a home, a stranger into a friend. Gratitude makes sense of our past, brings peace for today, and creates a vision for tomorrow."~ Melody Beattie

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For a copy of the Health Department's Notice of Information Practices, contact the Health Department or visit the Health Department's website at http://www.gchd.us/

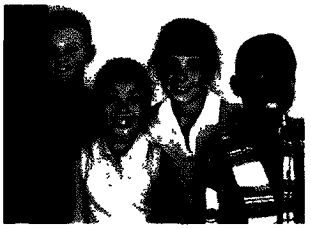
From: Wells, Eden (DHHS)
Sent: Saturday, October 24, 2015 7:39 AM
To: Peeler, Nancy (DHHS);Travis, Rashmi (DHHS);Moran, Susan (DHHS);Dykema, Linda D. (DHHS)
Subject: Fwd: Flint Schools Meeting
Attachments: 0A423C7E-DDC6-48C8-A9CA-ACEB79C9AFBE2000U1XC.pdf; ATT00001.htm

FYI only- a vetted educational program for schools from EPA

Sent from my iPhone

Begin forwarded message:

> **From:** Mona Hanna-Attisha <MHanna1@hurleymc.com>
> **Date:** October 24, 2015 at 6:13:38 AM EDT
> **To:** "LaRocco, Toni" <tlarocco@gchd.us>
> **Cc:** "Wells, Eden (DHHS)" <WellsE3@michigan.gov>, "Valacak, Mark" <MVALACAK@gchd.us>, "neeleyrep34@gmail.com" <neeleyrep34@gmail.com>, "Eileen Tomasi" <etomasi@flintschools.org>
> **Subject: Re: Flint Schools Meeting**
>
> FYI attached is a model school-based water in lead intervention and testing program. It's from EPA region 2. It's called the 3T's and if focuses on water testing and long term fixes. It has lots of great resources in it.



Training, Testing, and Telling 816E05006

Introducing the **3Ts** for **Reducing Lead** in **Drinking Water** in **Schools** and **Child Care Facilities**

Introducing the 3Ts

The 3Ts outreach program is in response to rising public concern over the health risks posed by elevated lead levels in the drinking water of our nation's schools and child care facilities.

In launching the 3Ts campaign, EPA's objective is to provide school officials and child care facility operators with the tools they need to understand and address lead in drinking water in their local communities:

Training – focuses on alerting school administrators, custodians, utilities and water officials to the risks of lead poisoning and the means of mitigating those risks.

Testing – underscores the importance of monitoring lead levels in school and child care facility drinking water to identify and respond to any existing problems.

Telling – emphasizes the need to communicate with the public regarding all facets of the issue, from funding and initiating a testing protocol, to reporting results, if needed, and proposing a remediation strategy.

A Collaborative Effort

The EPA recognizes that schools, child care facilities and local government officials have limited budgets with which to address an increasing number of health and safety issues. Therefore, it is important to note that the 3Ts program is not an endorsement of new Federal mandates. It is, instead, a call for education, collaboration, and partnership-building to find necessary funding and encourage utilities to be more sensitive to public concern about water quality.

Your 3Ts Toolkit

To implement an outreach program of education and advocacy, our toolkit includes the following materials and resources. It is designed for easy adaptation to your local needs, either selectively or in its entirety.

Page Two - Training, Testing, and Telling

Training

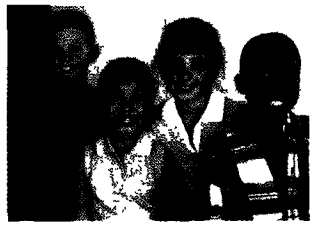
- Fact Sheet
- Frequently Asked Questions
- National Resources and Information

Telling

- Template Introductory Letter to Parents and Caregivers
- Template Newsletter Articles (2)
- Ways to Display Onsite Information
- Organizing a Workshop or Open House
- Workshop Agenda and Discussion Guidelines
- Template Information Update Announcement
- Template Public Address
- Issue and Crisis Management Guidelines

Testing

- 3Ts for Reducing Lead in Drinking Water in Schools: Revised Technical Guidance
- 3Ts for Reducing Lead in Drinking Water in Child Care Facilities: Revised Guidance



Lead in Drinking Water

What You Should **Know** to **Protect Children** in Your **School** or **Child Care Facility**

Environmental Protection Agency's Role in Safeguarding Drinking Water

The U.S. Environmental Protection Agency (EPA) is responsible for ensuring the safety of our country's drinking water. EPA works together with state environmental or health agencies to accomplish this mission. Charged with this mandate, EPA is concerned about the potential for elevated lead levels in the drinking water of schools and child care centers, which serve those most vulnerable to the health risks of lead exposure – *our nation's children.*

Why Schools and Child Care Facilities Are of Concern

EPA is reaching out to schools and child care centers across the country because there are a number of factors which may result in children's exposure to lead in these facilities;

- The extended periods of time children spend in school and child care facilities.
- The age of buildings, plumbing and fixtures that are subject to corrosion and the leaching of lead into drinking water.
- The on again/off again water use patterns that promote corrosion as water stands in plumbing pipes when it's not in use.

Lead and Public Health

Lead is a toxic metal that can be harmful to human health when ingested or inhaled. Even in very small doses, lead can pose a health threat. Childhood lead exposure may interfere with red blood cell chemistry and impair the development of the brain and central nervous system. Adverse effects may include delays in normal physical and mental development in babies and young children as well as deficits in attention span, hearing, and learning abilities.

Lead will also be stored in bones to be released later into the bloodstream. Fetuses and young children up to the age of six are most at risk because their growing bodies tend to absorb more lead than the average adult.

Federal Regulation of Lead in Drinking Water

Safe Drinking Water Act (SDWA): Passed in 1974, this federal law requires EPA to establish regulations for known or potential contaminants in drinking water, including lead. Under SDWA, regulations developed by EPA apply to public water systems. Schools and child care facilities

that are served by a public water system are not subject to SDWA monitoring and treatment requirements because these schools and child care facilities are not considered public water systems.

Under the Safe Drinking Water Act, lead is regulated by the following provisions:

- **The 1986 SDWA Lead Ban:** This provision of the SDWA requires the use of "lead-free" pipe, solder, and flux in the installation or repair of any public water system or any plumbing in a residential or non-residential facility providing water for human consumption. Solders and flux are considered to be lead-free when they contain less than 0.2 percent lead. Before this ban took effect on June 19, 1986, solders used to join water pipes typically contained about 50 percent lead. Pipes and pipe fittings are considered "lead-free" under the Lead Ban when they contain less than 8 percent lead. Plumbing fixtures that are not "lead-free" were banned from sale after August 6, 1998. Plumbing fixtures are subject to the NSF International standard.

- **The 1988 Lead Contamination Control Act (LCCA):** The purpose of the LCCA is to reduce lead exposure and the health risks associated with it by reducing lead levels in drinking water at schools and child care centers. The LCCA created lead monitoring and reporting requirements for all schools, and required the replacement of drinking water fixtures that contained excessive levels of lead (see Appendix E of the 3Ts for Reducing Lead in Drinking Water in Schools: Revised Technical Guidance for a listing of these fixtures). The provisions are not enforceable. As a result, states have the option to voluntarily enforce the provisions of the Act (or alternate provisions) through their own authority.

- **The 1991 Lead and Copper Rule (LCR):** The LCR requires public water suppliers to monitor for lead in drinking water and to provide treatment for corrosive water if lead or copper are found at unacceptable levels. EPA strongly recommends that schools test their facilities for lead. However, unless a school owns its public water system, testing for lead and copper within the school is not specifically required. Therefore, many schools served by water systems owned by cities, towns, or other entities may have never been tested for lead under the LCR.

EPA Call to Action

EPA hopes to reach out to schools and child care facilities in order to educate them regarding the benefits of testing. In an effort to encourage school districts to take action, EPA is spearheading a **3Ts for Reducing Lead in Drinking Water in Schools and Child Care**

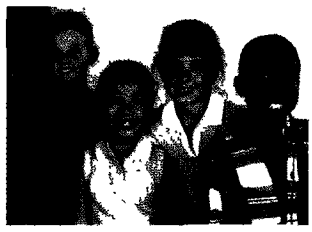
Facilities outreach campaign. Nonregulatory in nature, this initiative calls for school districts and child care centers nationwide to launch their own proactive campaigns of education, prevention, testing and remediation to minimize the threat of lead exposure from drinking water and help ensure the safety of both the children and adults that use their facilities.

The Importance of Testing

The best way to find out if a school or child care center has high levels of lead in the drinking water is to test the water. A testing program can identify if lead levels are near the EPA level of concern, identify the source of lead, and target the most effective, timely and cost-efficient methods of remediation.

An effective drinking water sampling and monitoring program incorporates the following:

- Designating a person to coordinate all activities.
- Developing a plumbing profile and performing targeted follow-up testing to identify sources of on-site lead contamination.
- Developing a drinking water sampling plan.
- Using a certified laboratory for analysis.
- Water testing at all on-site potable water outlets accessible to students and staff for drinking, cooking, or making coffee and other hot beverages.
- Taking remedial action to correct any problems identified.
- Establishing a schedule for periodic follow-up sampling to monitor lead levels.
- Initiating an ongoing program of communication with students, parents, staff, and the community at large to keep all concerned audiences informed of the proactive steps being taken to minimize possible exposure to lead in the facility's drinking water.
- Managing records in a central location.



Frequently Asked Questions

Lead Exposure: the Risks and Remedies

Q. What is lead?

A. Lead is a naturally occurring toxic metal that is harmful if inhaled or swallowed. Lead can be found in air, soil, dust, food, and water. Lead is commonly used in plumbing materials and water service lines. Exposure to elevated lead levels can result in adverse health effects, especially in fetuses, infants and children up to the age of six.

Q. How does lead get into a school or child care center's drinking water?

A. Typically, the lead in plumbing pipes, solder and other plumbing materials, such as water coolers and faucets, is the source of lead in drinking water. The most common cause is corrosion. Corrosion is a chemical reaction between the water and the lead pipes and solder. Corrosion is accelerated by water characteristics such as low pH (acidity), low mineral content, high temperature, and extended contact time with plumbing pipes. For example, corrosion accelerates when water in the plumbing system stands overnight, over the weekend, and throughout term breaks when there are no classes.

Q. If testing and monitoring the quality of drinking water is not specifically mandated by state or local law, why should a school or child care center devote resources to such a course of action?

A. School and child care administrators have a professional responsibility to ensure the health and safety of the children entrusted to their care. Ensuring that the water provided in the facilities is safe for children to drink is a fundamental responsibility that must be proactively addressed. Moreover, in addition to the health advantages, schools and child care facilities that voluntarily sample drinking water and make lead levels and remediation plans available to the public will enjoy the following benefits:

- Enhanced credibility
- Positive publicity
- Parental and community support
- Stature as a standard-setting "best practices" facility

Q. What are the health risks associated with lead exposure?

A. Lead poses a significant health risk to young children, especially infants and fetuses, where the danger is very severe. This is because growing children absorb lead more rapidly and are negatively impacted by a level of lead exposure that would have little effect on an adult. A child's mental and physical development can be irreversibly impaired by over-exposure to lead. EPA estimates that drinking water can make up 20% or more of a person's total exposure to lead. Infants who consume mostly mixed formula can receive 40% to 60% of their exposure to lead from drinking water.

Q. How much lead in drinking water is too much?

A. In school or child care settings, EPA has set a guidance level of 20 ppb (0.020 mg/L) when testing 250 ml first-draw samples from water fountains and outlets. (First draw refers to the first water to come out of the tap after an 8-18 hour period of inactivity.) When results show lead levels exceeding 20 ppb, those fountains and outlets should be taken out of service until remediation is complete.

Q. Is lead exposure at schools significant to my child's health?

A. The Centers for Disease Control and Prevention (CDC) recommend that as a community we should reduce all sources of lead exposure as much as possible, because it can have adverse health effects even at low concentrations. The school may take actions to reduce lead exposure in their facilities, but parents also should realize that exposure to lead may occur in the home. Actions in the home to reduce lead exposure are just as important as the step the school is taking to reduce lead.

Q. What is remediation?

A. Remediation refers to the short- and long-term steps that can be taken to reduce the levels of lead in drinking water if test results indicate that a school or child care facility has a lead problem. The implementation of remediation plans is impacted by many factors, including cost, likelihood of success, availability of water, and staffing requirements.

Q. If a problem is identified at a school or child care center, what are the options available for reducing lead levels in the drinking water?

A. Based on available human and financial resources, the following routine, short-term and long-term steps will help mitigate the problem:

Routine Control Measures

Below are examples of routine activities that should be conducted to prevent exposure to elevated levels of lead:

- Clean debris from all accessible screens frequently. If you discovered sediments in faucet screens, have the sediments tested for lead and continue to clean your screens frequently, even if the analysis finds no lead.

- Use only cold water for food and beverage preparation. Hot water will dissolve lead more quickly than cold water and is likely to contain increased lead levels. If hot water is needed, it should be taken from the cold water tap and heated on a stove or in a microwave oven.

- Instruct the users (students and staff) to run the water before drinking or staff could run the water before students arrive, so they are drinking water that has not been in contact with the faucet interior since faucets are often a major source of lead in drinking water.

- Placard bathroom sinks with notices that water should not be consumed. You should use pictures if there are small children using bathrooms.

Interim (Short-Term) Control Measures

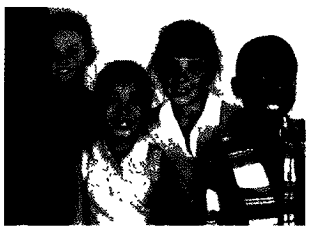
(Please see the *3Ts for Reducing Lead in Drinking Water in Schools* for a more detailed description of the interim control measures.)

- "Flush" the piping system in your building.
- Provide bottled water.
- Shut off problem outlets.

Permanent Remedies

After obtaining an understanding of your water supply and the lead conditions in your facility (as a result of testing), you should examine the permanent treatment options and select those most appropriate to your situation. (Please see the *3Ts for Reducing Lead in Drinking Water in Schools* for a more detailed description of the permanent remedies.)

- Replace outlets.
- Reduce lead levels at the tap. For example, install point-of-use (POU) devises that reduce lead at the tap.
- Check grounding wires. Electrical current may accelerate the corrosion of lead in piping materials.
- Lead pipe replacement. Lead pipes within the school and those portions of the lead service lines under the water supplier's jurisdiction can be replaced.
- Reconfigure plumbing. In some facilities, the plumbing system might be modified so that water supplied for drinking or cooking is redirected to bypass sources of lead contamination.
- Manual flushing. Flushing individual problem outlets or all outlets may also represent a permanent, albeit ongoing, solution.
- Automated flushing. Time-operated solenoid valves can be installed and set to automatically flush the main pipes (headers) of the system.
- Bottled water. If other treatment fails or is impractical, bottled water can be purchased for consumption by the building community.
- Use lead-free materials. Make sure that any plumber who does repair or replacement work on the facility's plumbing system uses only "lead-free" solders and other materials.
- Shut off problem outlets.



National Resources and Information

Local Resources

Secure the following information from these local sources:

- Local Water Supplier (contact name and number)
  - Annual water quality report (Consumer Confidence Report)
  - Details about how your water is treated
  - Lead public education materials (if the water systems exceeded lead action levels)

- State Department of Health/Environment (contact name and number)
  - Lead and drinking water public health information
  - State lead-in-drinking-water regulatory guidelines
  - Testing children for blood lead levels
  - List of laboratories certified for analysis of lead in drinking water samples

National Toll-Free Hotlines

Call to locate the appropriate agencies and secure drinking water information.

EPA Safe Drinking Water Hotline
1-800-426-4791

Lead Hotline
1-800-424-LEAD (5323)

Government, Professional Organization and Advocacy Websites

United States Environmental Protection Agency
Office of Ground Water and Drinking Water
www.epa.gov/safewater

Page Two: National Resources and Information

Clean Water Fund
www.cleanwaterfund.org

United Sates Department of Education, Office of Safe and Drug-Free Schools
www.ed.gov/about/offices/list/osdfs/?src=oc

National Head Start Association
www.nhsa.org

Healthy Schools Network
www.healthyschools.org

Centers for Disease Control and Prevention, Childhood Lead Poisoning Prevention Program
www.cdc.gov/nceh/lead/lead.htm

American Water Works Association (AWWA)
www.awwa.org

Campaign for Safe and Affordable Drinking Water
www.safe-drinking-water.org

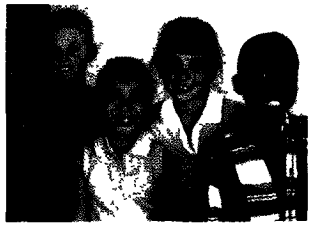
Pediatric Environmental Health Specialty Units
www.aoec.org/PEHSU.htm

an **Initial Sample**

- **Collect the sample before any water has been used. Water should not be used for 8-18 hours before sampling.**
- Make sure you have clean hands.
- Complete the sample recording form.
- Only use containers (250 milliliter) supplied by your certified lab.
  - Containers should not be opened until you are ready to collect the sample.
  - Sampling containers that have been compromised in any way, e.g., by being touched on the threads or the interior surfaces, must not be used.
  - Keep food and drink away from the sample and its container.
  - If you are collecting a sample from a faucet, aerators and screens should be removed before taking samples.
  - Anything attached to the end of the faucet, e.g., hoses, should be removed before taking samples.
- Make sure no water has been withdrawn from the tap or water fountain before you collect the sample.
- Place the container under the faucet or drinking water fountain that is being tested and collect 250 milliliters of water.
  - If a faucet is being tested make sure you turn on the cold water tap.
- Turn on the water and fill the container without allowing any water to run down the drain.
- Close the container according to the instructions from your certified lab.
- Make sure the container is labeled with the same information from your sample recording form.
- Prepare the container for shipping according to the certified lab's instructions.
- Ship containers according to the certified lab's instructions.
- Samples must be delivered to the lab within 14 days of collection for proper testing.

a **Flush** (Follow Up) **Sample**

- **Collect the sample first thing in the morning before any water has been used. Water should not be used for 8-18 hours before sampling.**
- Make sure you have clean hands.
- Complete the sample recording form.
- Only use containers (250 milliliter) supplied by your certified lab.
  - Containers should not be opened until you are ready to collect the sample.
  - Sampling containers that have been compromised in any way, e.g., by being touched on the threads or the interior surfaces, must not be used.
  - Keep food and drink away from the sample and its container.
  - If you are collecting a sample from a faucet, aerators and screens should be removed before taking samples.
  - Anything attached to the end of the faucet, e.g., hoses, should be removed before taking samples.
- Make sure no water has been withdrawn from the tap or water fountain before you collect the sample.
  - If a faucet is being tested make sure you turn on the cold water tap.
- Turn on the water for the faucet or drinking water fountain and let it run down the drain for 30 seconds (you may be asked to run the water for a different length of time – make sure you run the water for the time instructed).
- Place the container under the faucet or drinking water fountain that is being tested and collect 250 milliliters of water.
- Turn on the water and fill the container without allowing any water to run down the drain.
- Close the container per instructions from your certified lab.
- Make sure the container is labeled with the same information from your sample recording form.
- Prepare the container for shipping per the certified lab's instructions.
- Ship containers per the certified lab's instructions.
- Samples must be delivered to the lab within 14 days of collection for proper testing.



Organizing a Lead in Drinking Water Workshop or Open House

Agenda and Discussion Guidelines

A workshop or open house provides the ideal forum for sharing information, dispelling misconceptions, and allowing guests to voice their concerns. Because the issues are complex, we encourage you to introduce a series of such events. To bolster attendance, tie the workshop in with regularly scheduled events such as PTA meetings.

Tasks/Activities to do prior to the workshop:

1) Form an Organizing Committee

Create an organizing committee to oversee planning, promotion, implementation, and follow-up in newsletters. This committee should draw from a variety of concerned groups, including: teachers, parents, students (pre-teens and teens), school board members, public health officials, chamber of commerce, drinking water system representatives, local civic leaders, etc.

2) Seek out Partnerships

Leverage the contacts of your organizing committee to secure workshop/open house partners willing to support your efforts and help with costs for printing, promotion, audiovisual aids, etc. Pursue partnerships with commercial and not-for-profit entities (e.g., testing laboratory, advocacy group, etc.) that have a significant stake in the lead in drinking water issue.

3) Develop an Agenda

Keep your formal presentation to 45 minutes, allowing another 15 minutes for speakers to take questions from the floor.

4) Special Equipment to Consider

- Audiovisual aids
  Podium
- Microphone and sound system
  Portable microphone for Q&A session
  Recording or videotaping equipment
  Additional seating

5) Promoting the Workshop

To secure the broadest awareness of your workshop or open house, you may want to use the *Lead in Drinking Water* announcement (Refer to Information Update Announcement or Letter in your toolkit).

During the Workshop:

6) Provide Brochures and Handouts

- Distribute a workshop agenda. List your discussion topics and speakers, providing brief biographies that include academic and professional credentials as well as contact information.
- Also make available your *Lead in Drinking Water* display pamphlets and handouts (Refer to "Ways to Display Onsite Information" in your toolkit).

7) Document the Workshop Proceedings

Take notes, record or videotape your workshop/open house presentation. Doing so will accurately document:

- What and how the issues were presented and received
- Attendee interest and participation
- Questions asked and answers provided
- What decisions or courses of action were proposed
- What commitments were made
- What follow-up action is necessary

After the Workshop:

8) Follow-up Publicity

Newsletter Follow-up: Run your workshop/open house success story in your own newsletter and distribute it for inclusion in the newsletters of partner organizations as well as neighborhood homeowner's associations, service clubs, major employers, community centers and environmental groups.

Additional Information:

Sample Agenda and Discussion Guidelines

These guidelines are designed to engage your audience, garner support and enhance public trust. The potential health effects of exposure to elevated lead levels is a complex issue that must be presented clearly and honestly. Your overriding message should resonate as an endorsement of education, transparency and full disclosure.

Sample Agenda

- Welcome by Principal or School Superintendent <or head of the Department of Health which licenses Child Care Centers>

  Welcoming remarks should provide a brief overview of EPA's **3Ts for Reducing Lead in Drinking Water in Schools and Child Care Facilities** call to action and your facility's proactive response.

- Introduction by School Principal or Child Care Administrator
  - Thank guests for attending to hear and be heard.
  - Introduce the experts who will be participating in the presentation. Speakers should include authorities drawn from the following sources:
    - School Board
    - Local Water Utility/Supplier
    - Healthcare Professionals
    - Building and Engineering Community

- Discussion and Presentations by Speakers

These are suggested areas of discussion. Speakers should be candid and comprehensive but concise, avoiding the use of unfamiliar acronyms and complicated technical language.

Question & Answer Session

The school principal or child care administrator should open the floor to questions and direct questions to the appropriate expert.

Q. What is lead?

A. Lead is a toxic metal commonly used in plumbing materials and water service lines. When ingested or inhaled, high levels of lead can produce lead poisoning, which poses the greatest health risk to fetuses, infants and children up to the age of six.

Q. How are children and adults exposed to lead?

A. There are a number of sources that can produce excess lead exposure. These include lead-based paint; lead in the air from industrial emissions, dust and soil; lead in food from crops or lead glaze on imported dinnerware; lead dust brought home by industrial workers on their shoes and clothing; and lead in water as a result of the corrosion of plumbing materials containing lead.

Q. How does lead get into drinking water?

A. Typically, the lead in plumbing pipes, solder and other plumbing materials is the source of lead in drinking water. The most common cause is corrosion. Corrosion is a chemical reaction between the water and the lead pipes and solder. Corrosion is accelerated by water characteristics such as low pH (acidity), low mineral content, high temperature, and extended contact time with plumbing pipes. For example, corrosion accelerates when water in the plumbing system stands overnight, over the weekend, and throughout term breaks when there are no classes.

Q. What health risks are associated with lead?

A. Lead poses a significant health risk to young children, especially infants and fetuses, where the danger is very severe. This is because growing children absorb lead more rapidly and are negatively impacted by a level of lead exposure that would have little effect on an adult. A child's mental and physical development can be irreversibly impaired by over-exposure to lead. EPA estimates that drinking water can make up 20% or more of a person's total exposure to lead. Infants who consume mostly mixed formula can receive 40% to 60% of their exposure to lead from drinking water.

Q. Who are the most at-risk populations and why?

A. Young children, infants and fetuses are most at-risk. This is due to a number of factors:

- The extended periods of time children spend in school and child care facilities.
- The age of buildings, plumbing and fixtures that are subject to corrosion and the leaching of lead into drinking water.
- The on again/off again water use patterns that promote corrosion as water stands in plumbing pipes when systems are not in use.

Q. How does a school or child care facility proceed with lead testing?

A. Before testing and taking corrective action, it is essential to assess the status of the plumbing system and identify any factors that might contribute to lead contamination. To do this, a plumbing profile must be developed.

The plumbing profile helps administrators understand whether they have a widespread contamination problem or only localized concerns. It also helps identify and prioritize sample sites, giving the following top priority: drinking fountains, kitchen sinks, home economics rooms, teacher's lounge sinks, nurse's office sink, classroom sinks in special education classrooms, and any sink visibly used for consumption.

It is important to note that large variations in lead concentrations may be found among individual outlets in a facility because of differences in flow rates and/or building materials used.

If potential problems are identified through the completion of a plumbing profile, the next step is to have the water tested. A sampling plan is developed that indicates where to take samples and how to prioritize the sample sites. In most cases, a laboratory or consultants are retained to conduct the testing in adherence to EPA sampling protocols designed specifically for schools and child care facilities. After that, a certified laboratory conducts sample analyses to ensure the accuracy of the results, which should be made public immediately.

Q. How much lead is too much?

A. In school or child care settings, EPA has set a guidance level of 20 ppb (0.020 mg/L) when testing 250 ml first-draw samples from water fountains and outlets. (First draw refers to the first water to come out of the tap after an 8-18 hour period of inactivity.) When results show lead

levels exceeding 20 ppb, those fountains and outlets should be taken out of service until remediation is complete.

Q. How safe is this facility's source water?

A. While EPA and state governments set and enforce standards, local governments and private water suppliers have direct responsibility for the quality of the water that ultimately flows through the tap into homes, businesses, office buildings, schools and child care centers.

Water systems test and treat their water, maintain the distribution systems that deliver water to consumers, and report on their water quality to the state. States and EPA provide technical assistance to water suppliers and can take legal action against systems that fail to provide water that meets state and EPA standards.

As a result of this "multiple barrier" approach to drinking water protection, our source water meets or exceeds all regulatory standards. By way of documentation, we are making available our supplier's Annual Water Quality Report, so be sure to pick up a copy on your way out.

Q. How safe is this facility's plumbing system? (Optional)

A. We believe our plumbing system is safe. Nevertheless, we want to be absolutely certain our drinking water does not pose a health risk to children or adults. That is why we are responding to EPA concerns with this initiative to reduce the potential for lead exposure from our drinking water.

Q. What can be done immediately, short-term, and on a long-term basis to minimize the potential lead risk from onsite drinking water? (Optional)

A. Based on available human and financial resources, the following routine, short-term and long-term steps can be taken to help mitigate the problem:

Routine Control Measures

Below are examples of routine activities that should be conducted to prevent exposure to elevated levels of lead:

- Clean debris from all accessible screens frequently. If you discovered sediments in faucet screens, have the sediments tested for lead and continue to clean your screens frequently, even if the analysis finds no lead.

- Use only cold water for food and beverage preparation. Hot water will dissolve lead more quickly than cold water and is likely to contain increased lead levels. If hot water is needed, it should be taken from the cold water tap and heated on a stove or in a microwave oven.

- Instruct the users (students and staff) to run the water before drinking or staff could run the water before students arrive, so they are drinking water that has not been in contact with the faucet interior since faucets are often a major source of lead in drinking water.

- Placard bathroom sinks with notices that water should not be consumed. You should use pictures if there are small children using bathrooms.

Interim (Short-Term) Control Measures

(Please see the *3Ts for Reducing Lead in Drinking Water in Schools* for a more detailed description of the interim control measures.)

- "Flush" the piping system in your building.
- Provide bottled water.
- Shut off problem outlets.

Permanent Remedies

After obtaining an understanding of your water supply and the lead conditions in your facility (as a result of testing), you should examine the permanent treatment options and select those most appropriate to your situation. (Please see the *3Ts for Reducing Lead in Drinking Water in Schools* for a more detailed description of the permanent remedies.)

- **Replace outlets.**
- **Reduce lead levels at the tap.** For example, install point-of-use (POU) devises that reduce lead at the tap.

- **Check grounding wires**. Electrical current may accelerate the corrosion of lead in piping materials.
- **Lead pipe replacement.** Lead pipes within the school and those portions of the lead service lines under the water supplier's jurisdiction can be replaced.
- **Reconfigure plumbing.** In some facilities, the plumbing system might be modified so that water supplied for drinking or cooking is redirected to bypass sources of lead contamination.
- **Manual flushing.** Flushing individual problem outlets or all outlets may also represent a permanent, albeit ongoing, solution.
- **Automated flushing.** Time-operated solenoid valves can be installed and set to automatically flush the main pipes (headers) of the system.
- **Bottled water.** If other treatment fails or is impractical, bottled water can be purchased for consumption by the building community.
- **Use lead-free materials.** Make sure that any plumber who does repair or replacement work on the facility's plumbing system uses only "lead-free" solders and other materials.
- **Shut off problem outlets.**

Q. What is this facility's timeline for conducting testing and taking action as necessary?

A. We are currently developing an effective drinking water sampling and monitoring program. We are working with state and local water authorities to formulate our strategy, and we are coordinating with the school district to begin sampling if the results of our plumbing profile indicate that a health risk exists. However, we have already initiated a program of communication with students, parents, staff and the community at large. This communication is designed to keep all concerned audiences informed of the proactive steps being taken to minimize possible exposure to lead in this facility's drinking water.

Q. How can parents minimize their child's overall exposure to lead?

A. As there are other common sources of lead exposure that are in the control of individual caregivers, these precautions are recommended:

- Wash children's hands and toys frequently and try to keep your children from putting anything other than food in their mouths.
- Homes built before 1978 are likely to have lead based paint in them. In order to reduce lead exposure from deteriorated lead-based paint, keep floors, window frames, windowsills and other surfaces in the home clean and free of dust.

- Don't bring lead dust into the house from your workplace or hobby. Make sure your child eats a healthy, well-balanced diet.
- Don't store food in high-lead pottery.
- Anytime the water in a particular faucet has not been used for six or more hours, "flush" your cold-water pipes by running the water until it becomes as cold as it will get. The more time water has been sitting in your home's pipes, the more lead it may contain. But be aware that flushing may not be effective in high-rise buildings with lead-soldered central piping.
- Use only water from the cold-water tap for drinking, cooking, and especially for making baby formula, as hot water is more corrosive and therefore likely to contain higher levels of lead.
- Have your water tested for lead and other contaminants. That is the only way to know how great a risk your home drinking water poses for the children and adults in your household.

Q. How can parents test for lead in home drinking water?

A. Have your water tested for lead by a certified laboratory. To assist you, we are making available a list of EPA-certified laboratories in the area, so please pick up a handout before you leave.

Household testing costs between $20 and $100. Because you cannot see, taste, or smell lead dissolved in water, testing is the only sure way to find out whether there are harmful quantities of lead in your home drinking water.

You should be particularly suspicious if your home has lead pipes (lead is a dull gray metal that is soft enough to be scratched easily with a house key), if you see signs of corrosion (frequent leaks, rust-colored water, and stained dishes or laundry), or if your non-plastic plumbing is less than five years old.

Your water supplier may have useful information, including whether the service connector used in your home or area is made of lead. Additionally, testing is especially important in high-rise buildings where flushing might not work.

Q. How can parents have their child's blood lead level tested?

A. Even if your children seem healthy, take them to a pediatrician for a blood test. The sample will be sent to a lab, and you'll have the results in a few days.

While lead exposure may result in symptoms such as stomachaches, loss of appetite, inability to sleep and hyperactivity, far too often, the symptoms are much more subtle, but may be long-lasting and irreversible. To be on the safe side, please make sure that your children are tested for lead exposure.

Q. In the months ahead, how will this facility keep parents and caregivers informed?

A. To keep you informed, this is just the first in a series of workshops <name of school or child care facility> will be presenting to bring the issue to the forefront. We've also set up a *Lead in Drinking Water* Information Display in our main office, where pamphlets and other resources are available throughout the school day. We'll be making updates available to you as new information becomes available, and we invite you to contact us at <telephone number> or <email address> if you have questions or wish to provide input.

Q. What can parents do to support this facility's lead-awareness program?

A. Getting involved is the most important way to support our efforts. Attend future workshops. Take advantage of the information we're making available. Educate yourselves and discuss the issue with fellow parents and community members. Volunteer your time to help us promote our awareness initiative. And lastly, contribute your expertise as a business, education or healthcare professional by participating in future workshops or by manning our information center and help line.

Before you leave, please sign our clipboard and provide your contact information if you wish to volunteer for our awareness campaign.

Public Address

Issue of Lead in Facility Drinking Water

I would like to tell you about [name of the school/child care center]'s plans to assess, and if necessary, reduce lead in our facility's drinking water. We are taking this course of action on a voluntary basis because it is the right thing to do in order to ensure that this facility remains a safe environment for both youngsters and adults.

The United States Environmental Protection Agency (EPA) is encouraging schools [child care centers] to reduce children's exposure to lead from facility drinking water by taking steps that include: testing drinking water for lead; disseminating results to parents, students, staff and other interested stakeholders; and taking appropriate and necessary actions to correct problems.

Exposure to lead is a concern because it is a toxic metal that has a range of adverse health effects, from lowered birth weight and slowed physical and mental development in infants, to lowered IQ levels, impaired hearing, reduced attention span, and poor classroom performance in young children.

Typically, when lead is found in drinking water at unacceptable levels it is from leaching from plumbing materials.

To safeguard our students [children], EPA recently launched a **3Ts for Reducing Lead in Drinking Water in Schools and Child Care Facilities** campaign aimed at encouraging voluntary actions to reduce potential exposure to lead in drinking water. In response, [name of your school] is taking decisive 3Ts action as follows: [note: suggested training, testing, telling actions]

- We are launching an education and awareness initiative to provide **training** to school personnel, parents, custodians and the community at large regarding the risks of lead poisoning and the means of mitigating those risks.

- We are developing a sampling plan so we can conduct **testing** at outlets where students and staff get water for drinking and cooking.

- We are **telling** you, our students' parents and caregivers, the actions we're taking to minimize your child's exposure to lead in drinking water.

Schools <child care centers> like ours, that receive water from a water utility, are not required by state or federal regulations to test for levels of lead in onsite drinking water. It is the responsibility of our water utility to control the corrosivity of the water in order to reduce the likelihood of lead leaching from plumbing, fixtures, solders, and other materials.

However, individual school plumbing may still leach lead. Therefore, in light of increased concern about the possible health effects posed by elevated levels of lead, we are taking the initiative to ensure the drinking water in our facility is safe.

OPTIONAL (Recognizing that communication is key, a *Lead in Drinking Water* Information Display is being set in our main school office. Here, free EPA materials, school handouts and issue updates will be available throughout the day.

We are also in the process of creating a staffed information center in our library, where parents will be able to ask questions, get answers and offer input.)

OPTIONAL (Additionally, we will be scheduling a Lead in Drinking Water Workshop in conjunction with an upcoming <PTA meeting or open house>, so watch for further information about all these activities.)

If you have any immediate concerns or would like to support our effort as a volunteer, please contact us at <telephone> or <email address>.

Meanwhile, if you are concerned about the level of lead to which your children are exposed from drinking water at home, take these precautions:

- Anytime the water in a particular faucet has not been used for six or more hours, "flush" your cold-water pipes by running the water until it becomes as cold as it will get. The more time water has been sitting in your home's pipes, the more lead it may contain. But be aware that flushing may not be effective in high-rise buildings with lead-soldered central piping.

- Use only water from the cold-water tap for drinking, cooking, and especially for making baby formula, as hot water is more corrosive and therefore likely to contain higher levels of lead.

- Have your water tested for lead and other contaminants. That is the only way to know how great a risk your home drinking water poses for the children and adults in your household.

If you decide to test your home water, use a certified laboratory. To assist you, we are making available a list of state certified laboratories in the area, so please pick up a handout before you leave.

I would only add that numerous health, security and educational issues currently compete for our limited resources. It is a great challenge to devote the appropriate attention and find the necessary funding to address all these pressing issues.

Furthermore, voluntary onsite water testing presents a special challenge because the testing itself may be costly, and should a problem be discovered, fixing the problem may be even more costly. We will be prioritizing our activities to ensure we have the resources necessary.

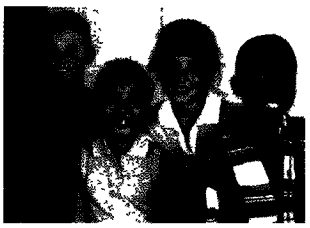
In the meantime, as we move forward, we'll be turning to a variety of partners for resources and expertise, including our water utility, state drinking water program, local health office, certified area laboratories, and local community organizations.

To date, community wide response to our awareness initiative has been tremendous. As we proceed and develop a specific course of action, we intend to keep parents and the public at large informed every step of the way.

If you have further questions about this issue and how we are addressing it, please feel free to discuss them with me. And for further information, please write down these toll-free EPA numbers:

- Consumer Information – (800) 424-LEAD
- Safe Drinking Water Hotline – (800) 426-4791
- State Department of Health - < insert phone number>
- Local Department of Health - < insert phone number>

On behalf of the administration of <School / Child Care Center>, many thanks for your involvement and support.



Ways to Display

Onsite Information

Objective:

An onsite *Lead in Drinking Water* information display serves as a very visible sign that your school or child care center is taking the initiative on this issue. Furthermore, it does not have to be elaborate to be effective. Your display can range from a simple bulletin board or table in the main office where pamphlets are available, to a professional-style kiosk and even a manned information center. Select the option that works best for your facility based on available time and resources.

Options:

1. Bulletin Board or Table Display

- Locate in or near the main administration office.
- Feature student-made signage or art (Suggested theme: What Drinking Water Means to Me).
- Make information easily available for quick pick-up.

2. Entrance Display

- Locate by main entrance.
- Kiosk-style trade-show unit with racks or plastic sleeves to hold pamphlets and handouts.
- Feature a banner, art and/or photography by students (Theme: What Drinking Water Means to Me).
- Rotate student art and/or photography to encourage parents to come in and see their child's work on display.
- Make information easily available for quick pick-up.

- Include a clipboard where visitors can sign up for email updates as new information becomes available.

3. Manned Library Display

- Information table skirted with student-decorated art and/or photography (Theme: What Drinking Water Means to Me).

- Staff during designated morning drop-off, lunchtime, or afternoon pick-up hours, either daily or on select days of the week as schedules allow.

- *Lead in Drinking Water* Volunteers: Assign teachers to staff your display or solicit volunteers, drawing from parents and your community's pool of knowledgeable talent, (i.e. retired teachers; college and university professors in the environmental sciences; professionals in the fields of medicine, public health, water treatment, engineering, plumbing and sanitation).

- Training: Have volunteers attend your *Lead in Drinking Water* Workshop. You may also want to have a separate orientation session so volunteers are completely familiar with the subject and your facility's plan of action. It is critical to public trust that everyone disseminating information knows the facts and presents your facility's position on the issues accurately and consistently.

- Include a clipboard where parents and other interested parties can sign up for email updates as new information becomes available.

- Have the librarian monitor the display to ensure it is staffed at assigned hours and well stocked with pamphlets and handouts.

Information for Distribution:

Order these publications from the National Service Center for Environmental Publications (800) 490-9198:

i. **Actions You Can Take To Reduce Lead in Drinking Water**. Web site publication. US EPA 810-F-93-001. June 1993.

ii. **Is there Lead in the Drinking Water?** Web site publication. US EPA 903-F-01-002. April 2002.

iii. **3Ts for Reducing Lead in Drinking Water in Schools: Revised Technical Guidance.** US EPA 816-B-05-008. December 2005.

iv. **3Ts for Reducing Lead in Drinking Water in Child Care Facilities: Revised Guidance.** US EPA 816-R-05-009. December 2005.

Download relevant articles and publications from the EPA website at http://www.epa.gov/safewater, including the following:

v. **Consumer Fact Sheet on Lead.** Web site article. US EPA. http://www.epa.gov/safewater/dwh/c-ioc/lead.html

vi. **Decision Tree for Pre-Sampling** (at schools). Web site article. US EPA. http://www.epa.gov/safewater/schools

vii. **Lead in Schools and Day Care Centers**. Web site article. US EPA. http://www.epa.gov/safewater/lead/schoolanddccs.htm

viii. **Post-Remediation Sampling** (after replacement of fixtures, pipe, fittings, etc.). US EPA. http://www.epa.gov/safewater/schools

Additional Lead Poison Prevention Information

ix. **National Lead Information Center** – Document Request Site. US EPA. http://www.epa.gov/lead/nlicdocs.htm

x. **EPA's Lead Awareness Program**. US EPA. http://www.epa.gov/lead

xi. **CDC Childhood Lead Poisoning Prevention Program**
http://www.cdc.gov/nceh/lead/lead.htm

xii. **Association of Environmental Clinics Pediatric Environmental Health Specialty Units** (PEHSU) **site**
http://www.aoec.org/PEHSU.htm

Solicit relevant brochures and educational handouts from the following local sources:

xiii. Local water utility (Annual Water Quality Report or Consumer Confidence Report)
xiv. State and local health agencies
xv. Certified local water testing laboratories
xvi. State drinking water program
xvii. State and local environmental groups

Facility staff should review any brochures and educational handouts ahead of time to be sure they understand what information is being provided to parents and the public and that material is appropriate for the situation at their facility.

For additional distribution materials, refer to the toolkit's National Resources and Information section.

Parent and Caregiver Letter

Date

Dear Parent or Caregiver:

We would like to tell you about our plans to reduce potential exposure to lead in drinking water in our facility. The United States Environmental Protection Agency (EPA) promotes healthy school [child care] environments and water quality is one component of a healthy environment. EPA is encouraging schools [child care centers] to reduce children's exposure to lead from facility drinking water by taking a number of steps. These include testing drinking water for lead; disseminating results to parents, students, staff and other interested stakeholders; and taking appropriate and necessary actions to correct problems.

Exposure to lead is a concern because it is a toxic metal that has a range of adverse health effects, from lowered birth weight and slowed physical and mental development in infants to lowered IQ levels, impaired hearing, reduced attention span, and poor classroom performance in young children.

To safeguard our students [children], EPA recently launched a **3Ts for Reducing Lead in Drinking Water in Schools and Child Care Facilities** campaign aimed at encouraging voluntary actions to reduce potential exposure to lead in drinking water. In response, [name of your school] is taking decisive 3Ts action as follows: [note: suggested training, testing, telling actions]

- We are launching an education and awareness initiative to provide **training** to school personnel, parents, custodians and the community at large regarding the risks of lead poisoning and the means of mitigating those risks.

- We are developing a sampling plan so we can conduct **testing** at outlets where students and staff get water for drinking and cooking.

- We are **telling** you, our students' parents and caregivers, the actions we're taking to minimize your child's exposure to lead in drinking water.

Recognizing that communication is key, a *Lead in Drinking Water* Information Display is being set up in the school office. Here, free EPA materials, school handouts, and issue updates will be available throughout the day. [optional :We're also in the process of creating a staffed information center in our library, where you'll be able to ask questions, get answers and offer input.]

Optional [Additionally, we'll be scheduling a lead workshop in conjunction with an upcoming <PTA meeting or open house>, so watch for further information about all these activities as it is sent home with your child.]

If you have any immediate concerns or would like to support our effort as a volunteer, please contact us at <telephone> or <email address>.

We are committed to keeping you informed every step of the way as we implement the 3Ts at our school.

Sincerely,

Administrator

Newsletter Article 1

LEAD IN DRINKING WATER INFORMATION DISPLAY

<School/Child Care Center> to Unveil *Lead in Drinking Water* Information Display

In recent days, concerns have been raised over the level of lead in the drinking water at <Anytown Elementary School>. In an effort to inform the community of ongoing efforts to protect children in our facility, parents and concerned community members will soon be invited to visit the school's new *Lead in Drinking Water* Information Display. Scheduled for introduction on <date>, the display will be located in the main <school/child care> office for easy access. Here, free pamphlets and handouts about lead in drinking water will be available throughout the school day.

In announcing the establishment of this information display, <School Principal/Child Care Administrator John Smith> noted, "The lead levels in <school/child care> drinking water are a growing public concern and we want to be proactive in responding. We're proud to be taking the initiative in keeping our parents and the community informed. Our *Lead in Drinking Water* Information Display is just the first step in our ongoing campaign of education and awareness."

[Optional: According to Mr. Smith, the <school/child care center> plans to open a second, staffed information center in the school library. This will give parents the opportunity to consult with school administrators and health authorities on lead in drinking water and the most effective ways to reduce exposure.]

The U.S. Environmental Protection Agency (EPA) recently launched a campaign to reach out to schools and child care centers across the country. This EPA initiative is focused on promoting voluntary testing of drinking water for lead, taking corrective action if problems are identified, and sharing testing results and plans for reducing lead exposure in drinking water with parents, staff, students, and the community at large.

Concluded <Mr. Smith>, "We are responding to EPA's voluntary call to action because we believe our children should have confidence in their drinking water while at our facility. Furthermore, we are committed to keeping our parents and the public informed as we work to ensure drinking water quality."

####

Newsletter Article 2

LEAD TESTING

<School/Child Care Center> Announces Lead Testing

The administration of <School/Child Care Center> has announced that it will be conducting on-site testing of drinking water outlets to check for elevated levels of lead. This voluntary testing is being conducted to ensure the health and safety of everyone who uses our facility, including children, parents, faculty and the community at large.

Schools and child care facilities that receive water from a drinking water system are not required by state or federal regulations to conduct sampling for lead. Nevertheless, the administration of <School/Child Care Center> has determined that it is in the public's best interest to take the initiative in dealing with this potential health risk. To that end, following instructions provided in an EPA guidance document designed especially for schools and child care facilities, we developed a plan for testing.

Having identified those drinking water outlets, testing is scheduled to take place on <time period> using EPA-approved instructions. These samples will then be analyzed by a certified laboratory. (Optional: During the sampling period, bottled water will be provided to all children and adults on the premises.)

We will share the results of our testing as soon as they are available. A copy of the test results will be posted in our administration office for review by parents, staff and the general community.

####

Information Update Announcement

Objective: This postcard-style announcement is designed to provide an effective and affordable way to communicate with parents and caregivers on a regular basis. Your proactive approach will be most likely to garner support if you communicate with parents frequently and forthrightly.

Please note that having the announcement delivered, returned by the student, and signed by the parent will cut costs and help guarantee the information arrives at home. Having parents sign will ensure it receives appropriate attention.

FRONT:

We're looking out for your child by looking out for lead in drinking water!

Graphic: group visual of infant with bottle and toddler and first-grader holding glasses of water. (This illustrates the most at-risk age groups.)

Caption: <Name of School or Child Care Center> wants you to know what we are doing to assure the quality of drinking water at our facility.

BACK:

Join our Lookout for Lead in Drinking Water!

Here's the latest on our Lead in Drinking Water awareness campaign. We invite you to become better informed and more involved. With your support, we can ensure your children receive quality drinking water at our facility and at home.

Option 1:

Headline: **Introducing our *Lead in Drinking Water* Information Display <Optional>**

A *Lead in Drinking Water* display has been set up in our main office. Here, free Environmental Protection Agency (EPA) materials, school handouts, and issue updates are now available throughout the day. Optional (We've also established a staffed information center in our library. Open <every afternoon from 2 – 3 p.m.>, please come in to ask questions, get answers, and offer your input.)

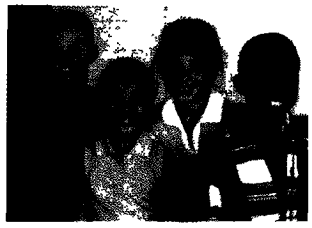
<Name of School/Child Care Center>
<Address and Telephone Number>
<Lead in Drinking Water Hotline:> (if applicable)
<Email Address>

Option 2:

Headline: **Join your PTA for a *Lead in Drinking Water* Open House**.

We are presenting a Lead in Drinking Water Open House in conjunction with your upcoming PTA meeting on <date of event>. Please join us to get the facts. Find out what steps we are taking to address the issue and minimize lead exposure from drinking water.

<Name of School/Child Care Center>
<Address and Telephone Number>
<Lead in Drinking Water Hotline:> (if applicable)
<Email Address>



Issue and Crisis Management

Guidelines

Objective:
At the heart of an effective issue/crisis management plan is preparation and coordination to deliver information swiftly, professionally and consistently. Preventing issues from escalating into crises demands a proactive approach designed to shape public opinion, defuse flashpoints, and counter any actual or potentially negative, misleading or misinformed word-of-mouth and/or media coverage.

1. Follow these communication guidelines for enhancing public perception.

- Take the initiative in providing information.
- Make sure your information is honest, accurate and comprehensive.
- Speak with one consistent voice.
- Anticipate questions and concerns and address them proactively.
- Be positive and forthcoming.
- Keep your audiences up to date as new information becomes available.

2. Form an issue/crisis management task force in advance.

- Assemble a team with technical, advocacy and communications expertise. Draw from internal resources as well as professionals and leaders in the community. Designate a single spokesperson to make announcements, respond to questions and conduct interviews. Doing so is critical to ensuring the accuracy and consistency of public information.

3. Create a contact list.

- Having names, phone numbers, fax numbers and email addresses at your fingertips is vital, especially when a quick response is necessary. Create a contact list and update it regularly. It should include task force members as well as fact-finding and communications contacts, including:
  - School Superintendent
  - School Board Members
  - Civic Leaders
  - Local Public Health Officials
  - Head of Building Maintenance/Custodial Services
  - State Department of Education
  - State Department of Health
  - State Drinking Water Program
  - EPA Regional Office
  - Utility/Water Supplier
  - Media (Newspaper, TV, Radio, Web and Newswire Outlets)

4. Define what constitutes an issue or crisis.

- **Issue:** A situation or specific event that has the potential to undermine credibility and positive public perception.

- **Crisis:** An event or series of events that directly damage your facility's reputation by demonstrating or implying a failure to ensure public safety.

5. Identify your target audiences for ongoing issue/crisis communication.

- **Internal:**
  - Teachers
  - Administrative Staff
  - Custodial Staff

- **External:**
  - Students and Parents
  - Media
  - Local Health Community
  - Local Drinking Water Community
  - Local Environmental Community
  - Local Lead Poisoning Prevention Program

6. Launch an ongoing campaign of education and awareness, capitalizing on a variety of communication vehicles.

- Press Releases (media)
- Follow-up Letters and Flyers (parents)
- Paycheck Stuffers (school or child care employees)
- Newsletter (parents and staff)
- Newsletter Articles (for advocacy groups, parent-teacher organizations, chambers of commerce, service clubs and other stakeholders)
- Postcard-style Information Updates (parents)
- Workshop/Open House (parents and community at large)
- Presentations (before a variety of local civic and community groups)

7. Prepare a fact sheet so that your task force spokesperson has accurate, up-to-date information about the status of your plumbing system and water source. Information should include answers to the following questions:

- When was the building constructed?
- Since then, have any new buildings or additions been constructed?
- If built after 1986, were lead-free plumbing and solder used in accordance with the requirements of the 1986 Safe Drinking Water Act Amendments?
- What are the potable water pipes made of in your facility? Does your facility contain components that may leach lead?
- Has your school or child care center checked the brands and models of water coolers to see if they are on EPA's list of banned coolers with lead-lined tanks?
- Has water quality testing been conducted at your facility? Were samples tested for lead, and if so, what concentrations of lead were found?
- Is water tested regularly for lead at your facility?
- Who supplies your facility's drinking water?
- According to information provided by your public water supplier:
  - Is the water system in compliance with federal and state standards for lead?
  - What is the latest 90th percentile lead level for the public water system?
  - Does the utility collect samples from your facility?
  - Is a corrosion control chemical being used? Does the system have results to show the effectiveness of the control measures? If so, what are they?
  - Does the water distribution system have any lead piping? If so, does the public water system plan to remove these sources of lead?
  - Will your water system provide assistance to support your efforts to minimize exposure to lead in your facility's drinking water?

- If potential problem areas have been identified and a sampling plan is being developed, provide answers to the following questions:
  - Who is heading up your sampling effort?
  - Who will collect and analyze samples and maintain records?
  - Where will the samples be collected?

- If sampling has just been completed, have answers to these questions:
  - What were the results?
  - Did lead levels exceed the EPA level of concern of 20 ppb? If so, at which drinking water outlets?
  - What is being done on an immediate, short-term and permanent basis to address any identified problems?
  - How are sampling results being made available to the public, including parents, teachers and other staff members, the media, and relevant parent, teacher, student and employee organizations?
  - If concerned, how and where can individuals be tested for blood lead levels?

Mona Hanna-Attisha MD MPH FAAP
Director, Pediatric Residency Program
Hurley Children's Hospital
Michigan State University

On Oct 23, 2015, at 3:58 PM, LaRocco, Toni <tlarocco@gchd.us> wrote:

> Hi all,
>
> We are planning to meet on Monday at 10:30 at the following address:
>
> Flint Community Schools
> Administration Building
> Health Services
> 923 E. Kearsley St.
> Flint, MI 48503
>
> Upon arrival please ask the receptionist for the location of the meeting.

Toni L LaRocco MS, RN
Director of Nursing Services
Genesee County Health Department
810.237.4544
tlarocco@gchd.us

"Gratitude unlocks the fullness of life. It turns what we have into enough, and more. It turns denial into acceptance, chaos to order, confusion to clarity. It can turn a meal into a feast, a house into a home, a stranger into a friend. Gratitude makes sense of our past, brings peace for today, and creates a vision for tomorrow." - Melody Beattie

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For a copy of the Health Department's Notice of Information Practices, contact the Health Department or visit the Health Department's website at http://www.gchd.us/

From: Wells, Eden (DHHS)
Sent: Sunday, October 25, 2015 6:37 PM
To: Moran, Susan (DHHS);Robinson, Mikelle (DHHS);Miller, Mark (DHHS);Lasher, Geralyn (DHHS);Hertel, Elizabeth (DHHS);Travis, Rashmi (DHHS);LaRocco, Toni;Valacak, Mark;hmcshane@gchd.us;Thompson, Sheryl D. (DHHS);Schoenow, Kris (DHHS);tbrickey@gchd.us
Subject: Fwd: Final Press Release/ with attachments
Attachments: GCHD MDHHS Letters PR DRAFT 5 102515.docx; ATT00001.htm; Parent Letter_Draft 8 102515.docx; ATT00002.htm; Provider letter_DRAFT5 102515.docx; ATT00003.htm

Sorry- attached.

Sent from my iPhone

Begin forwarded message:

> **From:** "Minicuci, Angela (DHHS)" <MinicuciA@michigan.gov>
> **Date:** October 25, 2015 at 1:44:23 PM EDT
> **To:** "Wells, Eden (DHHS)" <WellsE3@michigan.gov>
> **Subject: Re: Final Press Release**
>
> Hi Eden,
>
> Attached are the updated letters and press release with the Governor's office edits. Can you please circulate with those on the 3pm call to make sure that these are final?
>
> Thanks!
>
> Angela
>
> ---
>
> **From:** Minicuci, Angela (DHHS)
> **Sent:** Friday, October 23, 2015 5:00 PM
> **To:** Wells, Eden (DHHS)
> **Subject:** RE: Final Press Release
>
> Have fun and have a good weekend!
>
> Angela

From: Wells, Eden (DHHS)
Sent: Friday, October 23, 2015 4:56 PM
To: Minicuci, Angela (DHHS) <MinicuciA@michigan.gov>
Subject: Re: Final Press Release

You ROCK!!!
Hey- gotta talk about polio tonight wearingh CME hat at 7. Here at UM oddly. Have a good weekend! Hope you feel better

Sent from my iPhone

On Oct 23, 2015, at 4:48 PM, Minicuci, Angela (DHHS) <MinicuciA@michigan.gov> wrote:

> Updated letters with the correct numbers attached. Do these look good?
>
> The press release was intended for GCHD distribution when the letters go. If there are no additional changes, the attached is ready to go out whenever the letters are. Just let us know ahead of time so that we can be ready for calls! Thank you!
>
> Angela
>
> **From:** LaRocco, Toni [mailto:tlarocco@gchd.us]
> **Sent:** Friday, October 23, 2015 4:44 PM
> **To:** Wells, Eden (DHHS) <WellsE3@michigan.gov>; McShane, Hilda <hmcshane@gchd.us>; Valacak, Mark <MVALACAK@gchd.us>
> **Cc:** Eisner, Jennifer (DHHS) <EisnerJ@michigan.gov>; Minicuci, Angela (DHHS) <MinicuciA@michigan.gov>
> **Subject:** RE: Final Press Release
>
> So is all this coming back in one email with all the blessed attachments? Parent and provider?
>
> **From:** Wells, Eden (DHHS) [mailto:WellsE3@michigan.gov]
> **Sent:** Friday, October 23, 2015 4:42 PM
> **To:** LaRocco, Toni; McShane, Hilda; Valacak, Mark
> **Cc:** Eisner, Jennifer (DHHS); Minicuci, Angela (DHHS)
> **Subject:** Final Press Release
>
> Just FYI, as we had some things we wanted to fix---I know HIlda is out but so she gets final version.
>
> E
>
> **From:** Minicuci, Angela (DHHS)
> **Sent:** Friday, October 23, 2015 4:05 PM
> **To:** Wells, Eden (DHHS)
> **Cc:** Lasher, Geralyn (DHHS); Eisner, Jennifer (DHHS)
> **Subject:** RE: UPDATED Letters and Press Release

RESENDING -

Hi Eden,

As we discussed, attached is the current draft of the letters (provider and UPDATED parent), and the updated press release, to reflect the changes to the parent letter. Please circulate this with those on the 3pm call.

Thank you,

Angela Minicuci

Office of External Relations and Communications

Michigan Department of Health and Human Services

Office: (517) 241-2112
Mobile: [PPI]
minicucia@michigan.gov
www.michigan.gov/mdhhs

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<GCHD MDHHS Letters PR DRAFT 4.docx>

<Parent Letter_Draft 6_October 22.docx>

<Provider letter_DRAFT3_edited.docx>

<Parent Letter_Draft 7.docx>
<Provider letter_DRAFT4_edited.docx>
<GCHD MDHHS Letters PR DRAFT 4.docx>

FOR IMMEDIATE RELEASE – DRAFT
GCHD CONTACT:
MDHHS CONTACT: Jennifer Eisner, (517) 241-2112, EisnerJ@michigan.gov

GCHD and MDHHS Partner to Issue Guidance to Flint Parents, Providers

FLINT, Mich. – In a joint effort to continue informing the community about lead exposure, the Genesee County Health Department (GCHD) and Michigan Department of Health and Human Services (MDHHS) today issued letters to parents and the provider community in Flint to assist in providing guidance to support families.

In response to the elevated blood lead levels found in some Flint children, GCHD and MDHHS have worked together closely to develop guidance for families and providers.

GCHD QUOTE

Parents are being provided information regarding lead testing, how to reduce lead exposure for your family, where lead comes from, and community and state resources for more information. Children can be exposed to lead from drinking water in lead pipes, old lead paint, soil, pottery, cosmetics and toys and some home remedies. Adult jobs and hobbies, like auto repair, stained glass and jewelry making, and ammunitions handling can also put children at risk if they touch clothing or play in areas where lead is found.

"As we continue to find ways to inform and guide the Flint community towards reducing lead exposures, we are appreciate of the collaboration with Genesee County Health Department," said Dr. Eden Wells, Chief Medical Executive with MDHHS. "Parents and providers can take a number of steps to help reduce exposure, identify signs of lead poisoning, and begin follow up care as needed. Working together we can all help to protect the health of families in Flint."

Primary care providers can assist in helping to ensure that children and families exposed to lead receive the care and resources they need to manage the potential health impacts of lead poisoning. MDHHS and GCHD worked with Dr. Mona Hanna-Attisha of the Hurley Medical Center to develop testing protocols and guidance regarding identification of lead poisoning, management of elevated blood lead levels, follow-up care, and community and state resources.

GCHD and MDHHS issued the following recommendations for parents:

- Families who live in the City of Flint and are on the Flint water system or who attend school, childcare, or spend time with a caregiver in the City of Flint, are encouraged to get their children tested for lead poisoning at their doctor's office or GCHD.
- Families can get their water tested for lead for free. Call 810-787-6537 for details about how.
- Families are encouraged to use a water filter in their home, and free filters are still available. Call 2-1-1 for information about where to pick up a free filter.
- Use filtered tap water for drinking (including making coffee, drink mixes, juice, baby formula), and cooking (even if you boil the water, the lead will stay in the water and food). Always use cold water when cooking.
- You can use unfiltered tap water for washing your hands, and washing dishes. If using unfiltered water, run the water for at least five minutes before you use it.
- Safe cleaning can also reduce the risk of lead exposure in the home. You can use unfiltered tap water for the following wiping down countertops, mopping floors, and washing clothes.

- Keep children away from lead paint and dust; use wet paper towels to clean up lead dust around windows, play areas and floors; and wash hands and toys often, using soap and water
- Lastly, always wash fruits with filtered water. Some foods help keep lead from being stored in the child's body, such as Calcium rich foods, Iron rich foods, and foods with Vitamin C.

GCHD and MDHHS will continue to provide more information to the community regarding reducing lead exposure and protecting the health of Flint residents. For more information, visit www.michigan.gov/lead.

# # #

This Document is a Non-Responsive Attachment.

October 25, 2015

Dear Parent,

To help make sure the children of Flint are safe from lead exposure, the Genesee County Health Department and the Michigan Department of Health and Human Services want to help you understand:

- Where does lead come from?
- What can I do to protect my family?
- Should I get my child tested for lead?
- Where can I find more information about lead?

Where does lead come from?

Lead is a serious health hazard, especially for small children who become lead poisoned when they eat, drink or breathe lead. Elevated levels of lead have been found in the drinking water from lead pipes in the City of Flint. Kids can also be exposed to lead from old lead paint, soil, pottery, cosmetics and toys and some home remedies. Adult jobs and hobbies, like auto repair, stained glass, jewelry making and ammunitions handling can also put children at risk if they touch clothing or play in areas where lead is found.

Should my child get a blood lead test?

Children who live in the City of Flint, live in a home using City of Flint water, or who attend school, childcare or often spend time with a caregiver in the City of Flint should be tested for lead poisoning. *This should be done as soon as possible.*

Where should I go to get a blood lead test for my child?

The best place to get your child's blood lead test is your doctor's office. Your pediatrician will follow up with you on lab tests and provide you with information on what to do next. You can also have a lead test at the Genesee County Health Department. If you need transportation, contact 2-1-1 for help.

Understanding your child's lead test result.

A lead level below 5 means there is little or no lead in your child's blood. Use the tips below to help keep your child safe. Your doctor may suggest retesting your child within the next 12 months to make sure the level does not go up.

A lead level of 5-14 means that your child has had some exposure to lead. Work with your doctor and local health department for further guidance on how to limit your lead exposure. Your doctor may retest your child in 1-3 months to make sure the level does not go up.

Children with very high levels of lead **(over 40)** may require treatment at the hospital.

What Can I Do to Keep My Family Safe?

The following steps should be taken right away to help protect you and your child.

Protecting your family from lead in the water:

- Get your water tested for lead. It's free. Call (810) 787-6537 to learn more.
- Use a water filter in your home. Call 2-1-1 for information on free water filters.
- If you do not have a water filter, use bottled water for drinking and mixing formula.
- Use filtered tap water for drinking (including making coffee, drink mixes, juice, baby formula), and cooking (even if you boil the water, the lead will stay in the water and food). Always use cold water when cooking.
- You can use unfiltered tap water for washing your hands, and washing dishes. If using unfiltered water, run the water for at least five minutes before you use it.

Safe cleaning:

Safe Cleaning is important. Keeping your home clean and safe from lead hazards will help to protect your family.

- You can use unfiltered tap water for the following wiping down countertops, mopping floors, and washing clothes.
- Keep children away from lead paint and dust.
- Use wet paper towels to clean up lead dust. Be sure to clean around windows, play areas and floors.
- Wash hands and toys often, using soap and water.

Good nutrition:

Some foods will help keep lead from being stored in a child's body. These are foods with a lot of calcium, iron and vitamin C. These foods include:

Calcium Rich Foods	Iron Rich Foods	Foods with Vitamin C

Draft

- Milk
- Cheese
- Yogurt
- Tofu
- Spinach
- Beans
- Lean meats like fish and chicken
- Whole grain cereals
- Peanut butter
- Oranges
- Orange juice
- Grapefruits
- Tomatoes
- Green peppers

Always wash your fruits with filtered water. If you are concerned about your child's diet, talk with your pediatrician who may also recommend a daily multivitamin.

WIC and SNAP provide assistance to parents and children who need fresh and healthy foods. Contact the **Genesee County WIC office at (810) 237-4537** to learn more. SNAP also offers a Double Bucks program to purchase even more healthy food for no additional costs.

Where can I get more information on lead?

- Genesee County Health Department Lead Program
  (810) 257-3833
- Michigan Department of Health and Human Services Childhood Lead Poisoning Prevention Program
  (888) 322-4453
  www.michigan.gov/lead
- United States Environmental Protection Agency
  www.epa.gov/lead
- U.S. Centers for Disease Control and Prevention (CDC) Web site
  www.cdc.gov/nceh/lead

Draft

This Document is a Non-Responsive Attachment.

PROVIDER DRAFT LETTER V.5
October 25, 2015
LoRocco Edits,Travis Edits,Attisha Edits, Peeler, Minicuci Edits
Cross checked with parent letter

Dear Provider:

As you may be aware from recent news reports, elevated levels of lead have been found in lead pipes within the City of Flint's water system.

To help protect the children of Flint from the current lead in water exposure, the Genesee County Health Department and Michigan Department of Health and Human Services are contacting you to assist you in providing guidance to support your families.

Children can be exposed to lead from drinking water in lead pipes, old lead paint, soil, pottery, cosmetics and toys and some home remedies. Adult jobs and hobbies, like auto repair, stained glass and jewelry making, and ammunitions handling can also put children at risk if they touch clothing or play in areas where lead is found.

As a primary care provider, you play a critical role in helping to ensure that children and families exposed to lead receive the care and reassurances they need to manage the potential health impacts of lead poisoning.

Identification. Children suffering from lead poisoning often fail to present outward symptoms. However, early clinical symptoms can include anemia, anorexia, abdominal pain and constipation. Lead is a neuro-toxin, and exposure can result in violent and aggressive behaviors, lead to learning disorders, may cause Attention Deficit Hyperactivity Disorder (ADHD) and has been known to reduce IQ by as many as 5-8 points with levels as low as 10 ug/dL. Lead is metabolized through the gastrointestinal system similar to iron and calcium, with uptake rates depending on the size and weight of the child. The blood half-life of lead is short (approximately 1 month) but the bone half-life can extend into decades.

Due to multiple risk factors facing many residents in the City of Flint (including aging housing conditions and water quality), we recommend that all children under age 6 living in the City of Flint or living in homes that use Flint water, attending school or childcare in Flint, or who spend time with a caregiver in the City of Flint, receive a blood lead test. Blood lead testing should be done through a child's primary care doctor to ensure adequate short-term and long-term follow-up. ***Families should be encouraged to have their children tested immediately either at their doctor's office or the Genesee County Health Department***.

Management of Blood Lead Levels. The following guidance is provided for management of childhood blood lead levels:

- **BLL < 5 ug/dL**
  - A lead level of less than 5 mcg/dL is not typically cause for concern.
  - Provide education and anticipatory guidance to ensure that lead levels do not rise.
  - Consider retesting in 12 months based on risk factors or concerns.
- **BLL >5 ug/dL**
  - **Children with capillary results of 5 ug/dL and higher must have a confirmatory venous blood draw.**
  - Families should receive anticipatory guidance, nutrition counseling, instruction on safe cleaning techniques and appropriate follow-up care from their primary care provider.

PROVIDER DRAFT LETTER V.5
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- In-home services including case management and environmental investigations are available for all children with lead levels greater than 5 ug/dL. Refer patients to the Genesee County Health Department for this service.
- Children with confirmed venous testing results greater than 5ug/dL within the past 18 months must be retested based on Medicaid policy and AAP guidelines. (See attached "Provider Quick Reference). If a child has not been retested within these timeframes, retesting is recommended as soon as possible.

- **BLL > 44 ug/dL.**
  - **Children with capillary results of 5 ug/dL and higher must have a confirmatory venous blood draw.**
  - Lead levels over 44 ug/dL may require hospitalization. Consult with an expert at the Children's Hospital of Michigan in Detroit for additional guidance.
  - Families should receive anticipatory guidance, nutrition counseling, instruction on safe cleaning techniques and appropriate follow-up care from their primary care provider.
  - In-home services including case management and environmental investigations are available for all children with lead levels greater than 5 ug/dL. Refer patients to the Genesee County Health Department for this service.
  - Children with confirmed venous testing results greater than 5ug/dL within the past 18 months must be retested based on Medicaid policy and AAP guidelines. (See attached "Provider Quick Reference). If a child has not been retested within these timeframes, retesting is recommended as soon as possible.

Reminder: All children covered by Medicaid must be tested at age 1 and 2.

Follow-up Care. As providers, there are steps you can take to help support your families:

1. Continue to inform and educate families regarding lead risks and preventative steps that they can take to minimize their risks.
2. Encourage your families to use filtered water for drinking, mixing formula and washing dishes. Families can contact 2-1-1 for information on free water filters.
3. Healthy nutrition is critical for lead-exposed children. Make sure your patients are consuming balanced diets high in iron, calcium and Vitamin C. If you have concerns about their nutrition, consider recommending a multivitamin with iron. WIC and SNAP provide assistance to parents and children who need fresh and healthy foods. Contact the Genesee County WIC office at (810) 237-4537 to learn more. In addition, SNAP offers a Double Bucks program that can provide healthy foods for less.
4. Breastfeeding is highly protective and encouraged. However, if the mother's blood lead level rises above 40ug/dL or her level is greater than 20 ug/dL and the baby has a level above 5 ug/dL breastfeeding is not recommended.
5. Because lead is a neuro-toxin, children with lead poisoning need longitudinal follow-up and may require developmental and behavioral health intervention services. Continue monitoring your patients' development at every visit.
6. Consider additional wrap-around and support services that will benefit your patients such as early childhood home visiting programs, early head start and head start. Call 2-1-1 for more information.

PROVIDER DRAFT LETTER V.5
October 25, 2015
LoRocco Edits,Travis Edits,Attisha Edits, Peeler, Minicuci Edits
Cross checked with parent letter

Local Resources. Several local resources are available to you and your patients:

- Blood Testing. Patients are encouraged to contact their primary care provider for testing. The Genesee County Health Department also administers lead tests. Patients in need of transportation should contact 2-1-1 for assistance.
- Water Testing. Water testing is free through the City of Flint Water Testing Plant. Patients can call 810-787-6537 to learn more.
- WIC and SNAP provide assistance to parents and children who need fresh and healthy foods. Contact the Genesee County WIC office at (810) 237-4537 to learn more.
- Child Development. If you have concerns about a child's growth, development or learning contact 2-1-1 for a Home Visiting Program in your area.

Websites and contact information.

- Genesee County Health Department Lead Program
  (810) 257-3833
- Michigan Department of Health and Human Services Childhood Lead Poisoning Prevention Program
  (888) 322-4453
- Michigan Department of Health and Human Services Lead Poisoning Prevention Video for Primary Care Providers on Youtube at /www.youtube.com/watch?v=AnkjCW_yGaU&feature=youtu.be.
- www.michigan.gov/lead
  United States Environmental Protection Agency
  www.epa.gov/lead
- U.S. Centers for Disease Control and Prevention (CDC) Web site
  www.cdc.gov/nceh/lead

draft 3

This Document is a Non-Responsive Attachment.

From: Wells, Eden (DHHS)
Sent: Sunday, October 25, 2015 6:58 PM
To: Moran, Susan (DHHS)
Subject: Re: Final Press Release/ with attachments

You are amazing-

Sent from my iPhone

On Oct 25, 2015, at 6:56 PM, Moran, Susan (DHHS) <MoranS@michigan.gov> wrote:

> Documents look great, a couple edits—
>
> ~~Press Release:~~
> "As we continue to find ways to inform and guide the Flint community towards reducing lead exposures, we are ~~appreciate~~ appreciative of the collaboration with Genesee County Health Department," said Dr. Eden Wells, Chief Medical Executive with MDHHS. "Parents and providers can take a number of steps to help reduce exposure, identify signs of lead poisoning, and begin follow up care as needed. Working together we can all help to protect the health of families in Flint."
>
> ~~Parent Letter:~~ The word doctor is used throughout the document- we should stay consistent.
> **Where should I go to get a blood lead test for my child?**
>
> The best place to get your child's blood lead test is your doctor's office. Your doctor ~~pediatrician~~ will follow up with you on lab tests and provide you with information on what to do next. You can also have a lead test at the Genesee County Health Department. If you need transportation, contact 2-1-1 for help.

From: Wells, Eden (DHHS)
Sent: Sunday, October 25, 2015 6:37 PM
To: Moran, Susan (DHHS); Robinson, Mikelle (DHHS); Miller, Mark (DHHS); Lasher, Geralyn (DHHS); Hertel, Elizabeth (DHHS); Travis, Rashmi (DHHS); LaRocco, Toni; Valacak, Mark; hmcshane@gchd.us; Thompson, Sheryl D. (DHHS); Schoenow, Kris (DHHS); tbrickey@gchd.us
Subject: Fwd: Final Press Release/ with attachments

Sorry- attached.

Sent from my iPhone

Begin forwarded message:

> **From:** "Minicuci, Angela (DHHS)" <MinicuciA@michigan.gov>
> **Date:** October 25, 2015 at 1:44:23 PM EDT

To: "Wells, Eden (DHHS)" <WellsE3@michigan.gov>
Subject: Re: Final Press Release

Hi Eden,

Attached are the updated letters and press release with the Governor's office edits. Can you please circulate with those on the 3pm call to make sure that these are final?

Thanks!

Angela

From: Minicuci, Angela (DHHS)
Sent: Friday, October 23, 2015 5:00 PM
To: Wells, Eden (DHHS)
Subject: RE: Final Press Release

Have fun and have a good weekend!

Angela

From: Wells, Eden (DHHS)
Sent: Friday, October 23, 2015 4:56 PM
To: Minicuci, Angela (DHHS) <MinicuciA@michigan.gov>
Subject: Re: Final Press Release

You ROCK!!!
Hey- gotta talk about polio tonight wearingh CME hat at 7. Here at UM oddly. Have a good weekend! Hope you feel better

Sent from my iPhone

On Oct 23, 2015, at 4:48 PM, Minicuci, Angela (DHHS) <MinicuciA@michigan.gov> wrote:

> Updated letters with the correct numbers attached. Do these look good?
>
> The press release was intended for GCHD distribution when the letters go. If there are no additional changes, the attached is ready to go out whenever the letters are. Just let us know ahead of time so that we can be ready for calls! Thank you!

Angela

From: LaRocco, Toni [mailto:tlarocco@gchd.us]
Sent: Friday, October 23, 2015 4:44 PM
To: Wells, Eden (DHHS) <WellsE3@michigan.gov>; McShane, Hilda <hmcshane@gchd.us>; Valacak, Mark <MVALACAK@gchd.us>
Cc: Eisner, Jennifer (DHHS) <EisnerJ@michigan.gov>; Minicuci, Angela (DHHS) <MinicuciA@michigan.gov>
Subject: RE: Final Press Release

So is all this coming back in one email with all the blessed attachments? Parent and provider?

From: Wells, Eden (DHHS) [mailto:WellsE3@michigan.gov]
Sent: Friday, October 23, 2015 4:42 PM
To: LaRocco, Toni; McShane, Hilda; Valacak, Mark
Cc: Eisner, Jennifer (DHHS); Minicuci, Angela (DHHS)
Subject: Final Press Release

Just FYI, as we had some things we wanted to fix---I know HIlda is out but so she gets final version.

E

From: Minicuci, Angela (DHHS)
Sent: Friday, October 23, 2015 4:05 PM
To: Wells, Eden (DHHS)
Cc: Lasher, Geralyn (DHHS); Eisner, Jennifer (DHHS)
Subject: RE: UPDATED Letters and Press Release

RESENDING -

Hi Eden,

As we discussed, attached is the current draft of the letters (provider and UPDATED parent), and the updated press release, to reflect the changes to the parent letter. Please circulate this with those on the 3pm call.

Thank you,

Angela Minicuci

Office of External Relations and Communications

Michigan Department of Health and Human Services

Office: (517) 241-2112
Mobile: PPI
minicuciа@michigan.gov
www.michigan.gov/mdhhs

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<GCHD MDHHS Letters PR DRAFT 4.docx>

<Parent Letter_Draft 6_October 22.docx>

<Provider letter_DRAFT3_edited.docx>

<Parent Letter_Draft 7.docx>
<Provider letter_DRAFT4_edited.docx>
<GCHD MDHHS Letters PR DRAFT 4.docx>

From: Wells, Eden (DHHS)
Sent: Monday, October 26, 2015 8:26 AM
To: Brickey, Tamara
Cc: Moran, Susan (DHHS);Robinson, Mikelle (DHHS);Miller, Mark (DHHS);Lasher, Geralyn (DHHS);Hertel, Elizabeth (DHHS);Travis, Rashmi (DHHS);LaRocco, Toni;Valacak, Mark;McShane, Hilda;Thompson, Sheryl D. (DHHS);Schoenow, Kris (DHHS)
Subject: Re: Final Press Release/ with attachments

So- stating that flushing the tap for 5 minutes first time of day or other? We are using the FAQ- we would have to look back at that.

Sent from my iPhone

On Oct 26, 2015, at 8:15 AM, Brickey, Tamara <tbrickey@gchd.us> wrote:

> Hi all,
>
> I was out of the office Friday so I apologize for the late response. With the parent letter, do you mean to communicate that you need to run the tap for five minutes before you can wash your hands? "You can use unfiltered tap water for washing your hands, and washing dishes. If using unfiltered water, run the water for at least five minutes before you use it." This sentence reads as though every time you wash your hands with unfiltered water, you need to run the tap for five minutes. I know most families will have concern with that.
>
> Thanks,

Tamara Brickey, MS, CHES

Public Health Division Director
Genesee County Health Department
630 S. Saginaw Street
Suite 4
Flint, MI 48502
(810) 257-3202 Fax: (810) 257-3147
tbrickey@gchd.us

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From: Moran, Susan (DHHS) [mailto:MoranS@michigan.gov]
Sent: Sunday, October 25, 2015 6:56 PM
To: Wells, Eden (DHHS); Robinson, Mikelle (DHHS); Miller, Mark (DHHS); Lasher, Geralyn (DHHS); Hertel, Elizabeth (DHHS); Travis, Rashmi (DHHS); LaRocco, Toni; Valacak, Mark; McShane, Hilda; Thompson, Sheryl D. (DHHS); Schoenow, Kris (DHHS); Brickey, Tamara
Subject: RE: Final Press Release/ with attachments

Documents look great, a couple edits—

Press Release:

"As we continue to find ways to inform and guide the Flint community towards reducing lead exposures, we are ~~appreciate~~ appreciative of the collaboration with Genesee County Health Department," said Dr. Eden Wells, Chief Medical Executive with MDHHS. "Parents and providers can take a number of steps to help reduce exposure, identify signs of lead poisoning, and begin follow up care as needed. Working together we can all help to protect the health of families in Flint."

Parent Letter: The word doctor is used throughout the document- we should stay consistent.

Where should I go to get a blood lead test for my child?

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Subject: Fwd: Final Press Release/ with attachments

Sorry- attached.

Sent from my iPhone

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> **From:** "Minicuci, Angela (DHHS)" <MinicuciA@michigan.gov>
> **Date:** October 25, 2015 at 1:44:23 PM EDT
> **To:** "Wells, Eden (DHHS)" <WellsE3@michigan.gov>
> **Subject: Re: Final Press Release**
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Thanks!

Angela

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(DHHS) <MinicuciA@michigan.gov>
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Office of External Relations and Communications

Michigan Department of Health and Human Services

Office: (517) 241-2112
Mobile: PPI
minicucia@michigan.gov
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<GCHD MDHHS Letters PR DRAFT 4.docx>

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To: Lasher, Geralyn (DHHS);Hertel, Elizabeth (DHHS);Lyon, Nick (DHHS);Becker, Timothy (DHHS)
Cc: Grijalva, Nancy (DHHS)
Subject: Fwd: Final Press Release
Attachments: GCHD MDHHS Letters PR DRAFT 5 102515.docx; ATT00001.htm; Parent Letter_Draft 8 102515.docx; ATT00002.htm; Provider letter_DRAFT5 102515.docx; ATT00003.htm

I know Rep Neeley will want, from his request Friday, to see these versions, and I met with him at 10---- share or no?

Sent from my iPhone

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Michigan Department of Health and Human Services

Office: (517) 241-2112
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FOR IMMEDIATE RELEASE – DRAFT
GCHD CONTACT:
MDHHS CONTACT: Jennifer Eisner, (517) 241-2112, EisnerJ@michigan.gov

GCHD and MDHHS Partner to Issue Guidance to Flint Parents, Providers

FLINT, Mich. – In a joint effort to continue informing the community about lead exposure, the Genesee County Health Department (GCHD) and Michigan Department of Health and Human Services (MDHHS) today issued letters to parents and the provider community in Flint to assist in providing guidance to support families.

In response to the elevated blood lead levels found in some Flint children, GCHD and MDHHS have worked together closely to develop guidance for families and providers.

GCHD QUOTE

Parents are being provided information regarding lead testing, how to reduce lead exposure for your family, where lead comes from, and community and state resources for more information. Children can be exposed to lead from drinking water in lead pipes, old lead paint, soil, pottery, cosmetics and toys and some home remedies. Adult jobs and hobbies, like auto repair, stained glass and jewelry making, and ammunitions handling can also put children at risk if they touch clothing or play in areas where lead is found.

"As we continue to find ways to inform and guide the Flint community towards reducing lead exposures, we are appreciate of the collaboration with Genesee County Health Department," said Dr. Eden Wells, Chief Medical Executive with MDHHS. "Parents and providers can take a number of steps to help reduce exposure, identify signs of lead poisoning, and begin follow up care as needed. Working together we can all help to protect the health of families in Flint."

Primary care providers can assist in helping to ensure that children and families exposed to lead receive the care and resources they need to manage the potential health impacts of lead poisoning. MDHHS and GCHD worked with Dr. Mona Hanna-Attisha of the Hurley Medical Center to develop testing protocols and guidance regarding identification of lead poisoning, management of elevated blood lead levels, follow-up care, and community and state resources.

GCHD and MDHHS issued the following recommendations for parents:

- Families who live in the City of Flint and are on the Flint water system or who attend school, childcare, or spend time with a caregiver in the City of Flint, are encouraged to get their children tested for lead poisoning at their doctor's office or GCHD.
- Families can get their water tested for lead for free. Call 810-787-6537 for details about how.
- Families are encouraged to use a water filter in their home, and free filters are still available. Call 2-1-1 for information about where to pick up a free filter.
- Use filtered tap water for drinking (including making coffee, drink mixes, juice, baby formula), and cooking (even if you boil the water, the lead will stay in the water and food). Always use cold water when cooking.
- You can use unfiltered tap water for washing your hands, and washing dishes. If using unfiltered water, run the water for at least five minutes before you use it.
- Safe cleaning can also reduce the risk of lead exposure in the home. You can use unfiltered tap water for the following wiping down countertops, mopping floors, and washing clothes.

- Keep children away from lead paint and dust; use wet paper towels to clean up lead dust around windows, play areas and floors; and wash hands and toys often, using soap and water
- Lastly, always wash fruits with filtered water. Some foods help keep lead from being stored in the child's body, such as Calcium rich foods, Iron rich foods, and foods with Vitamin C.

GCHD and MDHHS will continue to provide more information to the community regarding reducing lead exposure and protecting the health of Flint residents. For more information, visit www.michigan.gov/lead.

# # #

This Document is a Non-Responsive Attachment.

October 25, 2015

Dear Parent,

To help make sure the children of Flint are safe from lead exposure, the Genesee County Health Department and the Michigan Department of Health and Human Services want to help you understand:

- Where does lead come from?
- What can I do to protect my family?
- Should I get my child tested for lead?
- Where can I find more information about lead?

Where does lead come from?

Lead is a serious health hazard, especially for small children who become lead poisoned when they eat, drink or breathe lead. Elevated levels of lead have been found in the drinking water from lead pipes in the City of Flint. Kids can also be exposed to lead from old lead paint, soil, pottery, cosmetics and toys and some home remedies. Adult jobs and hobbies, like auto repair, stained glass, jewelry making and ammunitions handling can also put children at risk if they touch clothing or play in areas where lead is found.

Should my child get a blood lead test?

Children who live in the City of Flint, live in a home using City of Flint water, or who attend school, childcare or often spend time with a caregiver in the City of Flint should be tested for lead poisoning. *This should be done as soon as possible.*

Where should I go to get a blood lead test for my child?

The best place to get your child's blood lead test is your doctor's office. Your pediatrician will follow up with you on lab tests and provide you with information on what to do next. You can also have a lead test at the Genesee County Health Department. If you need transportation, contact 2-1-1 for help.

Understanding your child's lead test result.

A lead level below 5 means there is little or no lead in your child's blood. Use the tips below to help keep your child safe. Your doctor may suggest retesting your child within the next 12 months to make sure the level does not go up.

A lead level of 5-14 means that your child has had some exposure to lead. Work with your doctor and local health department for further guidance on how to limit your lead exposure. Your doctor may retest your child in 1-3 months to make sure the level does not go up.

Children with very high levels of lead **(over 40)** may require treatment at the hospital.

What Can I Do to Keep My Family Safe?
The following steps should be taken right away to help protect you and your child.

Protecting your family from lead in the water:

- Get your water tested for lead. It's free. Call (810) 787-6537 to learn more.
- Use a water filter in your home. Call 2-1-1 for information on free water filters.
- If you do not have a water filter, use bottled water for drinking and mixing formula.
- Use filtered tap water for drinking (including making coffee, drink mixes, juice, baby formula), and cooking (even if you boil the water, the lead will stay in the water and food). Always use cold water when cooking.
- You can use unfiltered tap water for washing your hands, and washing dishes. If using unfiltered water, run the water for at least five minutes before you use it.

Safe cleaning:

Safe Cleaning is important. Keeping your home clean and safe from lead hazards will help to protect your family.

- You can use unfiltered tap water for the following wiping down countertops, mopping floors, and washing clothes.
- Keep children away from lead paint and dust.
- Use wet paper towels to clean up lead dust. Be sure to clean around windows, play areas and floors.
- Wash hands and toys often, using soap and water.

Good nutrition:
Some foods will help keep lead from being stored in a child's body. These are foods with a lot of calcium, iron and vitamin C. These foods include:

Calcium Rich Foods	Iron Rich Foods	Foods with Vitamin C

- Milk
- Cheese
- Yogurt
- Tofu
- Spinach
- Beans
- Lean meats like fish and chicken
- Whole grain cereals
- Peanut butter
- Oranges
- Orange juice
- Grapefruits
- Tomatoes
- Green peppers

Always wash your fruits with filtered water. If you are concerned about your child's diet, talk with your pediatrician who may also recommend a daily multivitamin.

WIC and SNAP provide assistance to parents and children who need fresh and healthy foods. Contact the **Genesee County WIC office at (810) 237-4537** to learn more. SNAP also offers a Double Bucks program to purchase even more healthy food for no additional costs.

Where can I get more information on lead?

- Genesee County Health Department Lead Program
  (810) 257-3833
- Michigan Department of Health and Human Services Childhood Lead Poisoning Prevention Program
  (888) 322-4453
  www.michigan.gov/lead
- United States Environmental Protection Agency
  www.epa.gov/lead
- U.S. Centers for Disease Control and Prevention (CDC) Web site
  www.cdc.gov/nceh/lead

This Document is a Non-Responsive Attachment.

PROVIDER DRAFT LETTER V.5
October 25, 2015
LoRocco Edits,Travis Edits,Attisha Edits, Peeler, Minicuci Edits
Cross checked with parent letter

Dear Provider:

As you may be aware from recent news reports, elevated levels of lead have been found in lead pipes within the City of Flint's water system.

To help protect the children of Flint from the current lead in water exposure, the Genesee County Health Department and Michigan Department of Health and Human Services are contacting you to assist you in providing guidance to support your families.

Children can be exposed to lead from drinking water in lead pipes, old lead paint, soil, pottery, cosmetics and toys and some home remedies. Adult jobs and hobbies, like auto repair, stained glass and jewelry making, and ammunitions handling can also put children at risk if they touch clothing or play in areas where lead is found.

As a primary care provider, you play a critical role in helping to ensure that children and families exposed to lead receive the care and reassurances they need to manage the potential health impacts of lead poisoning.

Identification. Children suffering from lead poisoning often fail to present outward symptoms. However, early clinical symptoms can include anemia, anorexia, abdominal pain and constipation. Lead is a neuro-toxin, and exposure can result in violent and aggressive behaviors, lead to learning disorders, may cause Attention Deficit Hyperactivity Disorder (ADHD) and has been known to reduce IQ by as many as 5-8 points with levels as low as 10 ug/dL. Lead is metabolized through the gastrointestinal system similar to iron and calcium, with uptake rates depending on the size and weight of the child. The blood half-life of lead is short (approximately 1 month) but the bone half-life can extend into decades.

Due to multiple risk factors facing many residents in the City of Flint (including aging housing conditions and water quality), we recommend that all children under age 6 living in the City of Flint or living in homes that use Flint water, attending school or childcare in Flint, or who spend time with a caregiver in the City of Flint, receive a blood lead test. Blood lead testing should be done through a child's primary care doctor to ensure adequate short-term and long-term follow-up. ***Families should be encouraged to have their children tested immediately either at their doctor's office or the Genesee County Health Department***.

Management of Blood Lead Levels. The following guidance is provided for management of childhood blood lead levels:

- **BLL < 5 ug/dL**
  - A lead level of less than 5 mcg/dL is not typically cause for concern.
  - Provide education and anticipatory guidance to ensure that lead levels do not rise.
  - Consider retesting in 12 months based on risk factors or concerns.
- **BLL >5 ug/dL**
  - **Children with capillary results of 5 ug/dL and higher must have a confirmatory venous blood draw.**
  - Families should receive anticipatory guidance, nutrition counseling, instruction on safe cleaning techniques and appropriate follow-up care from their primary care provider.

PROVIDER DRAFT LETTER V.5
October 25, 2015
LoRocco Edits,Travis Edits,Attisha Edits, Peeler, Minicuci Edits
Cross checked with parent letter

- In-home services including case management and environmental investigations are available for all children with lead levels greater than 5 ug/dL. Refer patients to the Genesee County Health Department for this service.
- Children with confirmed venous testing results greater than 5ug/dL within the past 18 months must be retested based on Medicaid policy and AAP guidelines. (See attached "Provider Quick Reference). If a child has not been retested within these timeframes, retesting is recommended as soon as possible.

- **BLL > 44 ug/dL.**
  - **Children with capillary results of 5 ug/dL and higher must have a confirmatory venous blood draw.**
  - Lead levels over 44 ug/dL may require hospitalization. Consult with an expert at the Children's Hospital of Michigan in Detroit for additional guidance.
  - Families should receive anticipatory guidance, nutrition counseling, instruction on safe cleaning techniques and appropriate follow-up care from their primary care provider.
  - In-home services including case management and environmental investigations are available for all children with lead levels greater than 5 ug/dL. Refer patients to the Genesee County Health Department for this service.
  - Children with confirmed venous testing results greater than 5ug/dL within the past 18 months must be retested based on Medicaid policy and AAP guidelines. (See attached "Provider Quick Reference). If a child has not been retested within these timeframes, retesting is recommended as soon as possible.

Reminder: All children covered by Medicaid must be tested at age 1 and 2.

Follow-up Care. As providers, there are steps you can take to help support your families:

1. Continue to inform and educate families regarding lead risks and preventative steps that they can take to minimize their risks.
2. Encourage your families to use filtered water for drinking, mixing formula and washing dishes. Families can contact 2-1-1 for information on free water filters.
3. Healthy nutrition is critical for lead-exposed children. Make sure your patients are consuming balanced diets high in iron, calcium and Vitamin C. If you have concerns about their nutrition, consider recommending a multivitamin with iron. WIC and SNAP provide assistance to parents and children who need fresh and healthy foods. Contact the Genesee County WIC office at (810) 237-4537 to learn more. In addition, SNAP offers a Double Bucks program that can provide healthy foods for less.
4. Breastfeeding is highly protective and encouraged. However, if the mother's blood lead level rises above 40ug/dL or her level is greater than 20 ug/dL and the baby has a level above 5 ug/dL breastfeeding is not recommended.
5. Because lead is a neuro-toxin, children with lead poisoning need longitudinal follow-up and may require developmental and behavioral health intervention services. Continue monitoring your patients' development at every visit.
6. Consider additional wrap-around and support services that will benefit your patients such as early childhood home visiting programs, early head start and head start. Call 2-1-1 for more information.

PROVIDER DRAFT LETTER V.5
October 25, 2015
LoRocco Edits,Travis Edits,Attisha Edits, Peeler, Minicuci Edits
Cross checked with parent letter

Local Resources. Several local resources are available to you and your patients:

- Blood Testing. Patients are encouraged to contact their primary care provider for testing. The Genesee County Health Department also administers lead tests. Patients in need of transportation should contact 2-1-1 for assistance.
- Water Testing. Water testing is free through the City of Flint Water Testing Plant. Patients can call 810-787-6537 to learn more.
- WIC and SNAP provide assistance to parents and children who need fresh and healthy foods. Contact the Genesee County WIC office at (810) 237-4537 to learn more.
- Child Development. If you have concerns about a child's growth, development or learning contact 2-1-1 for a Home Visiting Program in your area.

Websites and contact information.

- Genesee County Health Department Lead Program
  (810) 257-3833
- Michigan Department of Health and Human Services Childhood Lead Poisoning Prevention Program
  (888) 322-4453
- Michigan Department of Health and Human Services Lead Poisoning Prevention Video for Primary Care Providers on Youtube at /www.youtube.com/watch?v=AnkjCW_yGaU&feature=youtu.be.
- www.michigan.gov/lead
  United States Environmental Protection Agency
  www.epa.gov/lead
- U.S. Centers for Disease Control and Prevention (CDC) Web site
  www.cdc.gov/nceh/lead

draft 3

This Document is a Non-Responsive Attachment.

From: Wells, Eden (DHHS)
Sent: Monday, October 26, 2015 11:46 AM
To: Dykema, Linda D. (DHHS)
Subject: Re: Time sensitive:Final Press Release/ with attachments

Sorry - ok!

Sent from my iPhone

On Oct 26, 2015, at 11:40 AM, Dykema, Linda D. (DHHS) <DykemaL@michigan.gov> wrote:

I'm not on the e-mail chain. I never received the materials so cannot comment.

From: Wells, Eden (DHHS)
Sent: Monday, October 26, 2015 11:30 AM
To: Minicuci, Angela (DHHS)
Cc: tbrickey@gchd.us; Peeler, Nancy (DHHS); Dykema, Linda D. (DHHS); Lishinski, Karen (DHHS)
Subject: Time sensitive:Final Press Release/ with attachments

Nancy, Ljnda or Tamara- please respond ASAP--- thoughts?

Sent from my iPhone

On Oct 26, 2015, at 10:18 AM, Minicuci, Angela (DHHS) <MinicuciA@michigan.gov> wrote:

Thanks Tamara and Eden. What's the language I should be using instead? Happy to make whatever changes you all think is best.

Angela

From: Wells, Eden (DHHS)
Sent: Monday, October 26, 2015 8:39 AM
To: tbrickey@gchd.us; Peeler, Nancy (DHHS) <PeelerN@michigan.gov>; Dykema, Linda D. (DHHS) <DykemaL@michigan.gov>; Lishinski, Karen (DHHS) <LishinskiK@michigan.gov>
Cc: Minicuci, Angela (DHHS) <MinicuciA@michigan.gov>
Subject: Fwd: Final Press Release/ with attachments

can you all find a better statement in the parent letter that Tamara refers to? Good pick up Tamara!!

Eden V. Wells, MD, MPH, FACPM
MDHHS
Sent from my iPad

Begin forwarded message:

From: "Brickey, Tamara" <tbrickey@gchd.us>
Date: October 26, 2015 at 8:15:22 AM EDT

To: "Moran, Susan (DHHS)" <MoranS@michigan.gov>, "Wells, Eden (DHHS)" <WellsE3@michigan.gov>, "Robinson, Mikelle (DHHS)" <RobinsonM18@michigan.gov>, "Miller, Mark (DHHS)" <millerm1@michigan.gov>, "Lasher, Geralyn (DHHS)" <lasherg@michigan.gov>, "Hertel, Elizabeth (DHHS)" <HertelE@michigan.gov>, "Travis, Rashmi (DHHS)" <TravisR@michigan.gov>, "LaRocco, Toni" <tlarocco@gchd.us>, "Valacak, Mark" <MVALACAK@gchd.us>, "McShane, Hilda" <hmcshane@gchd.us>, "Thompson, Sheryl D. (DHHS)" <ThompsonS2@michigan.gov>, "Schoenow, Kris (DHHS)" <SchoenowK@michigan.gov>
Subject: RE: Final Press Release/ with attachments

Hi all,

I was out of the office Friday so I apologize for the late response. With the parent letter, do you mean to communicate that you need to run the tap for five minutes before you can wash your hands? "You can use unfiltered tap water for washing your hands, and washing dishes. If using unfiltered water, run the water for at least five minutes before you use it." This sentence reads as though every time you wash your hands with unfiltered water, you need to run the tap for five minutes. I know most families will have concern with that.

Thanks,

Tamara Brickey, MS, CHES

Public Health Division Director
Genesee County Health Department
630 S. Saginaw Street
Suite 4
Flint, MI 48502
(810) 257-3202 Fax: (810) 257-3147
tbrickey@gchd.us

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For a copy of the Health Department's Notice of Information Practices, contact the Health Department or visit the Health Department's website at http://www.gchd.us/

From: Moran, Susan (DHHS) [mailto:MoranS@michigan.gov]
Sent: Sunday, October 25, 2015 6:56 PM
To: Wells, Eden (DHHS); Robinson, Mikelle (DHHS); Miller, Mark (DHHS); Lasher, Geralyn (DHHS); Hertel, Elizabeth (DHHS); Travis, Rashmi (DHHS); LaRocco, Toni; Valacak, Mark; McShane, Hilda; Thompson, Sheryl D. (DHHS); Schoenow, Kris (DHHS); Brickey, Tamara
Subject: RE: Final Press Release/ with attachments

Documents look great, a couple edits—

Press Release:

"As we continue to find ways to inform and guide the Flint community towards reducing lead exposures, we are ~~appreciate~~ appreciative of the collaboration with Genesee County Health Department," said Dr. Eden Wells, Chief Medical Executive with MDHHS. "Parents and providers can take a number of steps to help reduce exposure, identify signs of lead poisoning, and begin follow up care as needed. Working together we can all help to protect the health of families in Flint."

Parent Letter: The word doctor is used throughout the document- we should stay consistent.

Where should I go to get a blood lead test for my child?

The best place to get your child's blood lead test is your doctor's office. Your doctor ~~pediatrician~~ will follow up with you on lab tests and provide you with information on what to do next. You can also have a lead test at the Genesee County Health Department. If you need transportation, contact 2-1-1 for help.

From: Wells, Eden (DHHS)
Sent: Sunday, October 25, 2015 6:37 PM
To: Moran, Susan (DHHS); Robinson, Mikelle (DHHS); Miller, Mark (DHHS); Lasher, Geralyn (DHHS); Hertel, Elizabeth (DHHS); Travis, Rashmi (DHHS); LaRocco, Toni; Valacak, Mark; hmcshane@gchd.us; Thompson, Sheryl D. (DHHS); Schoenow, Kris (DHHS); tbrickey@gchd.us
Subject: Fwd: Final Press Release/ with attachments

Sorry- attached.

Sent from my iPhone

Begin forwarded message:

From: "Minicuci, Angela (DHHS)" <MinicuciA@michigan.gov>
Date: October 25, 2015 at 1:44:23 PM EDT
To: "Wells, Eden (DHHS)" <WellsE3@michigan.gov>
Subject: Re: Final Press Release

Hi Eden,

Attached are the updated letters and press release with the Governor's office edits. Can you please circulate with those on the 3pm call to make sure that these are final?

Thanks!

Angela

From: Minicuci, Angela (DHHS)
Sent: Friday, October 23, 2015 5:00 PM
To: Wells, Eden (DHHS)
Subject: RE: Final Press Release

Have fun and have a good weekend!

Angela

From: Wells, Eden (DHHS)
Sent: Friday, October 23, 2015 4:56 PM
To: Minicuci, Angela (DHHS) <MinicuciA@michigan.gov>
Subject: Re: Final Press Release

You ROCK!!!
Hey- gotta talk about polio tonight wearingh CME hat at 7. Here at UM oddly. Have a good weekend! Hope you feel better

Sent from my iPhone

On Oct 23, 2015, at 4:48 PM, Minicuci, Angela (DHHS) <MinicuciA@michigan.gov> wrote:
Updated letters with the correct numbers attached. Do these look good?

The press release was intended for GCHD distribution when the letters go. If there are no additional changes, the attached is ready to go out whenever the letters are. Just let us know ahead of time so that we can be ready for calls! Thank you!

Angela

From: LaRocco, Toni [mailto:tlarocco@gchd.us]
Sent: Friday, October 23, 2015 4:44 PM
To: Wells, Eden (DHHS) <WellsE3@michigan.gov>; McShane, Hilda <hmcshane@gchd.us>; Valacak, Mark <MVALACAK@gchd.us>
Cc: Eisner, Jennifer (DHHS) <EisnerJ@michigan.gov>; Minicuci, Angela (DHHS) <MinicuciA@michigan.gov>
Subject: RE: Final Press Release

So is all this coming back in one email with all the blessed attachments? Parent and provider?

From: Wells, Eden (DHHS) [mailto:WellsE3@michigan.gov]
Sent: Friday, October 23, 2015 4:42 PM
To: LaRocco, Toni; McShane, Hilda; Valacak, Mark
Cc: Eisner, Jennifer (DHHS); Minicuci, Angela (DHHS)
Subject: Final Press Release

Just FYI, as we had some things we wanted to fix---I know HIlda is out but so she gets final version.

E

From: Minicuci, Angela (DHHS)
Sent: Friday, October 23, 2015 4:05 PM
To: Wells, Eden (DHHS)
Cc: Lasher, Geralyn (DHHS); Eisner, Jennifer (DHHS)
Subject: RE: UPDATED Letters and Press Release

RESENDING -

Hi Eden,

As we discussed, attached is the current draft of the letters (provider and UPDATED parent), and the updated press release, to reflect the changes to the parent letter. Please circulate this with those on the 3pm call.

Thank you,

Angela Minicuci

Office of External Relations and Communications

Michigan Department of Health and Human Services

Office: (517) 241-2112
Mobile: PPI
minicucia@michigan.gov
www.michigan.gov/mdhhs

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<GCHD MDHHS Letters PR DRAFT 4.docx>

<Parent Letter_Draft 6_October 22.docx>

<Provider letter_DRAFT3_edited.docx>

<Parent Letter_Draft 7.docx>
<Provider letter_DRAFT4_edited.docx>
<GCHD MDHHS Letters PR DRAFT 4.docx>

From: Wells, Eden (DHHS)
Sent: Monday, October 26, 2015 12:27 PM
To: Dykema, Linda D. (DHHS)
Subject: Fwd: Final Press Release
Attachments: GCHD MDHHS Letters PR DRAFT 5 102615.docx; ATT00001.htm; Parent Letter_Draft 9 102615.docx; ATT00002.htm; Provider letter_DRAFT6 102615.docx; ATT00003.htm

Sent from my iPhone

Begin forwarded message:

From: "Minicuci, Angela (DHHS)" <MinicuciA@michigan.gov>
Date: October 26, 2015 at 11:50:27 AM EDT
To: "Wells, Eden (DHHS)" <WellsE3@michigan.gov>
Cc: "Moran, Susan (DHHS)" <MoranS@michigan.gov>, "Robinson, Mikelle (DHHS)" <RobinsonM18@michigan.gov>, "Miller, Mark (DHHS)" <millerm1@michigan.gov>, "Valacak, Mark" <MVALACAK@gchd.us>, "LaRocco, Toni" <tlarocco@gchd.us>, "hmcshane@gchd.us" <hmcshane@gchd.us>, "Travis, Rashmi (DHHS)" <TravisR@michigan.gov>, "Thompson, Sheryl D. (DHHS)" <ThompsonS2@michigan.gov>, "Schoenow, Kris (DHHS)" <SchoenowK@michigan.gov>, "Lasher, Geralyn (DHHS)" <lasherg@michigan.gov>, "Hertel, Elizabeth (DHHS)" <HertelE@michigan.gov>, "Brickey, Tamara" <tbrickey@gchd.us>
Subject: RE: Final Press Release

Good morning everyone,

The final drafts of the letters and press release are attached. Who will be formatting these on letterhead and with signatures? What does the timing of releasing these documents look like? Are we still doing so today?

Thank you,

Angela

From: Wells, Eden (DHHS)
Sent: Sunday, October 25, 2015 2:40 PM
To: Minicuci, Angela (DHHS) <MinicuciA@michigan.gov>
Cc: Moran, Susan (DHHS) <MoranS@michigan.gov>; Robinson, Mikelle (DHHS) <RobinsonM18@michigan.gov>; Miller, Mark (DHHS) <millerm1@michigan.gov>; Valacak, Mark <MVALACAK@gchd.us>; LaRocco, Toni <tlarocco@gchd.us>; hmcshane@gchd.us; Travis, Rashmi (DHHS) <TravisR@michigan.gov>; Thompson, Sheryl D. (DHHS) <ThompsonS2@michigan.gov>; Schoenow, Kris (DHHS) <SchoenowK@michigan.gov>; Lasher, Geralyn (DHHS) <lasherg@michigan.gov>; Hertel, Elizabeth (DHHS) <HertelE@michigan.gov>; Brickey, Tamara <tbrickey@gchd.us>
Subject: Re: Final Press Release
Importance: High

Will do---they are all CC'd on this email---**Folks, please review and ensure that these are absolutely final.**

Eden

Eden V. Wells, MD, MPH, FACPM
Chief Medical Executive
Michigan Department of Health and Human Services
201 Townsend Street, 5th Floor CVB
Lansing, MI 48913
Phone: 517-335-8011
wellse3@michigan.gov

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To: Wells, Eden (DHHS)
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Sent: Friday, October 23, 2015 4:44 PM
To: Wells, Eden (DHHS) <WellsE3@michigan.gov>; McShane, Hilda <hmcshane@gchd.us>; Valacak, Mark <MVALACAK@gchd.us>
Cc: Eisner, Jennifer (DHHS) <EisnerJ@michigan.gov>; Minicuci, Angela (DHHS) <MinicuciA@michigan.gov>
Subject: RE: Final Press Release

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From: Wells, Eden (DHHS) [mailto:WellsE3@michigan.gov]
Sent: Friday, October 23, 2015 4:42 PM
To: LaRocco, Toni; McShane, Hilda; Valacak, Mark
Cc: Eisner, Jennifer (DHHS); Minicuci, Angela (DHHS)
Subject: Final Press Release

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E

From: Minicuci, Angela (DHHS)
Sent: Friday, October 23, 2015 4:05 PM
To: Wells, Eden (DHHS)
Cc: Lasher, Geralyn (DHHS); Eisner, Jennifer (DHHS)
Subject: RE: UPDATED Letters and Press Release

RESENDING -

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Thank you,

Angela Minicuci
Office of External Relations and Communications
Michigan Department of Health and Human Services

Office: (517) 241-2112
Mobile: PPI
minicucia@michigan.gov
www.michigan.gov/mdhhs

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<GCHD MDHHS Letters PR DRAFT 4.docx>

<Parent Letter_Draft 6_October 22.docx>

<Provider letter_DRAFT3_edited.docx>

<Parent Letter_Draft 7.docx>

<Provider letter_DRAFT4_edited.docx>

<GCHD MDHHS Letters PR DRAFT 4.docx>

FOR IMMEDIATE RELEASE – DRAFT
GCHD CONTACT:
MDHHS CONTACT: Jennifer Eisner, (517) 241-2112, EisnerJ@michigan.gov

GCHD and MDHHS Partner to Issue Guidance to Flint Parents, Providers

FLINT, Mich. – In a joint effort to continue informing the community about lead exposure, the Genesee County Health Department (GCHD) and Michigan Department of Health and Human Services (MDHHS) today issued letters to parents and the provider community in Flint to assist in providing guidance to support families.

In response to the elevated blood lead levels found in some Flint children, GCHD and MDHHS have worked together closely to develop guidance for families and providers.

GCHD QUOTE

Parents are being provided information regarding lead testing, how to reduce lead exposure for your family, where lead comes from, and community and state resources for more information. Children can be exposed to lead from drinking water in lead pipes, old lead paint, soil, pottery, cosmetics and toys and some home remedies. Adult jobs and hobbies, like auto repair, stained glass and jewelry making, and ammunitions handling can also put children at risk if they touch clothing or play in areas where lead is found.

"As we continue to find ways to inform and guide the Flint community towards reducing lead exposures, we are appreciate of the collaboration with Genesee County Health Department," said Dr. Eden Wells, Chief Medical Executive with MDHHS. "Parents and providers can take a number of steps to help reduce exposure, identify signs of lead poisoning, and begin follow up care as needed. Working together we can all help to protect the health of families in Flint."

Primary care providers can assist in helping to ensure that children and families exposed to lead receive the care and resources they need to manage the potential health impacts of lead poisoning. MDHHS and GCHD worked with Dr. Mona Hanna-Attisha of the Hurley Medical Center to develop testing protocols and guidance regarding identification of lead poisoning, management of elevated blood lead levels, follow-up care, and community and state resources.

GCHD and MDHHS issued the following recommendations for parents:

- Families who live in the City of Flint and are on the Flint water system or who attend school, childcare, or spend time with a caregiver in the City of Flint, are encouraged to get their children tested for lead poisoning at their doctor's office or GCHD.
- Families can get their water tested for lead for free. Call 810-787-6537 for details about how.
- Families are encouraged to use a water filter in their home, and free filters are still available. Call 2-1-1 for information about where to pick up a free filter.
- Use filtered tap water for drinking (including making coffee, drink mixes, juice, baby formula), and cooking (even if you boil the water, the lead will stay in the water and food). Always use cold water when cooking.
- You can use unfiltered tap water for washing your hands, and washing dishes. If using unfiltered water, run the water for at least five minutes before you use it.
- Safe cleaning can also reduce the risk of lead exposure in the home. You can use unfiltered tap water for the following wiping down countertops, mopping floors, and washing clothes.

- Keep children away from lead paint and dust; use wet paper towels to clean up lead dust around windows, play areas and floors; and wash hands and toys often, using soap and water
- Lastly, always wash fruits with filtered water. Some foods help keep lead from being stored in the child's body, such as Calcium rich foods, Iron rich foods, and foods with Vitamin C.

GCHD and MDHHS will continue to provide more information to the community regarding reducing lead exposure and protecting the health of Flint residents. For more information, visit www.michigan.gov/lead.

# # #

This Document is a Non-Responsive Attachment.

October 26, 2015

Dear Parent,

To help make sure the children of Flint are safe from lead exposure, the Genesee County Health Department and the Michigan Department of Health and Human Services want to help you understand:

- Where does lead come from?
- What can I do to protect my family?
- Should I get my child tested for lead?
- Where can I find more information about lead?

Where does lead come from?

Lead is a serious health hazard, especially for small children who become lead poisoned when they eat, drink or breathe lead. Elevated levels of lead have been found in the drinking water from lead pipes in the City of Flint. Kids can also be exposed to lead from old lead paint, soil, pottery, cosmetics and toys and some home remedies. Adult jobs and hobbies, like auto repair, stained glass, jewelry making and ammunitions handling can also put children at risk if they touch clothing or play in areas where lead is found.

Should my child get a blood lead test?

Children who live in the City of Flint, live in a home using City of Flint water, or who attend school, childcare or often spend time with a caregiver in the City of Flint should be tested for lead poisoning. *This should be done as soon as possible.*

Where should I go to get a blood lead test for my child?

The best place to get your child's blood lead test is your doctor's office. Your pediatrician will follow up with you on lab tests and provide you with information on what to do next. You can also have a lead test at the Genesee County Health Department. If you need transportation, contact 2-1-1 for help.

Understanding your child's lead test result.

A lead level below 5 means there is little or no lead in your child's blood. Use the tips below to help keep your child safe. Your doctor may suggest retesting your child within the next 12 months to make sure the level does not go up.

A lead level of 5-14 means that your child has had some exposure to lead. Work with your doctor and local health department for further guidance on how to limit your lead exposure. Your doctor may retest your child in 1-3 months to make sure the level does not go up.

Children with very high levels of lead **(over 40)** may require treatment at the hospital.

What Can I Do to Keep My Family Safe?

The following steps should be taken right away to help protect you and your child.

Protecting your family from lead in the water:

- Get your water tested for lead. It's free. Call (810) 787-6537 to learn more.
- Use a water filter in your home. Call 2-1-1 for information on free water filters.
- If you do not have a water filter, use bottled water for drinking and mixing formula.
- Use filtered tap water for drinking (including making coffee, drink mixes, juice, baby formula), and cooking (even if you boil the water, the lead will stay in the water and food). Always use cold water when cooking.
- You can use unfiltered tap water for washing your hands, and washing dishes.
- If unfiltered water must be used for consumption, run the tap for five minutes prior to consuming. Do this first thing in morning or if the faucet has not been used in more than 8 hours.

Safe cleaning:

Safe Cleaning is important. Keeping your home clean and safe from lead hazards will help to protect your family.

- You can use unfiltered tap water for the following wiping down countertops, mopping floors, and washing clothes.
- Keep children away from lead paint and dust.
- Use wet paper towels to clean up lead dust. Be sure to clean around windows, play areas and floors.
- Wash hands and toys often, using soap and water.

Good nutrition:

Some foods will help keep lead from being stored in a child's body. These are foods with a lot of calcium, iron and vitamin C. These foods include:

Calcium Rich Foods	Iron Rich Foods	Foods with Vitamin C

- Milk
- Cheese
- Yogurt
- Tofu
- Spinach
- Beans
- Lean meats like fish and chicken
- Whole grain cereals
- Peanut butter
- Oranges
- Orange juice
- Grapefruits
- Tomatoes
- Green peppers

Always wash your fruits with filtered water. If you are concerned about your child's diet, talk with your pediatrician who may also recommend a daily multivitamin.

WIC and SNAP provide assistance to parents and children who need fresh and healthy foods. Contact the **Genesee County WIC office at (810) 237-4537** to learn more. SNAP also offers a Double Bucks program to purchase even more healthy food for no additional costs.

Where can I get more information on lead?

- Genesee County Health Department Lead Program
  (810) 257-3833
- Michigan Department of Health and Human Services Childhood Lead Poisoning Prevention Program
  (888) 322-4453
  www.michigan.gov/lead
- United States Environmental Protection Agency
  www.epa.gov/lead
- U.S. Centers for Disease Control and Prevention (CDC) Web site
  www.cdc.gov/nceh/lead

This Document is a Non-Responsive Attachment.

PROVIDER DRAFT LETTER V.6
October 26, 2015
LoRocco Edits,Travis Edits,Attisha Edits, Peeler, Minicuci Edits
Cross checked with parent letter

October 26, 2015

Dear Provider:

As you may be aware from recent news reports, elevated levels of lead have been found in lead pipes within the City of Flint's water system.

To help protect the children of Flint from the current lead in water exposure, the Genesee County Health Department and Michigan Department of Health and Human Services are contacting you to assist you in providing guidance to support your families.

Children can be exposed to lead from drinking water in lead pipes, old lead paint, soil, pottery, cosmetics and toys and some home remedies. Adult jobs and hobbies, like auto repair, stained glass and jewelry making, and ammunitions handling can also put children at risk if they touch clothing or play in areas where lead is found.

As a primary care provider, you play a critical role in helping to ensure that children and families exposed to lead receive the care and reassurances they need to manage the potential health impacts of lead poisoning.

Identification. Children suffering from lead poisoning often fail to present outward symptoms. However, early clinical symptoms can include anemia, anorexia, abdominal pain and constipation. Lead is a neuro-toxin, and exposure can result in violent and aggressive behaviors, lead to learning disorders, may cause Attention Deficit Hyperactivity Disorder (ADHD) and has been known to reduce IQ by as many as 5-8 points with levels as low as 10 ug/dL. Lead is metabolized through the gastrointestinal system similar to iron and calcium, with uptake rates depending on the size and weight of the child. The blood half-life of lead is short (approximately 1 month) but the bone half-life can extend into decades.

Due to multiple risk factors facing many residents in the City of Flint (including aging housing conditions and water quality), we recommend that all children under age 6 living in the City of Flint or living in homes that use Flint water, attending school or childcare in Flint, or who spend time with a caregiver in the City of Flint, receive a blood lead test. Blood lead testing should be done through a child's primary care doctor to ensure adequate short-term and long-term follow-up. ***Families should be encouraged to have their children tested immediately either at their doctor's office or the Genesee County Health Department***.

Management of Blood Lead Levels. The following guidance is provided for management of childhood blood lead levels:

- **BLL < 5 ug/dL**
  - A lead level of less than 5 mcg/dL is not typically cause for concern.
  - Provide education and anticipatory guidance to ensure that lead levels do not rise.
  - Consider retesting in 12 months based on risk factors or concerns.
- **BLL >5 ug/dL**
  - **Children with capillary results of 5 ug/dL and higher must have a confirmatory venous blood draw.**

PROVIDER DRAFT LETTER V.6
October 26, 2015
LoRocco Edits,Travis Edits,Attisha Edits, Peeler, Minicuci Edits
Cross checked with parent letter

- Families should receive anticipatory guidance, nutrition counseling, instruction on safe cleaning techniques and appropriate follow-up care from their primary care provider.
- In-home services including case management and environmental investigations are available for all children with lead levels greater than 5 ug/dL. Refer patients to the Genesee County Health Department for this service.
- Children with confirmed venous testing results greater than 5ug/dL within the past 18 months must be retested based on Medicaid policy and AAP guidelines. (See attached "Provider Quick Reference). If a child has not been retested within these timeframes, retesting is recommended as soon as possible.

- **BLL > 44 ug/dL.**
  - **Children with capillary results of 5 ug/dL and higher must have a confirmatory venous blood draw.**
  - Lead levels over 44 ug/dL may require hospitalization. Consult with an expert at the Children's Hospital of Michigan in Detroit for additional guidance.
  - Families should receive anticipatory guidance, nutrition counseling, instruction on safe cleaning techniques and appropriate follow-up care from their primary care provider.
  - In-home services including case management and environmental investigations are available for all children with lead levels greater than 5 ug/dL. Refer patients to the Genesee County Health Department for this service.
  - Children with confirmed venous testing results greater than 5ug/dL within the past 18 months must be retested based on Medicaid policy and AAP guidelines. (See attached "Provider Quick Reference). If a child has not been retested within these timeframes, retesting is recommended as soon as possible.

Reminder: All children covered by Medicaid must be tested at age 1 and 2.

Follow-up Care. As providers, there are steps you can take to help support your families:

1. Continue to inform and educate families regarding lead risks and preventative steps that they can take to minimize their risks.
2. Encourage your families to use filtered water for drinking, mixing formula and washing dishes. Families can contact 2-1-1 for information on free water filters.
3. Healthy nutrition is critical for lead-exposed children. Make sure your patients are consuming balanced diets high in iron, calcium and Vitamin C. If you have concerns about their nutrition, consider recommending a multivitamin with iron. WIC and SNAP provide assistance to parents and children who need fresh and healthy foods. Contact the Genesee County WIC office at (810) 237-4537 to learn more. In addition, SNAP offers a Double Bucks program that can provide healthy foods for less.
4. Breastfeeding is highly protective and encouraged. However, if the mother's blood lead level rises above 40ug/dL or her level is greater than 20 ug/dL and the baby has a level above 5 ug/dL breastfeeding is not recommended.
5. Because lead is a neuro-toxin, children with lead poisoning need longitudinal follow-up and may require developmental and behavioral health intervention services. Continue monitoring your patients' development at every visit.

PROVIDER DRAFT LETTER V.6
October 26, 2015
LoRocco Edits,Travis Edits,Attisha Edits, Peeler, Minicuci Edits
Cross checked with parent letter

6. Consider additional wrap-around and support services that will benefit your patients such as early childhood home visiting programs, early head start and head start. Call 2-1-1 for more information.

Local Resources. Several local resources are available to you and your patients:

- Blood Testing. Patients are encouraged to contact their primary care provider for testing. The Genesee County Health Department also administers lead tests. Patients in need of transportation should contact 2-1-1 for assistance.
- Water Testing. Water testing is free through the City of Flint Water Testing Plant. Patients can call 810-787-6537 to learn more.
- WIC and SNAP provide assistance to parents and children who need fresh and healthy foods. Contact the Genesee County WIC office at (810) 237-4537 to learn more.
- Child Development. If you have concerns about a child's growth, development or learning contact 2-1-1 for a Home Visiting Program in your area.

Websites and contact information.

- Genesee County Health Department Lead Program
  (810) 257-3833

- Michigan Department of Health and Human Services Childhood Lead Poisoning Prevention Program
  (888) 322-4453

- Michigan Department of Health and Human Services Lead Poisoning Prevention Video for Primary Care Providers on Youtube at /www.youtube.com/watch?v=AnkjCW_yGaU&feature=youtu.be.

- www.michigan.gov/lead
  United States Environmental Protection Agency
  www.epa.gov/lead

- U.S. Centers for Disease Control and Prevention (CDC) Web site
  www.cdc.gov/nceh/lead

This Document is a Non-Responsive Attachment.

From: Wells, Eden (DHHS)
Sent: Monday, October 26, 2015 6:07 PM
To: Moran, Susan (DHHS)
Subject: Fwd: BLLs Latest
Attachments: Flint Weekly Summary 10-23.pdf; ATT00001.htm

This?

Sent from my iPhone

Begin forwarded message:

> **From:** "Scott, Robert L. (DHHS)" <ScottR9@michigan.gov>
> **Date:** October 26, 2015 at 4:42:50 PM EDT
> **To:** "Minicuci, Angela (DHHS)" <MinicuciA@michigan.gov>, "Peeler, Nancy (DHHS)" <PeelerN@michigan.gov>, "Wells, Eden (DHHS)" <WellsE3@michigan.gov>
> **Cc:** "Eisner, Jennifer (DHHS)" <EisnerJ@michigan.gov>
> **Subject: RE: BLLs Latest**
>
> Please see attached.
>
> ---
>
> **From:** Minicuci, Angela (DHHS)
> **Sent:** Monday, October 26, 2015 3:13 PM
> **To:** Scott, Robert L. (DHHS) <ScottR9@michigan.gov>; Peeler, Nancy (DHHS) <PeelerN@michigan.gov>; Wells, Eden (DHHS) <WellsE3@michigan.gov>
> **Cc:** Eisner, Jennifer (DHHS) <EisnerJ@michigan.gov>
> **Subject:** RE: BLLs Latest
>
> Hi Bob,
>
> Do we have an updated report? Thanks so much!
>
> Angela
>
> ---
>
> **From:** Minicuci, Angela (DHHS)
> **Sent:** Friday, October 23, 2015 10:57 AM
> **To:** Scott, Robert L. (DHHS) <ScottR9@michigan.gov>; Peeler, Nancy (DHHS) <PeelerN@michigan.gov>; Wells, Eden (DHHS) <WellsE3@michigan.gov>
> **Subject:** RE: BLLs Latest
>
> Yea, I think that would be awesome.
>
> Angela
>
> ---
>
> **From:** Scott, Robert L. (DHHS)
> **Sent:** Friday, October 23, 2015 10:52 AM
> **To:** Minicuci, Angela (DHHS) <MinicuciA@michigan.gov>; Peeler, Nancy (DHHS)

<PeelerN@michigan.gov>; Wells, Eden (DHHS) <WellsE3@michigan.gov>
Subject: RE: BLLs Latest

I can do it. How about this?

1) Total number of children tested since 9/28/15 press conference.
2) Total number of children with capillary EBLLs since 4/1/14 water change, still needing confirmation.
3) Total number of confirmed EBLL cases since 4/1/14.
4) Total number of children with capillary EBLLs since 9/28/15, needing confirmation.
5) Total number of confirmed EBLL cases since 9/28/15.

From: Minicuci, Angela (DHHS)
Sent: Friday, October 23, 2015 10:30 AM
To: Scott, Robert L. (DHHS) <ScottR9@michigan.gov>; Peeler, Nancy (DHHS) <PeelerN@michigan.gov>; Wells, Eden (DHHS) <WellsE3@michigan.gov>
Subject: RE: BLLs Latest

Hi Bob, my only thought on this is can we include something on each page that has a cumulative number of tests done, and number of EBLL cases?

Angela

From: Scott, Robert L. (DHHS)
Sent: Thursday, October 22, 2015 5:16 PM
To: Peeler, Nancy (DHHS) <PeelerN@michigan.gov>; Wells, Eden (DHHS) <WellsE3@michigan.gov>; Minicuci, Angela (DHHS) <MinicuciA@michigan.gov>
Subject: RE: BLLs Latest

Eden and Angela,

Per your request, please see attached. Consider this a 1st (well, 3rd) draft, and let me know if you have suggestions or questions.

Thanks,
Bob

From: Peeler, Nancy (DHHS)
Sent: Wednesday, October 21, 2015 4:16 PM
To: Wells, Eden (DHHS) <WellsE3@michigan.gov>; Minicuci, Angela (DHHS) <MinicuciA@michigan.gov>; Scott, Robert L. (DHHS) <ScottR9@michigan.gov>
Subject: RE: BLLs Latest

We've been having the same conversation here -- yes, we can do that, happy to do that. Bob was starting to work on a format this morning. If you have specific information you would want in a weekly report, let us know, as that will help us to pull what you really need. I know Epi was also talking about a weekly analysis of sorts, which I think would go more in-depth than the counts and such we can give you as a starting point.

Nancy

From: Wells, Eden (DHHS)
Sent: Wednesday, October 21, 2015 1:41 PM
To: Minicuci, Angela (DHHS); Peeler, Nancy (DHHS); Scott, Robert L. (DHHS)
Subject: RE: BLLs Latest

Yes,

I almost think we should get weekly summary. How many test have been done since the first press conference (9/28?)

From: Minicuci, Angela (DHHS)
Sent: Wednesday, October 21, 2015 1:05 PM
To: Peeler, Nancy (DHHS); Scott, Robert L. (DHHS); Wells, Eden (DHHS)
Subject: BLLs Latest

Hi Nancy and Bob,

Out of curiosity, could we begin looking at pulling some data about recent Flint BLL data? I think all results have to be reported to us within 5 days of the test result, correct?

If so, is there any chance we can begin taking a look at what that data is telling us? Not wanting to do anything with it yet, but just trying to think a little more proactively.

Thanks,

Angela Minicuci
Office of External Relations and Communications
Michigan Department of Health and Human Services
Office: (517) 241-2112
Mobile: PPI
minicuciа@michigan.gov
www.michigan.gov/mdhhs

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Weekly Summary of New Blood Lead Test Results for Flint ZIPS 48501-48507
Records Processed 10/23/15 and Cumulative Totals

Cumulative Totals	
# children tested since 9/28/15 press conference:	572
# children with capillary EBLLs since April 2014 water change, still needing confirmation:	76
# confirmed EBLL cases since April 2014:	77
# children with capillary EBLLs since 9/28/15, needing confirmation:	5
# confirmed EBLL cases since 9/28/15:	5

Tests Processed This Week:	**405**
(Date Drawn >= 9/28/15):	405

By Age	
age < 3:	82
age 3-5:	62
age 6-17:	113
adults:	148

By ZIP Code	
48501	2
48502	3
48503	111
48504	95
48505	47
48506	70
48507	77

Elevated BLL (>= 5 ug/dL) Processed This Week:	**12**

EBLL by Age	
age < 3:	7
age 3-5:	1
age 6-17:	1
adults:	3

EBLL by ZIP Code	
48501	0
48502	0
48503	1
48504	2
48505	3
48506	2
48507	4

EBLL by Range and Specimen Type	
Venous 5-14:	5
Capillary 5-14:	4
Unknown type 5-14:	1
Venous 15-44:	1
Capillary 15-44:	1
Venous 45+:	0
Capillary 45+:	0

EBLL by Circumstance	
1st Test:	6
Not 1st Test, but 1st EBLL:	3
Venous Confirmation of EBLL Capillary:	2
Follow-up Test, Increasing:	0
Follow-up Test, Steady:	0
Follow-up Test, Decreasing:	1

Number of Children Hospitalized:	0

This Document is a Non-Responsive Attachment.

From: Wells, Eden (DHHS)
Sent: Tuesday, October 27, 2015 9:50 AM
To: LaRocco, Toni
Subject: Fw: FINAL Documents
Attachments: Parent Letter FINAL Draft 102615.docx; ATT00001.htm; Press Release FINAL Draft 102615.docx; ATT00002.htm; Provider letter_DRAFT6 102615.docx; ATT00003.htm

Here are the final press release and the letters- you all need to finalize the press release and then foreword what you consider final.

E

From: Wells, Eden (DHHS)
Sent: Monday, October 26, 2015 4:09 PM
To: Valacak, Mark; LaRocco, Toni; GJOHNSON@gchd.us; hmcshane@gchd.us
Cc: Minicuci, Angela (DHHS)
Subject: Fwd: FINAL Documents

Hi folks,

Here are the final materials from NDHHS on joint letterheads. The press release needs a comment from you all. Please send your final draft of press release to Angela and I.

Based on when letters are printed and ready to be sent and ready to send out- this will be ready- will discuss timing for now.

Eden

Sent from my iPhone

Begin forwarded message:

> **From:** "Minicuci, Angela (DHHS)" <MinicuciA@michigan.gov>
> **Date:** October 26, 2015 at 3:33:55 PM EDT
> **To:** "Wells, Eden (DHHS)" <WellsE3@michigan.gov>
> **Cc:** "Lasher, Geralyn (DHHS)" <lasherg@michigan.gov>, "Eisner, Jennifer (DHHS)" <EisnerJ@michigan.gov>
> **Subject: FINAL Documents**
>
> Hi Eden,
>
> Attached are the final letters and press release. I also have all of the attachments that need to be sent with these letters but I'm not including them here.

Can you please share these with everyone? We will print the letters and their attachments, and GCHD can send the release when the letters are going to be sent.

Thank you,

Angela Minicuci
Office of External Relations and Communications
Michigan Department of Health and Human Services
Office: (517) 241-2112
Mobile: PPI
minicuciа@michigan.gov
www.michigan.gov/mdhhs

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October 26, 2015

Dear Parent,

To help make sure the children of Flint are safe from lead exposure, the Genesee County Health Department and the Michigan Department of Health and Human Services are providing answers to the following questions:

- Where does lead come from?
- What can I do to protect my family?
- Should I get my child tested for lead?
- Where can I find more information about lead?

Where does lead come from?

Elevated levels of lead have been found in the drinking water from lead pipes in the City of Flint. Kids can also be exposed to lead from old lead paint, soil, pottery, cosmetics and toys and some home remedies. Adult jobs and hobbies, like auto repair, stained glass, jewelry making and ammunitions handling can also put children at risk if they touch clothing or play in areas where lead is found. Lead is a serious health hazard, especially for small children who become lead poisoned when they eat, drink or breathe lead.

Should my child get a blood lead test? Children who live in the City of Flint, live in a home using City of Flint water, or who attend school, childcare or often spend time with a caregiver in the City of Flint should be tested for lead poisoning.
This should be done as soon as possible.

Where should I go to get a blood lead test for my child?

The best place to get your child's blood lead test is your doctor's office. Tests are covered by most health plans. Your doctor will follow up with you on lab tests and provide you with information on what to do next. Your child can also get a free lead test at the Genesee County Health Department. If you need transportation, contact 2-1-1 for help.

Understanding your child's lead test result.

A lead level below 5 means there is a little lead in your child's blood. Use the tips below to help keep your child safe. Your doctor may suggest retesting your child within the next 12 months to make sure the level does not go up.

A lead level of 5-44 means that your child has had some exposure to lead. Work with your doctor and local health department for further guidance on how to limit your lead exposure. Your doctor may retest your child in 1-3 months to make sure the level does not go up.

Children with very high levels of lead **(over 44)** may require treatment at the hospital.

What Can I Do to Keep My Family Safe?

The following steps should be taken right away to help protect you and your child.

Protecting your family from lead in the water:

- Get your water tested for lead. It's free. Call (810) 787-6537 to learn more.
- Use a water filter in your home. Call 2-1-1 for information on free NSF Certified water filters.
- Run only cold water through the filter.
- If you do not have a water filter, use bottled water for drinking and mixing formula.
- Use filtered or bottled water for drinking (including making coffee, drink mixes, juice, baby formula), and cooking (even if you boil the water, the lead will stay in the water and food).
- You can use unfiltered tap water for washing your hands and washing dishes.
- If you have to use unfiltered water for drinking or cooking, run the tap for five minutes before using the water.

Safe cleaning:

Safe cleaning is important. Keeping your home clean and safe from lead hazards will help to protect your family.

- Buildings built before 1978 could have lead paint in them.Use wet paper towels to clean up paint chips and dust in these older buildings. Be sure to clean around windows, play areas, and floors.
- Wash hands and toys often with soap and water.
- You can use unfiltered tap water to wipe down countertops, mop floors, and wash clothes.

Good nutrition:

Some foods will help keep lead from being stored in a child's body. These are foods with a lot of calcium, iron and vitamin C. These foods include:

Calcium Rich Foods	**Iron Rich Foods**	**Foods with Vitamin C**
➢ Milk	➢ Beans	➢ Oranges
➢ Cheese	➢ Lean meats like fish and chicken	➢ Orange juice
➢ Yogurt	➢ Whole grain cereals	➢ Grapefruits
➢ Tofu	➢ Peanut butter	➢ Tomatoes
➢ Spinach		➢ Green peppers

Always wash your fruits with filtered water. If you are concerned about your child's diet, talk with your doctor who may also recommend a daily multivitamin.

WIC and SNAP provide assistance to parents and children who need fresh and healthy foods. Contact the **Genesee County WIC office at (810) 237-4537** to learn more. SNAP also offers a Double Bucks program to purchase even more healthy food for no additional costs.

Where can I get more information on lead?

- Genesee County Health Department Lead Program
  (810) 257-3833
- Michigan Department of Health and Human Services
  Childhood Lead Poisoning Prevention Program
  (888) 322-4453
  www.michigan.gov/lead
- United States Environmental Protection Agency
  www.epa.gov/lead
- U.S. Centers for Disease Control and Prevention (CDC) Web site
  www.cdc.gov/nceh/lead

Sincerely,

Eden V. Wells, MD, MPH, FACPM
Chief Medical Executive
Michigan Department of Health and Human Services

Gary K. Johnson, MD, MPH
Medical Director
Genesee County Health Department

This Document is a Non-Responsive Attachment.

FOR IMMEDIATE RELEASE – DRAFT

GCHD CONTACT:

MDHHS CONTACT: Jennifer Eisner, (517) 241-2112, EisnerJ@michigan.gov

GCHD and MDHHS Partner to Issue Guidance to Flint Parents, Providers

FLINT, Mich. – In a joint effort to continue informing the community about lead exposure, the Genesee County Health Department (GCHD) and Michigan Department of Health and Human Services (MDHHS) today issued letters to parents and the provider community in Flint to assist in providing guidance to support families.

In response to the elevated blood lead levels found in some Flint children, GCHD and MDHHS have worked together closely to develop guidance for families and providers.

GCHD QUOTE

Parents are being provided information regarding lead testing, how to reduce lead exposure for your family, where lead comes from, and community and state resources for more information. Children can be exposed to lead from drinking water in lead pipes, old lead paint, soil, pottery, cosmetics and toys and some home remedies. Adult jobs and hobbies, like auto repair, stained glass and jewelry making, and ammunitions handling can also put children at risk if they touch clothing or play in areas where lead is found.

"As we continue to find ways to inform and guide the Flint community towards reducing lead exposures, we are appreciative of the collaboration with Genesee County Health Department," said Dr. Eden Wells, Chief Medical Executive with MDHHS. "Parents and providers can take a number of steps to help reduce exposure, identify signs of lead poisoning, and begin follow up care as needed. Working together we can all help to protect the health of families in Flint."

Primary care providers can assist in helping to ensure that children and families exposed to lead receive the care and resources they need to manage the potential health impacts of lead poisoning. MDHHS and GCHD worked with Dr. Mona Hanna-Attisha of the Hurley Medical Center to develop testing protocols and guidance regarding identification of lead poisoning, management of elevated blood lead levels, follow-up care, and community and state resources.

GCHD and MDHHS issued the following recommendations for parents:

- Families who live in the City of Flint and are on the Flint water system or who attend school, childcare, or spend time with a caregiver in the City of Flint, are encouraged to get their children tested for lead poisoning at their doctor's office or GCHD.
- Families can get their water tested for lead for free. Call 810-787-6537 for details about how.

- Families are encouraged to use an NSF Certified water filter in their home, and free filters are still available. Call 2-1-1 for information about where to pick up a free filter.
- Run only cold water through the filter.
- Use filtered or bottled water for drinking (including making coffee, drink mixes, juice, baby formula), and cooking (even if you boil the water, the lead will stay in the water and food).
- You can use unfiltered tap water for washing your hands, and washing dishes. If you must use unfiltered water for drinking or cooking, run the tap for five minutes before using the water.
- Safe cleaning can also reduce the risk of lead exposure in the home. You can use unfiltered tap water to wipe down countertops, mop floors, and wash clothes.
- Keep children away from lead paint and dust; use wet paper towels to clean up lead dust around windows, play areas and floors; and wash hands and toys often, using soap and water
- Lastly, always wash fruits with filtered water. Some foods help keep lead from being stored in the child's body, such as Calcium rich foods, Iron rich foods, and foods with Vitamin C.

GCHD and MDHHS will continue to provide more information to the community regarding reducing lead exposure and protecting the health of Flint residents. For more information, visit www.michigan.gov/lead.

# # #

This Document is a Non-Responsive Attachment.

PROVIDER DRAFT LETTER V.6
October 26, 2015
LoRocco Edits,Travis Edits,Attisha Edits, Peeler, Minicuci Edits
Cross checked with parent letter

October 26, 2015

Dear Provider:

As you may be aware from recent news reports, elevated levels of lead have been found in lead pipes within the City of Flint's water system.

To help protect the children of Flint from the current lead in water exposure, the Genesee County Health Department and Michigan Department of Health and Human Services are contacting you to assist you in providing guidance to support your families.

Children can be exposed to lead from drinking water in lead pipes, old lead paint, soil, pottery, cosmetics and toys and some home remedies. Adult jobs and hobbies, like auto repair, stained glass and jewelry making, and ammunitions handling can also put children at risk if they touch clothing or play in areas where lead is found.

As a primary care provider, you play a critical role in helping to ensure that children and families exposed to lead receive the care and reassurances they need to manage the potential health impacts of lead poisoning.

Identification. Children suffering from lead poisoning often fail to present outward symptoms. However, early clinical symptoms can include anemia, anorexia, abdominal pain and constipation. Lead is a neuro-toxin, and exposure can result in violent and aggressive behaviors, lead to learning disorders, may cause Attention Deficit Hyperactivity Disorder (ADHD) and has been known to reduce IQ by as many as 5-8 points with levels as low as 10 ug/dL. Lead is metabolized through the gastrointestinal system similar to iron and calcium, with uptake rates depending on the size and weight of the child. The blood half-life of lead is short (approximately 1 month) but the bone half-life can extend into decades.

Due to multiple risk factors facing many residents in the City of Flint (including aging housing conditions and water quality), we recommend that all children under age 6 living in the City of Flint or living in homes that use Flint water, attending school or childcare in Flint, or who spend time with a caregiver in the City of Flint, receive a blood lead test. Blood lead testing should be done through a child's primary care doctor to ensure adequate short-term and long-term follow-up. ***Families should be encouraged to have their children tested immediately either at their doctor's office or the Genesee County Health Department***.

Management of Blood Lead Levels. The following guidance is provided for management of childhood blood lead levels:

- **BLL < 5 ug/dL**
  - A lead level of less than 5 mcg/dL is not typically cause for concern.
  - Provide education and anticipatory guidance to ensure that lead levels do not rise.
  - Consider retesting in 12 months based on risk factors or concerns.
- **BLL >5 ug/dL**
  - **Children with capillary results of 5 ug/dL and higher must have a confirmatory venous blood draw.**

PROVIDER DRAFT LETTER V.6
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- Families should receive anticipatory guidance, nutrition counseling, instruction on safe cleaning techniques and appropriate follow-up care from their primary care provider.
- In-home services including case management and environmental investigations are available for all children with lead levels greater than 5 ug/dL. Refer patients to the Genesee County Health Department for this service.
- Children with confirmed venous testing results greater than 5ug/dL within the past 18 months must be retested based on Medicaid policy and AAP guidelines. (See attached "Provider Quick Reference). If a child has not been retested within these timeframes, retesting is recommended as soon as possible.

- **BLL > 44 ug/dL.**
  - **Children with capillary results of 5 ug/dL and higher must have a confirmatory venous blood draw.**
  - Lead levels over 44 ug/dL may require hospitalization. Consult with an expert at the Children's Hospital of Michigan in Detroit for additional guidance.
  - Families should receive anticipatory guidance, nutrition counseling, instruction on safe cleaning techniques and appropriate follow-up care from their primary care provider.
  - In-home services including case management and environmental investigations are available for all children with lead levels greater than 5 ug/dL. Refer patients to the Genesee County Health Department for this service.
  - Children with confirmed venous testing results greater than 5ug/dL within the past 18 months must be retested based on Medicaid policy and AAP guidelines. (See attached "Provider Quick Reference). If a child has not been retested within these timeframes, retesting is recommended as soon as possible.

Reminder: All children covered by Medicaid must be tested at age 1 and 2.

Follow-up Care. As providers, there are steps you can take to help support your families:

1. Continue to inform and educate families regarding lead risks and preventative steps that they can take to minimize their risks.
2. Encourage your families to use filtered water for drinking, mixing formula and washing dishes. Families can contact 2-1-1 for information on free water filters.
3. Healthy nutrition is critical for lead-exposed children. Make sure your patients are consuming balanced diets high in iron, calcium and Vitamin C. If you have concerns about their nutrition, consider recommending a multivitamin with iron. WIC and SNAP provide assistance to parents and children who need fresh and healthy foods. Contact the Genesee County WIC office at (810) 237-4537 to learn more. In addition, SNAP offers a Double Bucks program that can provide healthy foods for less.
4. Breastfeeding is highly protective and encouraged. However, if the mother's blood lead level rises above 40ug/dL or her level is greater than 20 ug/dL and the baby has a level above 5 ug/dL breastfeeding is not recommended.
5. Because lead is a neuro-toxin, children with lead poisoning need longitudinal follow-up and may require developmental and behavioral health intervention services. Continue monitoring your patients' development at every visit.

PROVIDER DRAFT LETTER V.6
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Cross checked with parent letter

6. Consider additional wrap-around and support services that will benefit your patients such as early childhood home visiting programs, early head start and head start. Call 2-1-1 for more information.

Local Resources. Several local resources are available to you and your patients:

- Blood Testing. Patients are encouraged to contact their primary care provider for testing. The Genesee County Health Department also administers lead tests. Patients in need of transportation should contact 2-1-1 for assistance.
- Water Testing. Water testing is free through the City of Flint Water Testing Plant. Patients can call 810-787-6537 to learn more.
- WIC and SNAP provide assistance to parents and children who need fresh and healthy foods. Contact the Genesee County WIC office at (810) 237-4537 to learn more.
- Child Development. If you have concerns about a child's growth, development or learning contact 2-1-1 for a Home Visiting Program in your area.

Websites and contact information.

- Genesee County Health Department Lead Program
  (810) 257-3833

- Michigan Department of Health and Human Services Childhood Lead Poisoning Prevention Program
  (888) 322-4453

- Michigan Department of Health and Human Services Lead Poisoning Prevention Video for Primary Care Providers on Youtube at /www.youtube.com/watch?v=AnkjCW_yGaU&feature=youtu.be.

- www.michigan.gov/lead
  United States Environmental Protection Agency
  www.epa.gov/lead

- U.S. Centers for Disease Control and Prevention (CDC) Web site
  www.cdc.gov/nceh/lead

This Document is a Non-Responsive Attachment.

From: Wells, Eden (DHHS)
Sent: Tuesday, October 27, 2015 11:04 AM
To: Lyon, Nick (DHHS);Becker, Timothy (DHHS);Lasher, Geralyn (DHHS);Hertel, Elizabeth (DHHS)
Cc: Grijalva, Nancy (DHHS)
Subject: Fw: DRAFT DELIBERATIVE; NOT SUBJECT TO FOIA - drinking water lead level
Attachments: draft deliberative TSG Subcommittee drinking water lead levels 10-16-2015.pdf

Importance: High

This is the school-based modelling report of the TSG, the Toxic Subgroup comittee---and lists themembers

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From: Dykema, Linda D. (DHHS)
Sent: Monday, October 26, 2015 4:21 PM
To: Wells, Eden (DHHS)
Subject: FW: DRAFT DELIBERATIVE; NOT SUBJECT TO FOIA - drinking water lead level

Sending again

From: Gray, Jennifer (DHHS)
Sent: Thursday, October 22, 2015 6:21 PM
To: Dykema, Linda D. (DHHS); Wells, Eden (DHHS)
Cc: Groetsch, Kory J. (DHHS)
Subject: Fw: DRAFT DELIBERATIVE; NOT SUBJECT TO FOIA - drinking water lead level
Importance: High

Linda and Eden,

Here is the document describing the recommendations for lead levels in school and daycare drinking water.

Jennifer

Jennifer Gray, Ph.D.
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Division of Environmental Health
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Lansing, MI 48913
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Email: grayj@michigan.gov

From: Dykema, Linda D. (DHHS)
Sent: Monday, October 19, 2015 11:48:31 AM

To: Wells, Eden (DHHS); Moran, Susan (DHHS)
Cc: Groetsch, Kory J. (DHHS); Gray, Jennifer (DHHS); Priem, Wesley F. (DHHS); Miller, Corinne (DHHS); Miller, Mark (DHHS); Robinson, Mikelle (DHHS)
Subject: FW: DRAFT DELIBERATIVE; NOT SUBJECT TO FOIA - drinking water lead level

Eden and Sue,

The attached provides the draft justification for screening values to be used to evaluate the results of drinking water sampling efforts at Flint schools.

HHS Division of Environmental Health toxicologist Jennifer Gray conducted the modeling and drafted the justification along with Toxicology and Response Section manager Kory Groetsch. They met with a select group of DEQ toxicologists, incorporated their comments and suggestions, the obtained concurrence on the appropriateness of the inputs and the conclusions. DEQ Dept. Dir. Jim Sygo has also been provided with the draft justification.

A risk management decision is now needed and there are 2 options: a single screening value of 2 ppb that would apply to all schools including daycares and elementary schools OR a 2-tier approach in which 2 ppb would apply only where children 0-12 months are present, but a higher concentration of 11 ppb would be used to protect children up to 7 years.

Linda

Justification of the drinking water "no corrective action" lead level for use in the Flint school and daycare drinking water sample decision tree

The Michigan Department of Health and Human Services (MDHHS) requested that the Toxic Steering Group (TSG) provide endorsement of a health-based drinking water lead level that would require "no corrective action" to put back into service drinking water faucets and fountains used by Flint school and daycare children. Selection of the "corrective actions" was not included in the charge question and is not discussed in this document. A TSG subcommittee was convened to examine this issue. Subcommittee members included Deb Mackenzie-Taylor (Michigan Department of Environmental Quality [MDEQ]), Robert Sills (MDEQ), Eric Wildfang (MDEQ), Jennifer Gray (MDHHS), Christine Flaga (MDEQ), and Kory Groetsch (MDHHS).

Neither the Centers for Disease Control and Prevention's Agency for Toxic Substances and Disease Registry (ATSDR) nor the U.S. Environmental Protection Agency (EPA) have derived toxicity endpoints (e.g. reference dose, minimal risk level) for lead to be used in risk assessments. Both agencies have stated that no blood lead level has been found to be safe and precautionary actions to reduce exposure to lead, such as running tapwater briefly before use, should always be followed. Due to the pharmacokinetic data and initial acceptable blood lead, the EPA developed a biokinetic model for evaluating lead exposure from multiple media. Lead levels in air, soil, house dust, diet, drinking water, and maternal blood are used to estimate geometric mean blood lead levels for a population of children and the probability that a child would be above a specified blood lead level[1]. The model results are compared to an EPA population health protection goal for young children exposed to lead at residential properties of 5% or lower risk of a child having a blood level greater than the CDC reference value of 5 micrograms lead per deciliter blood (µg/dL)[2]. The model, however, does not include inputs to account for direct paint chip ingestion and assumes that children are not exposed to elevated lead in soil and house dust from lead based paint.

Use of the EPA's Integrated Exposure Uptake Biokinetic (IEUBK) Model

The EPA's Integrated Exposure Uptake Biokinetic (IEUBK) Model for Lead in Children version 1.1 Build 11 was used to evaluate exposure to children one year old or younger and children seven years old or younger. Default values were retained unless otherwise noted below. See Table 2-1 in the "User's Guide for the Integrated Exposure Uptake Biokinetic Model for Lead in Children (IEUBK) Windows©" for the listing of all the default values[3]. Values selected that are more appropriate for a Michigan urban area, Flint, are described briefly below.

[1] The modeling output includes the percent of children in a population that are above a specified blood lead level, but that value can be also be viewed as the probability (risk) that a certain child would be above the specified blood lead level.

[2] As stated on the EPA's Lead at Superfund Sites: Frequent Questions from Risk Assessors on the Integrated Exposure Uptake Biokinetic (IEUBK) Model webpage, found at http://www2.epa.gov/superfund/lead-superfund-sites-frequent-questions-risk-assessors-integrated-exposure-uptake#mean.

[3] The model itself and documentation, including the user's guide for the model can be found at http://www2.epa.gov/superfund/lead-superfund-sites-software-and-users-manuals.

Air data

MDEQ performs monitoring for lead in ambient air (as measured in Total Suspended Particulates; lead [TSP]) at a number of fixed stations in Michigan. Some of these monitoring stations (e.g., in Belding, Port Huron, and Vassar) were established to intentionally capture the influence of specific nearby industrial emissions, while others were established to provide data reflecting the general ambient air lead levels in urban areas. The TSG Subcommittee reviewed the ambient air monitoring data, focusing on urban ambient air lead data that would be representative of contemporary Flint conditions. The most recent MDEQ annual air monitoring report is for 2014[4]. The summary statistics provided in the MDEQ annual air quality reports include 3-month average (mean) levels, the highest value (24-hour sample), and the 2nd highest value (24-hour sample). The National Ambient Air Quality Standard (NAAQS) for lead (0.15 micrograms per cubic meter [$\mu g/m^3$]) has a 3-month averaging time.

Ambient air lead was monitored by MDEQ in Flint (Whaley Park; 3610 Iowa Ave.) until early 2007. The 2005 calendar quarter arithmetic mean values were 0.008, 0.010, 0.011, and 0.012 $\mu g/m^3$. The 2006 calendar quarter arithmetic mean values were 0.005, 0.007, 0.012, and 0.006 $\mu g/m^3$. Although Flint data more recent than 2007 are not available, MDEQ staff considered other urban lead monitoring sites to be fairly representative of Flint conditions. Grand Rapids, Allen Park, and Dearborn each had a highest rolling 3-month arithmetic mean lead (TSP) level of 0.01 $\mu g/m^3$ in 2013; for 2014, these values were 0.01 $\mu g/m^3$ for Grand Rapids and Allen Park and 0.02 $\mu g/m^3$ for Dearborn. These data indicate that the IEUBK model default value of 0.1 $\mu g/m^3$ is not the most appropriate air lead level for Flint, and support a representative value of 0.01 $\mu g/m^3$ for the air data model input assumption. While a slightly higher air lead level was obtained for Dearborn, the small difference between 0.01 and 0.02 $\mu g/m^3$, would not impact model outputs.

Water consumption

The default drinking water intakes are age-dependent and based on national averages[5]. These were updated to match the mean drinking water intakes (direct and indirect) in Table 3-1 from the U.S. EPA Exposure Factors Handbook: 2011 Edition[6].

- 0-1 years old - 0.32 liter/day (L/d) (age-adjusted from the values in Table 3-1)
- 1-2 years old - 0.271 L/d
- 2-3 years old - 0.317 L/d
- 3-4 years old - 0.327 L/d (3 to 6 years old in Table 3-1)
- 4-5 years old - 0.327 L/d (3 to 6 years old in Table 3-1)

[4] The MDEQ 2014 Annual Air Quality Report can be found at http://www.michigan.gov/documents/deq/deq-aqd-amu-2014_Annual_Air_Quality_Report_492732_7.pdf?20151014123800.

[5] Per the "User's Guide for the Integrated Exposure Uptake Biokinetic Model for Lead in Children (IEUBK) Windows©", "The default consumption rates are age-dependent and based on national averages. These consumption rates should be changed only when valid site-specific monitoring data is available."

[6] The U.S. EPA Exposure Factors Handbook: 2011 Edition can be found at file:///C:/Users/grayj/Downloads/EFH-COMPLETE.PDF.

- 5-6 years old - 0.327 L/d (3 to 6 years old in Table 3-1)
- 6-7 years old - 0.414 L/d (6 to 11 years old in Table 3-1)

Drinking water data for alternate drinking water sources

The alternate drinking water sources used for these modeling runs are listed below with a brief description.

- "Percent of Total Consumed as First Draw" – This value applies to household tap water. This was set to 0% as Genesee County issued an Public Health Emergency Advisory[7] recommending that no one drink the City of Flint water until it has been tested or unless it is being filtered through a filter meeting the National Sanitation Foundation (NSF)/American National Standards Institute (ANSI) standard 53.
- "Concentration of Lead in First Draw (µg/L)" – With the "Percent of Total Consumed as First Draw" set to 0%, this value will not alter the model run output so the default of 4 micrograms per liter (µg/L or parts per billion [ppb]) was retained.
- "Concentration of Lead in Flushed (µg/L)" – This value applies to household tap water. This was set to 1 µg/L (ppb) as filters meeting NSF/ANSI standard 53 are recommended for use in all households. The filters distributed remove greater than 99% of the lead and would result in filtered water containing lead levels of approximately 1 µg/L (ppb) or less.
- "Percentage of Total Consumed from Fountains" – This was set to 50%, as children in school and daycare settings spend around eight hours or more in those locations. Eight hours could be expected to be approximately half of their waking hours in a day. This value also assumes daily intake of drinking water from a school or daycare source. There could be variation in the amount of time children would actually be drinking water from these locations based on involvement in before- or after-school or daycare programs, activities, or events.
- "Concentration of Lead in Fountain Water (µg/L)" – Modeling runs were carried out for every 1 µg/L (ppb) step between zero and 15 µg/L, and also 30 and 100 µg/L (ppb). Modeling runs for the zero to 15 µg/L (ppb) steps were carried out to perform a sensitivity analysis to evaluate how a one µg/L (ppb) change in lead water concentrations alters the outputs of the model. The 30 and 100 µg/L (ppb) levels were included as preliminary representatives of high-end lead levels obtained from school drinking water fountains.

Site-specific soil data

Soil lead levels on residential properties vary greatly[8]. The primary influence is from pre-1978 use of lead paint on the outside of buildings[9,10,11]. Lead-paint was banned in 1978. In addition, the age of

[7] The Genesee County Public Health Emergency Declaration can be found at http://www.gchd.us/docs/public_health_emergency_announcement_10_1_15.pdf.

[8] Datko-Williams, L., A. Wilkie, et al. (2014). "Analysis of U.S. soil lead (Pb) studies from 1970 to 2012." Science of The Total Environment **468-469**: 854-863.

[9] Francek, M. A. (1992). "Soil lead levels in a small town environment: a case study from Mt Pleasant, Michigan." Environ Pollut **76**(3): 251-257.

housing[8,9], paint condition, and distance from the building can greatly impact the concentration of lead in soil. The soil lead concentrations near the foundation of houses with lead paint are frequently over 1,000 ppm[9,11,12,13]. Historic vehicle emissions from leaded gasoline are another source of residential soil lead, so distance from road and traffic volume at the time leaded gasoline was in use are also influential factors on residential soil concentrations[10,11,13]. Other potential influences are fill material (e.g., foundry sand, smelter slag), and/or local industrial emission sources. The highest soil lead concentrations are typically found in urban areas with high population density.

Soil lead data for residential soils in Flint are not currently available. Flint park data and other relevant residential soil lead studies were reviewed to evaluate appropriate surrogate concentrations for this assessment.

The MDEQ[14] reported soil lead concentrations from urban parks including Flint. This data set included 12 sample locations from 10 Flint parks. Surface soil samples were collected at 0-2 inches and subsurface samples were collected at 4-6 inches. This dataset may not adequately represent residential soil samples with a lead paint contribution from buildings. Other studies have shown that open spaces may have much lower soil lead concentrations than areas near residential buildings that were built prior to 1978[11,15]. The geometric mean and geometric mean plus two standard deviation surface soil concentrations (see below) from this Flint park dataset were used for this assessment. The geometric mean plus two standard deviation surface soil concentration represents an upper percentile value that may partially account for the higher soil lead levels expected around buildings with lead paint.

Another data source is from soil samples collected from the Rouge River watershed between 1992 and 2002[16]. This dataset was compiled from MDEQ files and Clayton Group Services files for the Rouge River watershed area in southeast Michigan. Although some data is from Part 201 sites of environmental contamination, most of the samples were collected as a result of other regulatory or real estate due diligence requirements. Sites with known industrial metal sources or that had near surface soil with unknown fill material were excluded from the dataset. The dataset included 28 residential sites that had

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[10] Francek, M. A., B. Makimaa, et al. (1994). "Small town lead levels: a case study from the homes of pre-schoolers in Mt. Pleasant, Michigan." Environ Pollut **84**(2): 159-166.
[11] Schwarz, K., S. T. Pickett, et al. (2012). "The effects of the urban built environment on the spatial distribution of lead in residential soils." Environ Pollut **163**: 32-39.
[12] Andra, S. S., D. Sarkar, et al. (2006). "Lead in Soils in Paint Contaminated Residential Sites at San Antonio, Texas, and Baltimore, Maryland." Bulletin of Environmental Contamination and Toxicology **77**(5): 643-650.
[13] Yesilonis, I. D., R. V. Pouyat, et al. (2008). "Spatial distribution of metals in soils in Baltimore, Maryland: role of native parent material, proximity to major roads, housing age and screening guidelines." Environ Pollut **156**(3): 723-731.
[14] "Draft Michigan Urban Park Topsoil Survey 1997, MDEQ" David Slayton, Office of Waste Management and Radiological Protection, MDEQ
[15] Zahran, S., H. W. Mielke, et al. (2013). "Determining the relative importance of soil sample locations to predict risk of child lead exposure." Environ Int **60**: 7-14.
[16] Murray, K. S., D. T. Rogers, et al. (2004). "Heavy metals in an urban watershed in southeastern Michigan." J Environ Qual **33**(1): 163-172.

535 surface soil samples with data reported for lead. Sample depth was 0 – 0.5 meters. The geometric mean value for residential surface soils reported from this study (see below) was used for this assessment.

The current Part 201 residential direct contact risk-based soil level was also used for this assessment for comparison. This value was generated from the IEUBK model using an acceptable blood lead concentration of 10 µg/dL, a drinking water concentration of 4 µg/L (ppb) and an Michigan-specific average air concentration of 0.04 µg/m^3 were used in the model at the time of criteria development.

Soil levels examined in the model runs were:

- 47.5 parts per million (ppm) – based on the geometric mean of 0-2 inch soil concentrations in Flint urban parks.
- 155 ppm – based on the geometric mean + two standard deviations of 0-2 inch soil concentrations in Flint urban parks.
- 160 ppm – based on the geometric mean for residential surface soil (0-0.5 meter) from Rouge River water shed[17].
- 400 ppm - the MDEQ Residential Direct Contact Risk-Based Screening Level for soil.

Both the residential soil geometric mean from the Rouge River watershed and the upper percentile from the Flint park data appear to represent the best surrogates for residential soil concentrations in Flint for this assessment. Although not from Flint, the Rouge River watershed residential soil data appears to be a fairly robust data set for urban residential soils in Michigan. The Flint park data upper percentile (geometric mean plus two standard deviations is approximately equivalent to the 97.5 percentile) may better account for potential building paint contributions to soil concentrations for urban residential soils than the geometric mean concentration of this dataset. The Flint park upper percentile (155 ppm) reported as two significant digits is equivalent to the Rouge River watershed residential soil lead geometric mean (160 ppm). The soil lead concentration of 160 ppm was selected for use in the calculation of the TSG Subcommittee's recommended health-based drinking water lead levels.

Maternal data

Maternal blood lead levels were changed to 0.8 µg/dL to match the NHANES (2011-2012) geometric mean lead level for women[18].

Blood level of concern (cutoff) for risk estimation

A cutoff value of 5 µg/dL was selected as the current Centers for Disease Control and Prevention blood reference level to identify children with blood lead levels that require follow-up actions. It is based on the blood lead level for the 97.5th percentile for the U.S. population of children, ages one to five[19].

[17] The value is from Table 5 in Murray, K. S., D. T. Rogers, et al. (2004). "Heavy metals in an urban watershed in southeastern Michigan." J Environ Qual **33**(1): 163-172.

[18] The Fourth National Report on Human Exposure to Environmental Chemicals, dated February 2015, can be found at http://www.cdc.gov/biomonitoring/pdf/FourthReport_UpdatedTables_Feb2015.pdf.

Outputs of the modeling runs and recommendation of drinking water lead levels for use during the evaluation of Flint school and daycare drinking water samples

The soil lead level of 160 ppm was selected as being the best surrogate for soil lead levels in the city of Flint. In the event that site-specific soil data is collected, the drinking water lead levels may need to be reevaluated. The entire set of modeling runs and graphs can be found in Attachment 1.

The recommended drinking water lead levels resulted in a 5% risk or lower that a child had a blood lead level above 5 µg/dL. The 5% is an EPA health protection goal for young children exposed to lead at residential properties.

Evaluating school and daycare drinking water samples together

The recommended lead screening level for use while evaluating both school and daycare drinking water samples is 2 µg/L (ppb). This lead level in drinking water samples results in no more than a 5% risk that children age 7 or younger would have blood lead levels above 5 µg/dL.

Age range	Blood lead geometric mean (in micrograms per deciliter [µg/dL])	Risk that a child could have a blood lead level above 5 µg/dL
0-1 year olds	2.308	5.004%
0-7 year olds	2.056	2.934%

Assumptions integral to the use of the health-based school and daycare drinking water lead level
This calculation includes two assumptions. One is that people have lead levels in home drinking water of no more than 1 µg/L (ppb) or are using filters to reduce lead levels to 1 µg/L (ppb) or below. The second is that children do not live in homes with highly elevated levels of lead in home dust or soil. The modeled lead dust levels do not account for lead coming from pre-1978 paint. Eighty-two percent of city of Flint houses were built before 1970[20]. Soil highly impacted with lead paint may have lead levels higher than the 160 ppm used in this calculation. If children are not drinking filtered water at home, are ingesting lead paint chips, or have elevated levels of lead in home dust or soil, a lead level lower than the one recommended above may need to be selected for the evaluation of school and daycare drinking water samples.

Evaluating school and daycare drinking water samples separately

The recommended lead screening level for use while evaluating daycare drinking water samples is

[19] The blood reference level and additional information can be found at http://www.cdc.gov/nceh/lead/ACCLPP/blood_lead_levels.htm.
[20] As determined by the U.S. Census and can be found at http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_14_1YR_S1101&prodType=table.

2 µg/L (ppb). This lead level in drinking water samples results in no more than a 5% risk that children age 1 or younger would have blood lead levels above 5 µg/dL.

Age range	Blood lead geometric mean (in micrograms per deciliter [µg/dL])	Risk that a child could have a blood lead level above 5 µg/dL
0-1 year olds	2.308	5.004%
0-7 year olds	2.056	2.934%

Assumptions integral to the use of the health-based daycare drinking water lead level
This calculation includes two assumptions. One is that people have lead levels in home drinking water of no more than 1 µg/L (ppb) or are using filters to reduce lead levels to 1 µg/L (ppb) or below. The second is that children do not live in homes with highly elevated levels of lead in home dust or soil. The modeled lead dust levels do not account for lead coming from pre-1978 paint. Eighty-two percent of city of Flint houses were built before 1970. Soil highly impacted with lead paint may have lead levels higher than the 160 ppm used in this calculation. If children are not drinking filtered water at home, are ingesting lead paint chips, or have elevated levels of lead in home dust or soil, a lead level lower than the one recommended above may need to be selected for the evaluation of school and daycare drinking water samples.

The recommended lead screening level for use while evaluating K-12 school drinking water samples is 11 µg/L (ppb). This lead level in drinking water samples results in no more than a 5% risk that children age 7 or younger would have blood lead levels above 5 µg/dL. However, when evaluating a population of children age 1 or younger, their risk of having a blood lead level above 5 µg/dL was 8.335%. The 11 µg/L (ppb) screening level is not adequately protective for children under the age of 1.

Age range	Blood lead geometric mean (in micrograms per deciliter [µg/dL])	Risk that a child could have a blood lead level above 5 µg/dL
0-1 year olds	2.61	8.335%
0-7 year olds	2.299	4.917%

Assumptions integral to the use of the health-based school drinking water lead level
This calculation includes two assumptions. One is that people have lead levels in home drinking water of no more than 1 µg/L (ppb) or are using filters to reduce lead levels to 1 µg/L (ppb) or below. The second is that children do not live in homes with highly elevated levels of lead in home dust or soil. The modeled lead dust levels do not account for lead coming from pre-1978 paint. Eighty-two percent of city of Flint houses were built before 1970. Soil highly impacted with lead paint may have lead levels higher than the 160 ppm used in this calculation. If children are not drinking filtered water at home, are ingesting lead paint chips, or have elevated levels of lead in home dust or soil, a lead level lower than the one recommended above may need to be selected for the evaluation of school and daycare drinking water samples.

		0-1 year olds		0-7 year olds	
Soil lead levels (ppm)	Fountain water (ppb)	Geometric mean Blood lead level (ug/dL)	%>5 ug/dL	Geometric mean Blood lead level (ug/dL)	%>5 ug/dL
47.6	0	1.184	0.109	0.92	0.016
155.3	0	2.198	4.014	1.958	2.302
160	0	2.24	4.381	2.002	2.573
400	0	4.268	36.82	4.135	34.306
2000	0	13.431	98.224	14.549	98.847
47.6	1	1.22	0.135	0.949	0.02
155.3	1	2.232	4.306	1.985	2.468
160	1	2.274	4.687	2.029	2.75
400	1	4.298	37.376	4.16	34.772
2000	1	13.447	98.235	14.564	98.954
47.6	2	1.257	0.165	0.977	0.026
155.3	2	2.266	4.609	2.012	2.64
160	2	2.308	5.004	2.056	2.934
400	2	4.327	37.929	4.184	35.236
2000	2	13.464	98.247	14.579	98.86
47.6	3	1.293	0.201	1.006	0.032
155.3	3	2.3	4.923	2.039	2.82
160	3	2.342	5.332	2.083	3.126
400	3	4.357	38.48	4.209	35.699
2000	3	13.48	98.258	14.595	98.867
47.6	4	1.33	0.241	1.034	0.04
155.3	4	2.334	5.248	2.067	3.007
160	4	2.376	5.671	2.11	3.324
400	4	4.386	39.029	4.233	36.161
2000	4	13.496	98.269	14.61	98.874
47.6	5	1.366	0.288	1.063	0.049
155.3	5	2.368	5.585	2.094	3.201
160	5	2.41	6.02	2.138	3.53
400	5	4.416	39.575	4.258	36.622
2000	5	13.513	98.28	14.625	98.88
47.6	6	1.402	0.341	1.091	0.06
155.3	6	2.401	5.932	2.121	3.402
160	6	2.443	6.381	2.165	3.743
400	6	4.445	40.118	4.282	37.082
2000	6	13.529	98.29	14.641	98.887
47.6	7	1.438	0.401	1.12	0.073
155.3	7	2.435	6.289	2.148	3.611
160	7	2.477	6.752	2.192	3.964
400	7	4.474	40.659	4.307	37.54
2000	7	13.545	98.301	14.656	98.893
47.6	8	1.474	0.468	1.148	0.087
155.3	8	2.468	6.658	2.175	3.827
160	8	2.51	7.133	2.219	4.191
400	8	4.504	41.196	4.331	37.997

		0-1 year olds		0-7 year olds	
Soil lead levels (ppm)	Fountain water (ppb)	Geometric mean Blood lead level (ug/dL)	%>5 ug/dL	Geometric mean Blood lead level (ug/dL)	%>5 ug/dL
2000	8	13.561	98.312	14.671	98.9
47.6	9	1.51	0.542	1.176	0.104
155.3	9	2.502	7.036	2.202	4.05
160	9	2.544	7.524	2.245	4.426
400	9	4.533	41.731	4.355	38.453
2000	9	13.577	98.323	14.686	98.906
47.6	10	1.546	0.625	1.205	0.123
155.3	10	2.535	7.425	2.229	4.28
160	10	2.577	7.925	2.272	4.668
400	10	4.562	42.263	4.38	38.907
2000	10	13.594	98.333	14.702	98.912
47.6	11	1.581	0.715	1.233	0.145
155.3	11	2.569	7.823	2.256	4.518
160	11	2.61	8.335	2.299	4.917
400	11	4.591	42.792	4.404	39.359
2000	11	13.61	98.344	14.717	98.919
47.6	12	1.617	0.815	1.261	0.169
155.3	12	2.602	8.231	2.283	4.762
160	12	2.643	8.755	2.326	5.174
400	12	4.62	43.317	4.428	39.81
2000	12	13.626	98.354	14.732	98.925
47.6	13	1.652	0.924	1.289	0.197
155.3	13	2.635	8.648	2.309	5.014
160	13	2.677	9.183	2.353	5.437
400	13	4.649	43.84	4.453	40.259
2000	13	13.642	98.364	14.747	98.931
47.6	14	1.688	1.043	1.317	0.227
155.3	14	2.668	9.075	2.336	5.273
160	14	2.71	9.621	2.38	5.707
400	14	4.677	44.359	4.477	40.707
2000	14	13.658	98.374	14.763	98.937
47.6	15	1.723	1.171	1.346	0.261
155.3	15	2.701	9.51	2.363	5.539
160	15	2.743	10.067	2.406	5.984
400	15	4.706	44.875	4.501	41.153
2000	15	13.674	98.385	14.778	98.944
47.6	30	2.243	4.406	1.762	1.325
155.3	30	3.188	16.918	2.76	10.313
160	30	3.228	17.593	2.803	10.908
400	30	5.131	52.202	4.861	47.608
2000	30	13.914	98.528	15.005	99.031
47.6	100	4.451	40.23	3.603	24.294
155.3	100	5.267	54.406	4.521	41.511
160	100	5.302	54.957	4.56	42.227

Attachment 1 IEUBK model outputs - sorted by water lead concentrations

		0-1 year olds		0-7 year olds	
Soil lead levels (ppm)	Fountain water (ppb)	Geometric mean Blood lead level (ug/dL)	%>5 ug/dL	Geometric mean Blood lead level (ug/dL)	%>5 ug/dL
400	100	6.967	75.99	6.463	70.746
2000	100	14.992	99.026	16.034	99.342

		0-1 year olds		0-7 year olds	
Soil lead levels (ppm)	Fountain water (ppb)	Geometric mean Blood lead level (ug/dL)	%>5 ug/dL	Geometric mean Blood lead level (ug/dL)	%>5 ug/dL
47.6	0	1.184	0.109	0.92	0.016
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47.6	15	1.723	1.171	1.346	0.261
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160	4	2.376	5.671	2.11	3.324
160	5	2.41	6.02	2.138	3.53
160	6	2.443	6.381	2.165	3.743
160	7	2.477	6.752	2.192	3.964
160	8	2.51	7.133	2.219	4.191
160	9	2.544	7.524	2.245	4.426
160	10	2.577	7.925	2.272	4.668
160	11	2.61	8.335	2.299	4.917
160	12	2.643	8.755	2.326	5.174
160	13	2.677	9.183	2.353	5.437
160	14	2.71	9.621	2.38	5.707
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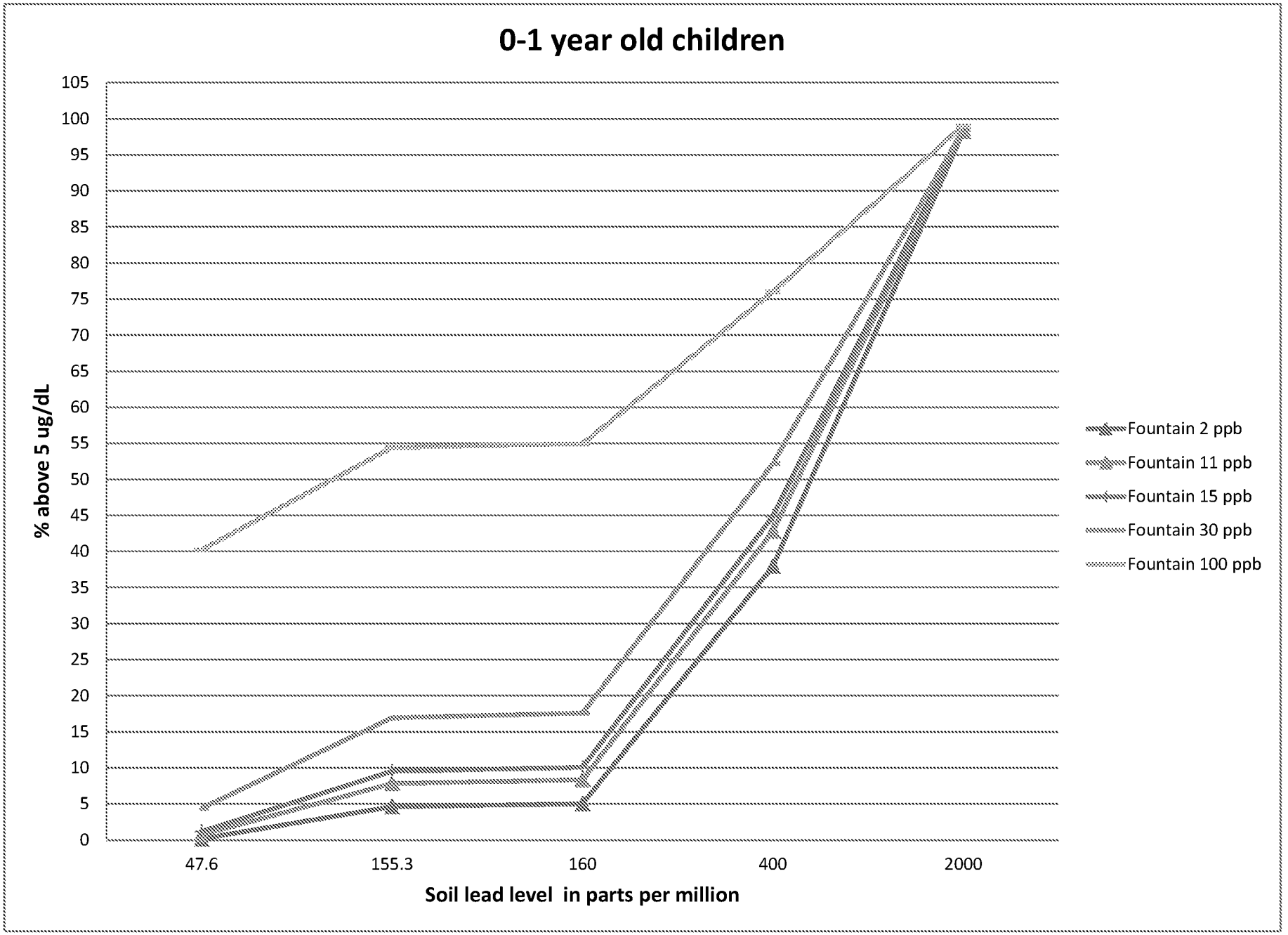
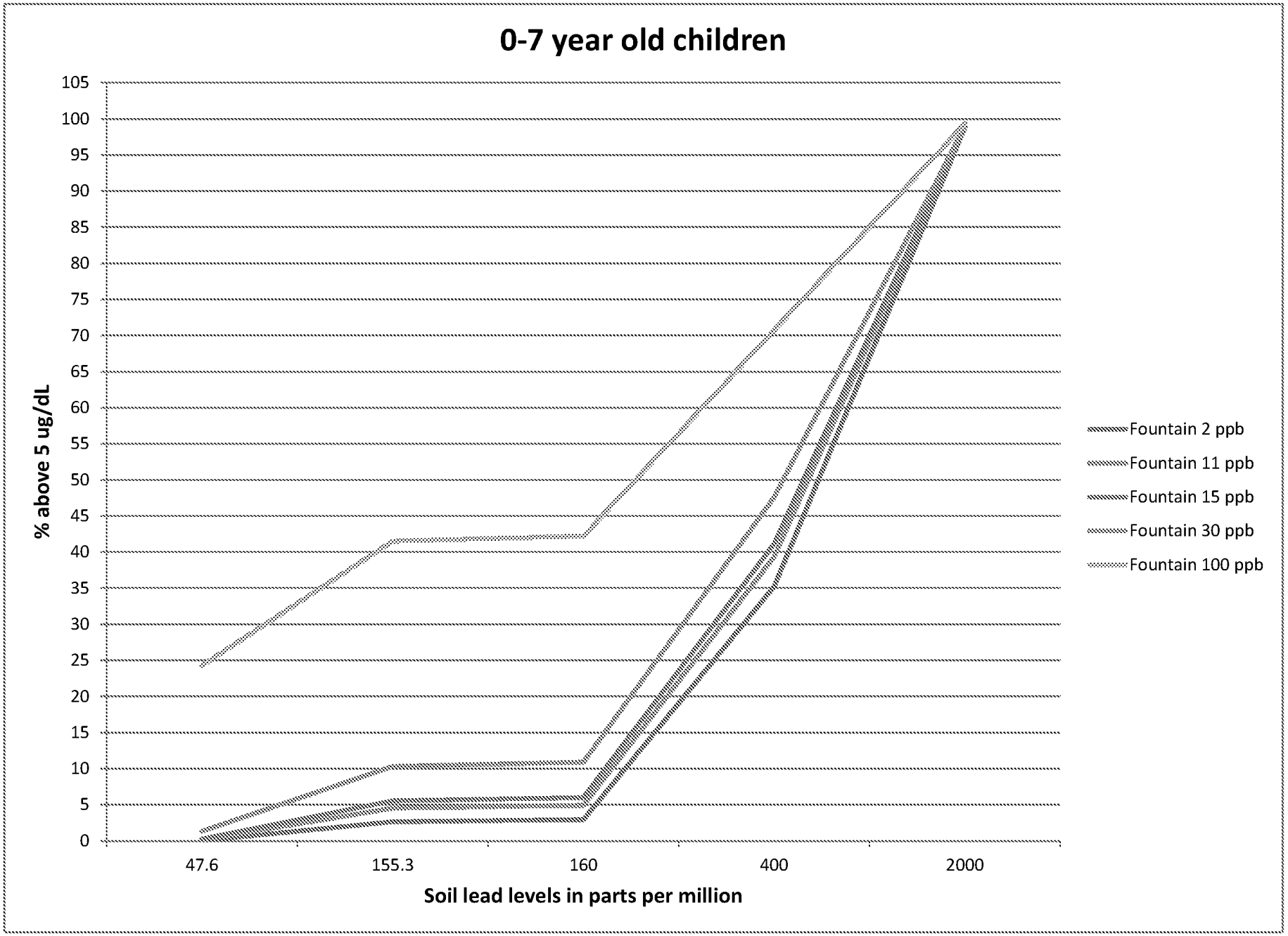
400	11	4.591	42.792	4.404	39.359
400	12	4.62	43.317	4.428	39.81
400	13	4.649	43.84	4.453	40.259
400	14	4.677	44.359	4.477	40.707
400	15	4.706	44.875	4.501	41.153
400	30	5.131	52.202	4.861	47.608
400	100	6.967	75.99	6.463	70.746
2000	0	13.431	98.224	14.549	98.847
2000	1	13.447	98.235	14.564	98.954
2000	2	13.464	98.247	14.579	98.86
2000	3	13.48	98.258	14.595	98.867
2000	4	13.496	98.269	14.61	98.874
2000	5	13.513	98.28	14.625	98.88
2000	6	13.529	98.29	14.641	98.887
2000	7	13.545	98.301	14.656	98.893
2000	8	13.561	98.312	14.671	98.9
2000	9	13.577	98.323	14.686	98.906
2000	10	13.594	98.333	14.702	98.912
2000	11	13.61	98.344	14.717	98.919
2000	12	13.626	98.354	14.732	98.925
2000	13	13.642	98.364	14.747	98.931
2000	14	13.658	98.374	14.763	98.937
2000	15	13.674	98.385	14.778	98.944
2000	30	13.914	98.528	15.005	99.031
2000	100	14.992	99.026	16.034	99.342

Graph of IEUBK model outputs for selected water lead levels for 0-1 year old children



Attachment 1

Graph of IEUBK model outputs for selected water lead levels for 0-7 year old choldren



From: Wells, Eden (DHHS)
Sent: Tuesday, October 27, 2015 3:04 PM
To: hmcshane@gchd.us
Cc: LaRocco, Toni
Subject: Fw: FINAL Documents
Attachments: Parent Letter FINAL Draft 102715.docx; Provider Letter FINAL Draft 102715.docx

HIlda,

Here are the signed letters, including the signed provider letter.

From: Minicuci, Angela (DHHS)
Sent: Tuesday, October 27, 2015 1:43 PM
To: LaRocco, Toni; Wells, Eden (DHHS)
Subject: RE: FINAL Documents

Hi Toni,

The updated letters are attached. DEQ requested we add this language to each letter: These recommendations will stay in effect until the Genesee County Health Department lifts the restrictions on water usage.

Thanks!

Angela

From: Minicuci, Angela (DHHS)
Sent: Tuesday, October 27, 2015 1:37 PM
To: 'LaRocco, Toni' <tlarocco@gchd.us>; Wells, Eden (DHHS) <WellsE3@michigan.gov>
Subject: RE: FINAL Documents

Yes, I will send the final letters in a moment.

Angela

From: LaRocco, Toni [mailto:tlarocco@gchd.us]
Sent: Tuesday, October 27, 2015 1:35 PM
To: Wells, Eden (DHHS) <WellsE3@michigan.gov>
Cc: Minicuci, Angela (DHHS) <MinicuciA@michigan.gov>
Subject: RE: FINAL Documents

So that is yet to follow

From: Wells, Eden (DHHS) [mailto:WellsE3@michigan.gov]
Sent: Tuesday, October 27, 2015 1:34 PM
To: LaRocco, Toni
Cc: Minicuci, Angela (DHHS)
Subject: Re: FINAL Documents

Angela has our signatures, and the provider letter will be signed by both Gary, and I as well

---

From: LaRocco, Toni <tlarocco@gchd.us>
Sent: Tuesday, October 27, 2015 1:17 PM
To: Wells, Eden (DHHS)
Subject: RE: FINAL Documents

The provider letter doesn't contain signatures.....what are we doing with this?

From: Wells, Eden (DHHS) [mailto:WellsE3@michigan.gov]
Sent: Tuesday, October 27, 2015 9:50 AM
To: LaRocco, Toni
Subject: Fw: FINAL Documents

Here are the final press release and the letters- you all need to finalize the press release and then foreword what you consider final.

E

From: Wells, Eden (DHHS)
Sent: Monday, October 26, 2015 4:09 PM
To: Valacak, Mark; LaRocco, Toni; GJOHNSON@gchd.us; hmcshane@gchd.us
Cc: Minicuci, Angela (DHHS)
Subject: Fwd: FINAL Documents

Hi folks,

Here are the final materials from NDHHS on joint letterheads. The press release needs a comment from you all. Please send your final draft of press release to Angela and I.

Based on when letters are printed and ready to be sent and ready to send out- this will be ready- will discuss timing for now.

Eden

Sent from my iPhone

Begin forwarded message:

> **From:** "Minicuci, Angela (DHHS)" <MinicuciA@michigan.gov>
> **Date:** October 26, 2015 at 3:33:55 PM EDT
> **To:** "Wells, Eden (DHHS)" <WellsE3@michigan.gov>
> **Cc:** "Lasher, Geralyn (DHHS)" <lasherg@michigan.gov>, "Eisner, Jennifer (DHHS)" <EisnerJ@michigan.gov>
> **Subject: FINAL Documents**
>
> Hi Eden,

Attached are the final letters and press release. I also have all of the attachments that need to be sent with these letters but I'm not including them here.

Can you please share these with everyone? We will print the letters and their attachments, and GCHD can send the release when the letters are going to be sent.

Thank you,

Angela Minicuci
Office of External Relations and Communications
Michigan Department of Health and Human Services
Office: (517) 241-2112
Mobile: PPI
minicucia@michigan.gov
www.michigan.gov/mdhhs

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October 27, 2015

Dear Parent,

To help make sure the children of Flint are safe from lead exposure, the Genesee County Health Department and the Michigan Department of Health and Human Services are providing answers to the following questions:

- Where does lead come from?
- What can I do to protect my family?
- Should I get my child tested for lead?
- Where can I find more information about lead?

Where does lead come from?

Elevated levels of lead have been found in the drinking water from lead pipes in the City of Flint. Kids can also be exposed to lead from old lead paint, soil, pottery, cosmetics and toys and some home remedies. Adult jobs and hobbies, like auto repair, stained glass, jewelry making and ammunitions handling can also put children at risk if they touch clothing or play in areas where lead is found. Lead is a serious health hazard, especially for small children who become lead poisoned when they eat, drink or breathe lead.

Should my child get a blood lead test? Children who live in the City of Flint, live in a home using City of Flint water, or who attend school, childcare or often spend time with a caregiver in the City of Flint should be tested for lead poisoning.
This should be done as soon as possible.

Where should I go to get a blood lead test for my child?

The best place to get your child's blood lead test is your doctor's office. Tests are covered by most health plans. Your doctor will follow up with you on lab tests and provide you with information on what to do next. Your child can also get a free lead test at the Genesee County Health Department. If you need transportation, contact 2-1-1 for help.

Understanding your child's lead test result.

A lead level below 5 means there is a little lead in your child's blood. Use the tips below to help keep your child safe. Your doctor may suggest retesting your child within the next 12 months to make sure the level does not go up.

A lead level of 5-44 means that your child has had some exposure to lead. Work with your doctor and local health department for further guidance on how to limit your lead exposure. Your doctor may retest your child in 1-3 months to make sure the level does not go up.

Children with very high levels of lead **(over 44)** may require treatment at the hospital.

What Can I Do to Keep My Family Safe?

The following steps should be taken right away to help protect you and your child.

Protecting your family from lead in the water:

- Get your water tested for lead. It's free. Call (810) 787-6537 to learn more.
- Use a water filter in your home. Call 2-1-1 for information on free NSF Certified water filters.
- Run only cold water through the filter.
- If you do not have a water filter, use bottled water for drinking and mixing formula.
- Use filtered or bottled water for drinking (including making coffee, drink mixes, juice, baby formula), and cooking (even if you boil the water, the lead will stay in the water and food).
- You can use unfiltered tap water for washing your hands and washing dishes.
- If you have to use unfiltered water for drinking or cooking, run the tap for five minutes before using the water.

Safe cleaning:

Safe cleaning is important. Keeping your home clean and safe from lead hazards will help to protect your family.

- Buildings built before 1978 could have lead paint in them.Use wet paper towels to clean up paint chips and dust in these older buildings. Be sure to clean around windows, play areas, and floors.
- Wash hands and toys often with soap and water.
- You can use unfiltered tap water to wipe down countertops, mop floors, and wash clothes.

Good nutrition:

Some foods will help keep lead from being stored in a child's body. These are foods with a lot of calcium, iron and vitamin C. These foods include:

Calcium Rich Foods	**Iron Rich Foods**	**Foods with Vitamin C**
➢ Milk	➢ Beans	➢ Oranges
➢ Cheese	➢ Lean meats like fish and chicken	➢ Orange juice
➢ Yogurt	➢ Whole grain cereals	➢ Grapefruits
➢ Tofu	➢ Peanut butter	➢ Tomatoes
➢ Spinach		➢ Green peppers

Always wash your fruits with filtered water. If you are concerned about your child's diet, talk with your doctor who may also recommend a daily multivitamin.

WIC and SNAP provide assistance to parents and children who need fresh and healthy foods. Contact the **Genesee County WIC office at (810) 237-4537** to learn more. SNAP also offers a Double Bucks program to purchase even more healthy food for no additional costs.

Where can I get more information on lead?

- Genesee County Health Department Lead Program
  (810) 257-3833
- Michigan Department of Health and Human Services
  Childhood Lead Poisoning Prevention Program
  (888) 322-4453
  www.michigan.gov/lead
- United States Environmental Protection Agency
  www.epa.gov/lead
- U.S. Centers for Disease Control and Prevention (CDC) Web site
  www.cdc.gov/nceh/lead

These recommendations will stay in effect until the Genesee County Health Department lifts the restrictions on water usage.

Sincerely,

Eden V. Wells, MD, MPH, FACPM
Chief Medical Executive
Michigan Department of Health and Human Services

Gary K. Johnson, MD, MPH
Medical Director
Genesee County Health Department

October 27, 2015

Dear Provider:

As you may be aware from recent news reports, elevated levels of lead have been found in lead pipes within the City of Flint's water system.

To help protect the children of Flint from the current lead in water exposure, the Genesee County Health Department and Michigan Department of Health and Human Services are contacting you to assist you in providing guidance to support your families.

Children can be exposed to lead from drinking water in that runs through lead pipes, old lead paint, soil, pottery, cosmetics and toys and some home remedies. Adult jobs and hobbies, like auto repair, stained glass and jewelry making, and ammunitions handling can also put children at risk if they touch clothing or play in areas where lead is found.

As a primary care provider, you play a critical role in helping to ensure that children and families exposed to lead receive the care and reassurances they need to manage the potential health impacts of lead poisoning.

Identification. Children suffering from lead poisoning often fail to present outward symptoms. However, early clinical symptoms can include anemia, anorexia, abdominal pain and constipation. Lead is a neuro-toxin, and exposure can result in violent and aggressive behaviors, lead to learning disorders, may cause Attention Deficit Hyperactivity Disorder (ADHD) and has been known to reduce IQ by as many as 5-8 points with levels as low as 10 ug/dL. Lead is metabolized through the gastrointestinal system similar to iron and calcium, with uptake rates depending on the size and weight of the child. The blood half-life of lead is short (approximately 1 month) but the bone half-life can extend into decades.

Due to multiple risk factors facing many residents in the City of Flint (including aging housing conditions and water quality), we recommend that all children under age 6 living in the City of Flint or living in homes that use Flint water, attending school or childcare in Flint, or who spend time with a caregiver in the City of Flint, receive a blood lead test. Blood lead testing should be done through a child's primary care doctor to ensure adequate short-term and long-term follow-up. ***Families should be encouraged to have their children tested immediately either at their doctor's office or the Genesee County Health Department***.

Management of Blood Lead Levels. The following guidance is provided for management of childhood blood lead levels:

- **BLL < 5 ug/dL**
  - A lead level of less than 5 mcg/dL is not typically cause for concern.
  - Provide education and anticipatory guidance to ensure that lead levels do not rise.

- Consider retesting in 12 months based on risk factors or concerns.

- **BLL >5 ug/dL**
  - **Children with capillary results of 5 ug/dL and higher must have a confirmatory venous blood draw.**
  - Families should receive anticipatory guidance, nutrition counseling, instruction on safe cleaning techniques and appropriate follow-up care from their primary care provider.
  - In-home services including case management and environmental investigations are available for all children with lead levels greater than 5 ug/dL. Refer patients to the Genesee County Health Department for this service.
  - Children with confirmed venous testing results greater than 5ug/dL within the past 18 months must be retested based on Medicaid policy and AAP guidelines. (See attached "Provider Quick Reference). If a child has not been retested within these timeframes, retesting is recommended as soon as possible.
- **BLL > 44 ug/dL.**
  - **Children with capillary results of 5 ug/dL and higher must have a confirmatory venous blood draw.**
  - Lead levels over 44 ug/dL may require hospitalization. Consult with an expert at the Children's Hospital of Michigan in Detroit for additional guidance.
  - Families should receive anticipatory guidance, nutrition counseling, instruction on safe cleaning techniques and appropriate follow-up care from their primary care provider.
  - In-home services including case management and environmental investigations are available for all children with lead levels greater than 5 ug/dL. Refer patients to the Genesee County Health Department for this service.
  - Children with confirmed venous testing results greater than 5ug/dL within the past 18 months must be retested based on Medicaid policy and AAP guidelines. (See attached "Provider Quick Reference). If a child has not been retested within these timeframes, retesting is recommended as soon as possible.

Reminder: All children covered by Medicaid must be tested at age 1 and 2.

Follow-up Care. As providers, there are steps you can take to help support your families:

1. Continue to inform and educate families regarding lead risks and preventative steps that they can take to minimize their risks.
2. Encourage your families to use filtered water for drinking, mixing formula and washing dishes. Families can contact 2-1-1 for information on free NSF Certified water filters.
3. Healthy nutrition is critical for lead-exposed children. Make sure your patients are consuming balanced diets high in iron, calcium and Vitamin C. If you have concerns about their nutrition, consider recommending a multivitamin with iron. WIC and SNAP provide assistance to parents and children who need fresh and healthy foods. Contact the Genesee County WIC office at (810) 237-4537 to learn more. In addition, SNAP offers a Double Bucks program that can provide healthy foods for less.

4. Breastfeeding is highly protective and encouraged. However, if the mother's blood lead level rises above 40ug/dL or her level is greater than 20 ug/dL and the baby has a level above 5 ug/dL breastfeeding is not recommended.
5. Because lead is a neuro-toxin, children with lead poisoning need longitudinal follow-up and may require developmental and behavioral health intervention services. Continue monitoring your patients' development at every visit.
6. Consider additional wrap-around and support services that will benefit your patients such as early childhood home visiting programs, early head start and head start. Call 2-1-1 for more information.

Local Resources. Several local resources are available to you and your patients:

- Blood Testing. Patients are encouraged to contact their primary care provider for testing. The Genesee County Health Department also administers lead tests. Patients in need of transportation should contact 2-1-1 for assistance.
- Water Testing. Water testing is free through the City of Flint Water Testing Plant. Patients can call 810-787-6537 to learn more.
- WIC and SNAP provide assistance to parents and children who need fresh and healthy foods. Contact the Genesee County WIC office at (810) 237-4537 to learn more.
- Child Development. If you have concerns about a child's growth, development or learning contact 2-1-1 for a Home Visiting Program in your area.

Websites and contact information.

- Genesee County Health Department Lead Program
  (810) 257-3833

- Michigan Department of Health and Human Services
  Childhood Lead Poisoning Prevention Program
  (888) 322-4453
  www.michigan.gov/lead

- Michigan Department of Health and Human Services
  Lead Poisoning Prevention Video for Primary Care Providers
  http://www.youtube.com/watch?v=AnkjCW_yGaU&feature=youtu.be

- United States Environmental Protection Agency
  www.epa.gov/lead

- U.S. Centers for Disease Control and Prevention (CDC) Web site
  www.cdc.gov/nceh/lead

These recommendations will stay in effect until the Genesee County Health Department lifts the restrictions on water usage.

Sincerely,

Eden Wells MD

Gary K Johnson, MD, MPH

Eden V. Wells, MD, MPH, FACPM
Chief Medical Executive
Michigan Department of Health and Human Services

Gary K. Johnson, MPH
Medical Director
Genesee County Health Department

From: Wells, Eden (DHHS)
Sent: Tuesday, October 27, 2015 5:23 PM
To: Moran, Susan (DHHS)
Subject: Re: BLLs Latest

Yup- ok

Sent from my iPhone

On Oct 27, 2015, at 5:20 PM, Moran, Susan (DHHS) <MoranS@michigan.gov> wrote:

> From our call today—Lynda D, Wes, Nancy and Wes supposed to develop a model report and present to us on Friday.....
>
> ---
>
> **From:** Wells, Eden (DHHS)
> **Sent:** Tuesday, October 27, 2015 5:16 PM
> **To:** Moran, Susan (DHHS)
> **Subject:** Fwd: BLLs Latest
>
> Do we we'd an Epi to assist him? Loaded issue, I know....
>
> Sent from my iPhone
>
> Begin forwarded message:
>
> > **From:** "Minicuci, Angela (DHHS)" <MinicuciA@michigan.gov>
> > **Date:** October 27, 2015 at 3:57:03 PM EDT
> > **To:** "Scott, Robert L. (DHHS)" <ScottR9@michigan.gov>, "Peeler, Nancy (DHHS)" <PeelerN@michigan.gov>, "Wells, Eden (DHHS)" <WellsE3@michigan.gov>
> > **Cc:** "Eisner, Jennifer (DHHS)" <EisnerJ@michigan.gov>
> > **Subject: RE: BLLs Latest**
> >
> > Hi Bob,
> >
> > Just following up on this. Does this report say that we've had 5 EBLLs since 9/28/15? And if so, why does the column next to that say we've had 12 EBLLs this week? Just making sure I'm reading this right!
> >
> > Angela
> >
> > ---
> >
> > **From:** Scott, Robert L. (DHHS)
> > **Sent:** Monday, October 26, 2015 4:43 PM
> > **To:** Minicuci, Angela (DHHS) <MinicuciA@michigan.gov>; Peeler, Nancy (DHHS) <PeelerN@michigan.gov>; Wells, Eden (DHHS) <WellsE3@michigan.gov>
> > **Cc:** Eisner, Jennifer (DHHS) <EisnerJ@michigan.gov>
> > **Subject:** RE: BLLs Latest
> >
> > Please see attached.

From: Minicuci, Angela (DHHS)
Sent: Monday, October 26, 2015 3:13 PM
To: Scott, Robert L. (DHHS) <ScottR9@michigan.gov>; Peeler, Nancy (DHHS) <PeelerN@michigan.gov>; Wells, Eden (DHHS) <WellsE3@michigan.gov>
Cc: Eisner, Jennifer (DHHS) <EisnerJ@michigan.gov>
Subject: RE: BLLs Latest

Hi Bob,

Do we have an updated report? Thanks so much!

Angela

From: Minicuci, Angela (DHHS)
Sent: Friday, October 23, 2015 10:57 AM
To: Scott, Robert L. (DHHS) <ScottR9@michigan.gov>; Peeler, Nancy (DHHS) <PeelerN@michigan.gov>; Wells, Eden (DHHS) <WellsE3@michigan.gov>
Subject: RE: BLLs Latest

Yea, I think that would be awesome.

Angela

From: Scott, Robert L. (DHHS)
Sent: Friday, October 23, 2015 10:52 AM
To: Minicuci, Angela (DHHS) <MinicuciA@michigan.gov>; Peeler, Nancy (DHHS) <PeelerN@michigan.gov>; Wells, Eden (DHHS) <WellsE3@michigan.gov>
Subject: RE: BLLs Latest

I can do it. How about this?

1) Total number of children tested since 9/28/15 press conference.
2) Total number of children with capillary EBLLs since 4/1/14 water change, still needing confirmation.
3) Total number of confirmed EBLL cases since 4/1/14.
4) Total number of children with capillary EBLLs since 9/28/15, needing confirmation.
5) Total number of confirmed EBLL cases since 9/28/15.

From: Minicuci, Angela (DHHS)
Sent: Friday, October 23, 2015 10:30 AM
To: Scott, Robert L. (DHHS) <ScottR9@michigan.gov>; Peeler, Nancy (DHHS) <PeelerN@michigan.gov>; Wells, Eden (DHHS) <WellsE3@michigan.gov>
Subject: RE: BLLs Latest

Hi Bob, my only thought on this is can we include something on each page that has a cumulative number of tests done, and number of EBLL cases?

Angela

From: Scott, Robert L. (DHHS)
Sent: Thursday, October 22, 2015 5:16 PM
To: Peeler, Nancy (DHHS) <PeelerN@michigan.gov>; Wells, Eden (DHHS) <WellsE3@michigan.gov>; Minicuci, Angela (DHHS) <MinicuciA@michigan.gov>
Subject: RE: BLLs Latest

Eden and Angela,

Per your request, please see attached. Consider this a 1st (well, 3rd) draft, and let me know if you have suggestions or questions.

Thanks,
Bob

From: Peeler, Nancy (DHHS)
Sent: Wednesday, October 21, 2015 4:16 PM
To: Wells, Eden (DHHS) <WellsE3@michigan.gov>; Minicuci, Angela (DHHS) <MinicuciA@michigan.gov>; Scott, Robert L. (DHHS) <ScottR9@michigan.gov>
Subject: RE: BLLs Latest

We've been having the same conversation here – yes, we can do that, happy to do that. Bob was starting to work on a format this morning. If you have specific information you would want in a weekly report, let us know, as that will help us to pull what you really need. I know Epi was also talking about a weekly analysis of sorts, which I think would go more in-depth than the counts and such we can give you as a starting point.

Nancy

From: Wells, Eden (DHHS)
Sent: Wednesday, October 21, 2015 1:41 PM
To: Minicuci, Angela (DHHS); Peeler, Nancy (DHHS); Scott, Robert L. (DHHS)
Subject: RE: BLLs Latest

Yes,

I almost think we should get weekly summary. How many test have been done since the first press conference (9/28?)

From: Minicuci, Angela (DHHS)
Sent: Wednesday, October 21, 2015 1:05 PM
To: Peeler, Nancy (DHHS); Scott, Robert L. (DHHS); Wells, Eden (DHHS)
Subject: BLLs Latest

Hi Nancy and Bob,

Out of curiosity, could we begin looking at pulling some data about recent Flint BLL data? I think all results have to be reported to us within 5 days of the test result, correct?

If so, is there any chance we can begin taking a look at what that data is telling us? Not wanting to do anything with it yet, but just trying to think a little more proactively.

Thanks,

Angela Minicuci
Office of External Relations and Communications
Michigan Department of Health and Human Services
Office: (517) 241-2112
Mobile: PPI
minicucia@michigan.gov
www.michigan.gov/mdhhs

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From: Wells, Eden (DHHS)
Sent: Wednesday, October 28, 2015 8:56 AM
To: Dykema, Linda D. (DHHS)
Cc: Bruneau, Michelle (DHHS)
Subject: Fwd: BLLs Latest
Attachments: Flint Weekly Summary 10-23.pdf; ATT00001.htm

Here is Bob's latest. New: talked to Sue-Nick needs a cleaned up version by 2 pm that makes sense!!

Mass clinics are Nov 5 at GCHD with Mclaren and nov 12 - a school Claire at Northwestern

Sent from my iPhone

Begin forwarded message:

> **From:** "Scott, Robert L. (DHHS)" <ScottR9@michigan.gov>
> **Date:** October 26, 2015 at 4:42:50 PM EDT
> **To:** "Minicuci, Angela (DHHS)" <MinicuciA@michigan.gov>, "Peeler, Nancy (DHHS)" <PeelerN@michigan.gov>, "Wells, Eden (DHHS)" <WellsE3@michigan.gov>
> **Cc:** "Eisner, Jennifer (DHHS)" <EisnerJ@michigan.gov>
> **Subject: RE: BLLs Latest**
>
> Please see attached.
>
> ---
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> **From:** Minicuci, Angela (DHHS)
> **Sent:** Monday, October 26, 2015 3:13 PM
> **To:** Scott, Robert L. (DHHS) <ScottR9@michigan.gov>; Peeler, Nancy (DHHS) <PeelerN@michigan.gov>; Wells, Eden (DHHS) <WellsE3@michigan.gov>
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Subject: RE: BLLs Latest

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Subject: RE: BLLs Latest

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Subject: RE: BLLs Latest

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Sent: Wednesday, October 21, 2015 1:05 PM
To: Peeler, Nancy (DHHS); Scott, Robert L. (DHHS); Wells, Eden (DHHS)
Subject: BLLs Latest

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Thanks,

Angela Minicuci
Office of External Relations and Communications
Michigan Department of Health and Human Services
Office: (517) 241-2112
Mobile: PPI
minicuciа@michigan.gov
www.michigan.gov/mdhhs

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Weekly Summary of New Blood Lead Test Results for Flint ZIPS 48501-48507
Records Processed 10/23/15 and Cumulative Totals

Cumulative Totals	
# children tested since 9/28/15 press conference:	572
# children with capillary EBLLs since April 2014 water change, still needing confirmation:	76
# confirmed EBLL cases since April 2014:	77
# children with capillary EBLLs since 9/28/15, needing confirmation:	5
# confirmed EBLL cases since 9/28/15:	5

Tests Processed This Week:	**405**
(Date Drawn >= 9/28/15):	405

By Age	
age < 3:	82
age 3-5:	62
age 6-17:	113
adults:	148

By ZIP Code	
48501	2
48502	3
48503	111
48504	95
48505	47
48506	70
48507	77

Elevated BLL (>= 5 ug/dL) Processed This Week:	**12**

EBLL by Age	
age < 3:	7
age 3-5:	1
age 6-17:	1
adults:	3

EBLL by ZIP Code	
48501	0
48502	0
48503	1
48504	2
48505	3
48506	2
48507	4

EBLL by Range and Specimen Type	
Venous 5-14:	5
Capillary 5-14:	4
Unknown type 5-14:	1
Venous 15-44:	1
Capillary 15-44:	1
Venous 45+:	0
Capillary 45+:	0

EBLL by Circumstance	
1st Test:	6
Not 1st Test, but 1st EBLL:	3
Venous Confirmation of EBLL Capillary:	2
Follow-up Test, Increasing:	0
Follow-up Test, Steady:	0
Follow-up Test, Decreasing:	1

Number of Children Hospitalized:	0

This Document is a Non-Responsive Attachment.

From: Wells, Eden (DHHS)
Sent: Wednesday, October 28, 2015 2:34 PM
To: Lasher, Geralyn (DHHS);Hertel, Elizabeth (DHHS)
Subject: Fwd: Genesee County Health Department water filter system daily mass notification - 10.26.15

Didn't see you both in this?

Sent from my iPhone

Begin forwarded message:

From: "Boyer, Jenifier" <JBoyer@co.genesee.mi.us>
Date: October 28, 2015 at 2:32:01 PM EDT
To: "Stickler, Lisa" <stickler@gchd.us>, "McShane, Hilda" <hmcshane@gchd.us>, "hcroft@cityofflint.com" <hcroft@cityofflint.com>, "kboles@valleyaaa.org" <kboles@valleyaaa.org>, "Brickey, Tamara" <tbrickey@gchd.us>, Jamie Gaskin <jgaskin@unitedwaygenesee.org>, "Holmes, Virginia (DHHS)" <HolmesV@michigan.gov>, "Howard, Stephanie" <SHoward@co.genesee.mi.us>, "skammer@cityofflint.com" <skammer@cityofflint.com>, Andy Leavitt <aleavitt@senatedems.org>, "moses@mi.gov" <moses@mi.gov>, "neeleyrep34@gmail.com" <neeleyrep34@gmail.com>, "ioliver@cfgf.org" <ioliver@cfgf.org>, "Purcell, Matthew" <MPurcell@co.genesee.mi.us>, "schoenowk@michigan.gov" <schoenowk@michigan.gov>, "thelenr4@michigan.gov" <thelenr4@michigan.gov>, Mark Valacak <mvalacak@gchd.us>, Jamie-Lee Venable <jvenable@unitedwaygenesee.org>, "Cupal, Suzanne" <SCupal@gchd.us>, "Henry, James" <jhenry@gchd.us>, "Hallwood, Dawn" <dhallwood@gchd.us>, "Swartout, April" <ASwartout@gchd.us>, "LaRocco, Toni" <tlarocco@gchd.us>, "EisnerJ@michigan.gov" <EisnerJ@michigan.gov>, "WellsE3@michigan.gov" <WellsE3@michigan.gov>, "millerm1@michigan.gov" <millerm1@michigan.gov>, "roachb@michigan.gov" <roachb@michigan.gov>, "ThompsonS2@michigan.gov" <ThompsonS2@michigan.gov>, "Johnson, M.D., Gary" <GJOHNSON@gchd.us>, "tsitko@flintschools.org" <tsitko@flintschools.org>, "plevine@gcms.org" <plevine@gcms.org>, "ksmith@flint.org" <ksmith@flint.org>, "mhanna1@hurleymc.com" <mhanna1@hurleymc.com>, "gonzalezi6@michigan.gov" <gonzalezi6@michigan.gov>, "morans@michigan.gov" <morans@michigan.gov>, "robinsonm18@michigan.gov" <robinsonm18@michigan.gov>, "lrey52@gmail.com" <lrey52@gmail.com>
Subject: RE: Genesee County Health Department water filter system daily mass notification - 10.26.15

Sorry I was triple booked yesterday and had to be somewhere else and could not call in.

Was there a decision made on the REFILL FILTER Distribution?
If so, are volunteers needed through our office?
If so, I need to know where and when!

I need to have something concrete by end of today or first thing tomorrow morning in order to have a chance meeting volunteer staffing needs! Please let me know. If I don't hear anything by 10am tomorrow, then our office will not be able to coordinate the volunteers.

Thank you,

Jen

Jenifier Boyer, PEM
Emergency Management Manager
Office of Genesee County Sheriff

https://www.facebook.com/GCEMHS

www.areyoureadysetsafe.com

DISCLAIMER: The information in this message is confidential and may be legally privileged. It is intended for the addressee. Access to this message by anyone else is unauthorized. If you are not the intended recipient, any disclosure, copying, or distribution of the message, or any action or omission taken by you in reliance on it, is prohibited and may be unlawful. Please immediately contact the sender if you have received this message in error. Thank you

---

From: Stickler, Lisa [mailto:STICKLER@gchd.us]
Sent: Monday, October 26, 2015 4:00 PM
To: McShane, Hilda; hcroft@cityofflint.com; kboles@valleyaaa.org; Boyer, Jenifier; Brickey, Tamara; Jamie Gaskin; Holmes, Virginia (DHHS); Howard, Stephanie; skammer@cityofflint.com; Andy Leavitt; moses@mi.gov; neeleyrep34@gmail.com; ioliver@cfgf.org; Purcell, Matthew; schoenowk@michigan.gov; thelenr4@michigan.gov; Mark Valacak; Jamie-Lee Venable; Cupal, Suzanne; Henry, James; Hallwood, Dawn; Swartout, April; LaRocco, Toni; EisnerJ@michigan.gov; WellsE3@michigan.gov; millerm1@michigan.gov; roachb@michigan.gov; ThompsonS2@michigan.gov; Johnson, M.D., Gary; tsitko@flintschools.org; plevine@gcms.org; ksmith@flint.org; mhanna1@hurleymc.com; gonzalezi6@michigan.gov; morans@michigan.gov; robinsonm18@michigan.gov; lrev52@gmail.com
Subject: RE: Genesee County Health Department water filter system daily mass notification - 10.26.15

On behalf of Hilda McShane/Mark Valacak the only update for today is:

This is an informational update and the Genesee County Health Department will provide these updates on a daily basis after 4 pm. We are asking all partners included in this email to provide any pertinent updates **DAILY** to Hilda McShane by 2:00pm. If you have nothing new to share, please inform Hilda that you have no updates at this time.

- 20 water filters delivered to Grand Blanc schools
- Lead testing clinic to be held at Burton Health Center from 8am-5pm on Nov. 5
- Education and Lead testing clinic to be held Nov. 12 at Brownell/Holmes Schools from 2-7pm for ages 0-5.
- GCHD sanitarians to assist DEQ in water testing in the Flint Schools

---

From: Stickler, Lisa
Sent: Friday, October 23, 2015 4:37 PM
To: McShane, Hilda; 'hcroft@cityofflint.com'; 'kboles@valleyaaa.org'; 'jboyer@co.genesee.mi.us'; Brickey, Tamara; 'Jamie Gaskin'; 'Holmes, Virginia (DHHS)'; 'showard@co.genesee.mi.us'; 'skammer@cityofflint.com'; 'Andy Leavitt'; 'moses@mi.gov'; 'neeleyrep34@gmail.com'; 'ioliver@cfgf.org'; 'mpurcell@co.genesee.mi.us'; 'schoenowk@michigan.gov'; 'thelenr4@michigan.gov'; Valacak, Mark; 'Jamie-Lee Venable'; Cupal, Suzanne; Henry, James; Hallwood, Dawn; Swartout, April; Stickler, Lisa; LaRocco, Toni; 'EisnerJ@michigan.gov'; 'WellsE3@michigan.gov'; 'millerm1@michigan.gov'; 'roachb@michigan.gov'; 'ThompsonS2@michigan.gov'; Johnson, M.D., Gary; 'tsitko@flintschools.org';

'plevine@gcms.org'; 'ksmith@flint.org'; 'mhanna1@hurleymc.com'; 'gonzalezj6@michigan.gov'; 'morans@michigan.gov'; 'robinsonm18@michigan.gov'; 'lrey52@gmail.com'
Subject: Genesee County Health Department water filter system daily mass notification - 10.23.15

On behalf of Hilda McShane/Mark Valacak the only update for today is:

A meeting will be held at the Department of Education Administration Building in Flint at 10:30am on Monday, Oct. 26 to discuss community education through the schools and future community testing.

From: McShane, Hilda
Sent: Tuesday, October 20, 2015 5:08 PM
To: hcroft@cityofflint.com; kboles@valleyaaa.org; jboyer@co.genesee.mi.us; Brickey, Tamara; Jamie Gaskin; Holmes, Virginia (DHHS); showard@co.genesee.mi.us; skammer@cityofflint.com; Andy Leavitt; moses@mi.gov; neeleyrep34@gmail.com; ioliver@cfgf.org; mpurcell@co.genesee.mi.us; schoenowk@michigan.gov; thelenr4@michigan.gov; Valacak, Mark; Jamie-Lee Venable; Cupal, Suzanne; Henry, James; Hallwood, Dawn; Swartout, April; lstickler@gchd.us; LaRocco, Toni; EisnerJ@michigan.gov; WellsE3@michigan.gov; millerm1@michigan.gov; roachb@michigan.gov; ThompsonS2@michigan.gov; Johnson, M.D., Gary; tsitko@flintschools.org; plevine@gcms.org; ksmith@flint.org; mhanna1@hurleymc.com; gonzalezj6@michigan.gov; morans@michigan.gov; robinsonm18@michigan.gov; lrey52@gmail.com
Subject: Genesee County Health Department water filter system daily mass notification - 10.20.15

This is an informational update and the Genesee County Health Department will provide these updates on a daily basis after 4 pm. We are asking all partners included in this email to provide any pertinent updates **DAILY** to Hilda McShane by 2:00pm. If you have nothing new to share, please inform Hilda that you have no updates at this time.

- Genesee County Health Department Community Health Director, Tamara Brickey, connected Chris Mann (GCHD IT consultant) with Ed Berger from MTA to reference the water filter database for an upcoming water filter distribution to disabled clients.

- Tamara Brickey, spoke with Vicki Austin Sacharski from the Disability Network for the purpose of connecting Disability Network clients with water filters. DN will track information of those clients who call in with questions about filters and get the information to GCHD. We will pass that information along to MTA for delivery. GCCARD may be able to assist with installation.

- Tamara is reaching out to a regional representative from DaVita Dialysis to help coordinate the distribution of water filters.

- Department of Health and Human Services has distributed the following:
  113 filters (of which 1 went to daycares)
  10 – 8 cup pitcher
  1 – 23 cup pitcher- to daycare
  Total distributed 124

- Flint Community Schools Superintendent, Bilal Tawab met on Friday, October 16, 2015 with representatives of MDEQ, LARA, and DHHS to discuss a new round of water testing at each of the Flint Community Schools starting on Wednesday, October 21,2015.

From: McShane, Hilda
Sent: Monday, October 19, 2015 4:30 PM

To: 'hcroft@cityofflint.com'; 'kboles@valleyaaa.org'; 'jboyer@co.genesee.mi.us'; Brickey, Tamara; 'Jamie Gaskin'; 'Holmes, Virginia (DHHS)'; 'showard@co.genesee.mi.us'; 'skammer@cityofflint.com'; 'Andy Leavitt'; 'moses@mi.gov'; 'neeleyrep34@gmail.com'; 'ioliver@cfgf.org'; 'mpurcell@co.genesee.mi.us'; 'schoenowk@michigan.gov'; 'thelenr4@michigan.gov'; Valacak, Mark; 'Jamie-Lee Venable'; Cupal, Suzanne; Henry, James; Hallwood, Dawn; Swartout, April; 'lstickler@gchd.us'; LaRocco, Toni; 'EisnerJ@michigan.gov'; 'WellsE3@michigan.gov'; 'millerm1@michigan.gov'; 'roachb@michigan.gov'; 'ThompsonS2@michigan.gov'; Johnson, M.D., Gary; 'tsitko@flintschools.org'; 'pievine@gcms.org'; 'ksmith@flint.org'; 'mhanna1@hurleymc.com'; 'gonzalezj6@michigan.gov'; 'morans@michigan.gov'; 'robinsonm18@michigan.gov'; 'lrey52@gmail.com'
Subject: RE: Genesee County Health Department water filter system daily mass notification - 10.19.15

This is an informational update and the Genesee County Health Department will provide these updates on a daily basis after 4 pm. We are asking all partners included in this email to provide any pertinent updates **DAILY** to Hilda McShane by 2:00pm. If you have nothing new to share, please inform Hilda that you have no updates at this time.

- 100 water filters were delivered to Burton location of Planned Parenthood for distribution by GCHD.
- Tamara Brickey (GCHD Community Health Director) and Hilda McShane (GCHD Marketing Specialist), met with MTA about reaching disabled and dialysis patients. MTA will work with GCHD to determine which MTA Your Ride clients may be in need of water filters.
- Another dialysis provider in Flint has requested 30 filters for patients.
- Toni (Nursing Director, GCHD), Jori July (GCHD Immunizations Supervisor) and Hilda McShane met this AM with Molina. Further arrangements with Molina will be made. No date set at this time.
- GCHD is still awaiting communication from Total Health Care.
- Department of Education has come out with a statement that all school age kids in Flint should be lead tested. Our state colleagues along with Toni will work on getting education out to the schools/families regarding getting kids tested.
- Diplomat has a program that they do with physicians about vitamins for kids. Dr. Mona Hanna-Attisha (Hurley) is talking to them about changing the formulary of the vitamin to help with lead issues in kids.
- Jim Henry (GCHD Environmental Health Supervisor) met with DEQ representatives on Friday. DEQ is proposing starting a new round of water testing in all schools receiving Flint water as of Wednesday, October 21, 2015. DEQ is proposing a stakeholder meeting every Friday to discuss updates.

From: McShane, Hilda
Sent: Friday, October 16, 2015 4:36 PM
To: 'hcroft@cityofflint.com'; 'kboles@valleyaaa.org'; 'jboyer@co.genesee.mi.us'; Brickey, Tamara; 'Jamie Gaskin'; 'Holmes, Virginia (DHHS)'; 'showard@co.genesee.mi.us'; 'skammer@cityofflint.com'; 'Andy Leavitt'; 'moses@mi.gov'; 'neeleyrep34@gmail.com'; 'ioliver@cfgf.org'; 'mpurcell@co.genesee.mi.us'; 'schoenowk@michigan.gov'; 'thelenr4@michigan.gov'; Valacak, Mark; 'Jamie-Lee Venable'; Cupal,

Suzanne; Henry, James; Hallwood, Dawn; Swartout, April; 'lstickler@gchd.us'; LaRocco, Toni; 'EisnerJ@michigan.gov'; 'WellsE3@michigan.gov'; 'millerm1@michigan.gov'; 'roachb@michigan.gov'; 'ThompsonS2@michigan.gov'; Johnson, M.D., Gary; 'tsitko@flintschools.org'; 'pievine@gcms.org'; 'ksmith@flint.org'; 'mhanna1@hurleymc.com'; 'gonzalezj6@michigan.gov'; 'morans@michigan.gov'; 'robinsonm18@michigan.gov'; 'lrey52@gmail.com'
Subject: Genesee County Health Department water filter system daily mass notification - 10.16.15

This is an informational update and the Genesee County Health Department will provide these updates on a daily basis after 4 pm. We are asking all partners included in this email to provide any pertinent updates **DAILY** to Hilda McShane by 2:00pm. If you have nothing new to share, please inform Hilda that you have no updates at this time.

- The attached document was provided, emailed, and mailed to 346 licensed food establishments using City of Flint Water by the Genesee County Health Department (GCHD). The Michigan Department of Agriculture and Rural Development (MDARD) emailed and mailed the attached document to: grocery, food processing establishments, and party stores using City of Flint water. This document is available at www.gchd.us.

- Michigan Department of Health and Human Services (MDHHS) and Genesee County Community Action Resource Department (GCCARC) distributed 247 water filter systems and 11 water pitchers on 10.15.15.

- The Michigan Childhood Lead Poisoning Prevention Program (CLPPP) created a toolkit to help agency partners, primary care providers and community advocates prepare for lead week, October 25-31, 2015. The Michigan toolkit contains ideas for local lead week activities, a sample press release, sample social media posts and a sample news article. Several CLPPP brochures have also been revised in anticipation of lead week, including the handout for parents, "Is Your Child Safe From Lead?" and a new handout for pregnant and breastfeeding mothers. A CLPPP program profile and a quick reference guide for primary care providers is also in the toolkit.

- Genesee County Health Department Nursing Director, Toni La Rocco, will meet with Molina Healthcare of Michigan representative, Omar Sims, to plan a lead clinic in the near future.

- DaVita Dialysis' Hurley location received 100 water filter systems on 10.16.15 from the Genesee County Health Department.

- Planned Parenthood is scheduled to receive 100 water filter systems on 10.19.15 from the Genesee County Health Department.

- Genesee County Health Department is working with Flint Mass Transit Authority (MTA) to distribute the water filter system to disabled and kidney dialysis YOUR RIDE customers.

- Chris Mann will have additional conversations with the State to discuss updates to the database for tracking filter distribution.

- Genesee County Environmental Health Supervisor, Jim Henry, is meeting with the DEQ laboratory director to discuss future samplings.

From: McShane, Hilda
Sent: Thursday, October 15, 2015 4:15 PM
To: 'hcroft@cityofflint.com'; 'kboles@valleyaaa.org'; 'jboyer@co.genesee.mi.us'; Brickey, Tamara; 'Jamie Gaskin'; 'Holmes, Virginia (DHHS)'; 'showard@co.genesee.mi.us'; 'skammer@cityofflint.com'; 'Andy Leavitt'; 'moses@mi.gov'; 'neelevrep34@gmail.com'; 'ioliver@cfgf.org'; 'mpurcell@co.genesee.mi.us'; 'schoenowk@michigan.gov'; 'thelenr4@michigan.gov'; Valacak, Mark; 'Jamie-Lee Venable'; Cupal, Suzanne; Henry, James; Hallwood, Dawn; Swartout, April; 'lstickler@gchd.us'; LaRocco, Toni; 'EisnerJ@michigan.gov'; 'WellsE3@michigan.gov'; 'millerm1@michigan.gov'; 'roachb@michigan.gov'; 'ThompsonS2@michigan.gov'; Johnson, M.D., Gary; 'tsitko@flintschools.org'; 'plevine@gcms.org'; 'ksmith@flint.org'; 'mhanna1@hurleymc.com'; 'gonzalezj6@michigan.gov'; 'morans@michigan.gov'; 'robinsonm18@michigan.gov'; 'lrey52@gmail.com'
Subject: RE: Genesee County Health Department water filter system daily mass notification - 10.14.15

This is an informational update and the Genesee County Health Department will provide these updates on a daily basis after 4 pm. We are asking all partners included in this email to provide any pertinent updates **DAILY** to Hilda McShane by 2:00pm. If you have nothing new to share, please inform Hilda that you have no updates at this time.

- As requested by the state of Michigan, Chris Mann of GCHD made all the requested changes to the water filter system database.
- DaVita Dialysis Center has requested 100 water filter systems. Filters will be dropped off Wednesday, October 14.
- Genesee County Health Department will be delivering 100 water filters to Planned Parenthood on Monday, October 19.
- City of Flint Schools' Superintendent is reaching out to his principals requesting input on the distribution of the water filter system to staff and families.
- Dr. Laura Carravallah reached out to Marc Edwards of Virginia Tech regarding the copper levels in the Flint water. Marc did test the Flint water and copper levels in the water are within EPA standards.
- Nursing Director, Toni LaRocco, is finalizing plans for an upcoming lead clinic with McLaren Health Plan on November 5. Toni and staff are in talks with Molina Healthcare of Michigan to schedule another lead clinic.

From: McShane, Hilda
Sent: Wednesday, October 14, 2015 5:06 PM
To: 'hcroft@cityofflint.com'; 'kboles@valleyaaa.org'; 'jboyer@co.genesee.mi.us'; Brickey, Tamara; 'Jamie Gaskin'; 'Holmes, Virginia (DHHS)'; 'showard@co.genesee.mi.us'; 'skammer@cityofflint.com'; 'Andy Leavitt'; 'moses@mi.gov'; 'neelevrep34@gmail.com'; 'ioliver@cfgf.org'; 'mpurcell@co.genesee.mi.us'; 'schoenowk@michigan.gov'; 'thelenr4@michigan.gov'; Valacak, Mark; 'Jamie-Lee Venable'; Cupal, Suzanne; Henry, James; Hallwood, Dawn; Swartout, April; 'lstickler@gchd.us'; LaRocco, Toni; 'EisnerJ@michigan.gov'; 'WellsE3@michigan.gov'; 'millerm1@michigan.gov'; 'roachb@michigan.gov'; 'ThompsonS2@michigan.gov'; Johnson, M.D., Gary; 'tsitko@flintschools.org'
Subject: RE: Genesee County Health Department water filter system daily mass notification - 10.14.15

This is an informational update and the Genesee County Health Department will provide these updates on a daily basis after 4 pm. We are asking all partners included in this email to provide any pertinent updates **DAILY** to Hilda McShane by 2:00pm. If you have nothing new to share, please inform Hilda that you have no updates at this time.

- Chris Mann and GCHD Community Health Director, Tamara Brickey, are working with the State to insert more field information to the current Excel water filter database.

- GCCARD's Lippincott location does not have stable internet connection and because of this, staff are not using the most up-to-date water filter system Excel file. The State is gathering this information and will send Genesee County Health Department their Excel database and we will upload the data on a daily basis.

- Tamara has made contact with Flint Schools. She will make arrangement with staff and student's families to receive a water filter system. A date for the filter distribution to staff and student's families has not been set.

- Jim Henry, GCHD Environmental Health Supervisor got a call from State. They are looking for our staff to do another round of sampling at all Flint schools who receive city of Flint water.

- Planned Parenthood will receive 100 water filters for distribution to their clients.

- GCHD will be making contact with the Disability Network to continue planning to reach the disabled population within Flint that need assistance obtaining a water filter.

- MDEQ reached out to the CDC regarding the effects of bathing in water contaminated with lead. The experts are looking further into this matter. See attached FAQ Flint Water Fact sheet.

- Dr. Caravella of GCHD's Board of Health is concerned whether the distributed water filter systems will remove copper. She is concerned about individuals in the community who have a rare condition related to copper.

- Jim Henry is working to receive lab results in a timely manner.

- GCHD Director of Nursing, Toni LaRocco had a conversation with various individuals from the State regarding blood lead clinic. Toni is working to implement an upcoming lead clinic for children, 0-5 scheduled with McLaren Health Plan. Toni is reaching out to the University of Michigan – Flint to have students and faculty present at all clinics. Toni is working on other locations to host clinics with other health plans. The first message for people should be that the first choice in testing should be at their primary care provider.

- FAQs regarding lead and water for providers and public will be released in future from MDHHS.

- As of October 13 the total distribution for both DHHS and GCCARD is 8447.

- 336 filters and pitchers were distributed on 10/13 by DHHS and GCCARD.

- Daycares also began picking up filters and pitchers on yesterday as well from GCCARD.

From: McShane, Hilda
Sent: Tuesday, October 13, 2015 5:24 PM
To: 'hcroft@cityofflint.com'; 'kboles@valleyaaa.org'; 'jboyer@co.genesee.mi.us'; Brickey, Tamara; Jamie Gaskin; 'Holmes, Virginia (DHHS)'; 'showard@co.genesee.mi.us'; 'skammer@cityofflint.com'; Andy Leavitt; 'moses@mi.gov'; 'neeleyrep34@gmail.com'; 'ioliver@cfgf.org'; 'mpurcell@co.genesee.mi.us'; 'schoenowk@michigan.gov'; tsitko@flintschool.org; 'thelenr4@michigan.gov'; 'thompson52@mi.gov'; Valacak, Mark; Jamie-Lee Venable; Cupal, Suzanne; Henry, James; Hallwood, Dawn; Swartout, April; 'lstickler@gchd.us'; LaRocco, Toni; 'EisnerJ@michigan.gov'; 'WellsE3@michigan.gov'; 'millerm1@michigan.gov'; 'roachb@michigan.gov'
Subject: Genesee County Health Department water filter system daily mass notification - 10.13.15

This is an informational update and the Genesee County Health Department will provide these updates on a daily basis after 4 pm. We are asking all partners included in this email to provide any pertinent updates **DAILY** to Hilda McShane by 2:00pm. If you have nothing new to share, please inform Hilda that you have no updates at this time.

- 20,000 filters + 9,000 replacement filters have been delivered to Genesee County Community Action Resource Department (GCARD) and Michigan Department Health Human Services (MDHHHS).

- We are reminding partners to blackout the barcode on filter boxes before distribution.

- As of 10.13.15 Flint Housing Commission has distributed water filters to all of its housing units.

- Valley Area Agency on Aging (VAAA) is creating a list of homebound seniors. Three (3) state employees and Five (5) GCCARD employees are working through that list and will help with home installation.

- Distribution has been completed at Rosehaven Manor, Court Street Commons, Riverfront Dorms, Job Corp, and University of Michigan-Flint international student population

- Municipalities with residents that receive Flint City water will be contacted and asked to be the distribution point for the water filter system in their area by the City of Flint.

- Eileen Tomasi from Flint Schools has asked to use the elementary schools as water filter distribution points for both staff living in Flint and parents of school children. GCHD is awaiting a follow up conversation with the Flint Community Schools.

- Genesee County Health Department (GCHD) is starting to see an increase in requests for blood lead testing. GCHD Nursing Director, Toni LaRocco, is working with McLaren Health Plan to develop a lead clinic in November. University of Michigan-Flint has offered nursing students to assist at the clinic. Adults can use the Genesee County Health Department's Primary Care Clinic and the Health Department will bill insurance, or go on standing orders.

- Total filters distributed by MDHHS and GCCARD, 8,000. Genesee County Health Department has distributed 4,000 filters, which include approximately 2,700 to the public, 100 to Wellness Services, 100 to GCHD Primary Care Clinic, 100 to WIC, 100 to Reverence, and 375 to Hurley Maternal Infant Health Home Visiting Services.

Hilda McShane
Marketing Specialist
Genesee County Health Department

Phone: 810.341.7661
FAX: 810.257.3147
hmcshane@gchd.us

Genesee County
Health Department

From: Wells, Eden (DHHS)
Sent: Thursday, October 29, 2015 8:31 AM
To: Robinson, Mikelle (DHHS)
Subject: Re: My notes on DEQ data

Thanks much, Mikelle!
E

Sent from my iPhone

On Oct 29, 2015, at 8:23 AM, Robinson, Mikelle (DHHS) <RobinsonM18@michigan.gov> wrote:

> Testing water in homes: Of 240 samples tested from households on Flint water, One zip code (48503) over 75 % were 5 ppb or lower. 90% were at 10 or below. " We now know where the problem is and we can address it."
>
> Freeman School water testing results were consistent. 31 samples were taken. 30 out of 31 sites were able to get to 5 ppb. Only 9 samples exceeded 15 ppb on first or second draw. They will be taking further samples. Results indicate the lead is likely from connecting plumbing. Replacing faucets at the schools will be recommended. This is the responsibility of the schools. The city said that there are no lead service lines to the schools.
>
> DEQ is planning to take samples at Eisenhower and Brownell schools on Saturday.

From: Wells, Eden (DHHS)
Sent: Thursday, October 29, 2015 4:10 PM
To: 'plevine@gcms.org';Mona Hanna-Attisha;Lawrence Reynolds;Jamie Gaskin
Subject: Fw: Genesee County Health Department water filter system daily mass notification - 10.29.15
Attachments: lead and your body FAQ.pdf; lead in water FAQ.pdf

Two very nice handouts/resources from GCHD...
E

From: Stickler, Lisa <STICKLER@gchd.us>
Sent: Thursday, October 29, 2015 4:01 PM
To: McShane, Hilda; hcroft@cityofflint.com; kboles@valleyaaa.org; jboyer@co.genesee.mi.us; Brickey, Tamara; Jamie Gaskin; Holmes, Virginia (DHHS); showard@co.genesee.mi.us; skammer@cityofflint.com; Andy Leavitt; Mose, Sandi Kay (DHHS); neeleyrep34@gmail.com; ioliver@cfgf.org; mpurcell@co.genesee.mi.us; Schoenow, Kris (DHHS); Thelen, Richard (DHHS); Valacak, Mark; Jamie-Lee Venable; Cupal, Suzanne; Henry, James; Hallwood, Dawn; Swartout, April; LaRocco, Toni; Eisner, Jennifer (DHHS); Wells, Eden (DHHS); Miller, Mark (DHHS); Roach, Billie Jo (MSP); Thompson, Sheryl D. (DHHS); Johnson, M.D., Gary; tsitko@flintschools.org; plevine@gcms.org; ksmith@flint.org; mhanna1@hurleymc.com; Gonzalez, Jonathan (DHHS); Moran, Susan (DHHS); Robinson, Mikelle (DHHS); doerrkay@gmail.com; lrey52@gmail.com; Lcarrav1@yahoo.com
Subject: Genesee County Health Department water filter system daily mass notification - 10.29.15

On behalf of Hilda McShane/Mark Valacak the updates for today are:

This is an informational update and the Genesee County Health Department will provide these updates on a daily basis after 4 pm. We are asking all partners included in this email to provide any pertinent updates **DAILY** to Hilda McShane and Lisa Stickler by 2:00pm. If you have nothing new to share, please inform Hilda that you have no updates at this time.

- **DHHS/GCCARD filter distribution:**
  112 filters
  (7) 8- cup pitchers
  (1) 23-cup daycare pitchers
  Total 120

- **Lead & Your Body and Lead in Water FAQ sheets (see attached pdfs.)**

From: Stickler, Lisa
Sent: Wednesday, October 28, 2015 3:56 PM
To: McShane, Hilda; 'hcroft@cityofflint.com'; 'kboles@valleyaaa.org'; 'jboyer@co.genesee.mi.us'; Brickey, Tamara; 'Jamie Gaskin'; 'Holmes, Virginia (DHHS)'; 'showard@co.genesee.mi.us'; 'skammer@cityofflint.com'; 'Andy Leavitt'; 'moses@mi.gov'; 'neeleyrep34@gmail.com'; 'ioliver@cfgf.org'; 'mpurcell@co.genesee.mi.us'; 'schoenowk@michigan.gov'; 'thelenr4@michigan.gov'; Valacak, Mark; 'Jamie-Lee Venable'; Cupal, Suzanne; Henry, James; Hallwood, Dawn; Swartout, April; LaRocco, Toni; 'EisnerJ@michigan.gov'; 'WellsE3@michigan.gov'; 'millerm1@michigan.gov'; 'roachb@michigan.gov';

'ThompsonS2@michigan.gov'; Johnson, M.D., Gary; 'tsitko@flintschools.org'; 'plevine@gcms.org'; 'ksmith@flint.org'; 'mhanna1@hurleymc.com'; 'gonzalezj6@michigan.gov'; 'morans@michigan.gov'; 'robinsonm18@michigan.gov'; Kay Doerr (doerrkay@gmail.com); 'lrey52@gmail.com'; Laura Ann Carravallah MD (Lcarrav1@yahoo.com)
Subject: Genesee County Health Department water filter system daily mass notification - 10.28.15

On behalf of Hilda McShane/Mark Valacak the only update for today is:

This is an informational update and the Genesee County Health Department will provide these updates on a daily basis after 4 pm. We are asking all partners included in this email to provide any pertinent updates **DAILY** to Hilda McShane and Lisa Stickler by 2:00pm. If you have nothing new to share, please inform Hilda that you have no updates at this time.

- Representative Sheldon Neeley to have a Town Hall Informational meeting Nov. 2 at the Bethel United Methodist Church at 6pm.
- Conference call to be held Oct. 29 with the Flint Schools to discuss the school lead education event at Brownell/Holmes on Nov. 12.

From: Stickler, Lisa
Sent: Monday, October 26, 2015 4:00 PM
To: McShane, Hilda; 'hcroft@cityofflint.com'; 'kboles@valleyaaa.org'; 'jboyer@co.genesee.mi.us'; Brickey, Tamara; 'Jamie Gaskin'; 'Holmes, Virginia (DHHS)'; 'showard@co.genesee.mi.us'; 'skammer@cityofflint.com'; 'Andy Leavitt'; 'moses@mi.gov'; 'neeleyrep34@gmail.com'; 'ioliver@cfgf.org'; 'mpurcell@co.genesee.mi.us'; 'schoenowk@michigan.gov'; 'thelenr4@michigan.gov'; Valacak, Mark; 'Jamie-Lee Venable'; Cupal, Suzanne; Henry, James; Hallwood, Dawn; Swartout, April; LaRocco, Toni; 'EisnerJ@michigan.gov'; 'WellsE3@michigan.gov'; 'millerm1@michigan.gov'; 'roachb@michigan.gov'; 'ThompsonS2@michigan.gov'; Johnson, M.D., Gary; 'tsitko@flintschools.org'; 'plevine@gcms.org'; 'ksmith@flint.org'; 'mhanna1@hurleymc.com'; 'gonzalezj6@michigan.gov'; 'morans@michigan.gov'; 'robinsonm18@michigan.gov'; 'lrey52@gmail.com'
Subject: RE: Genesee County Health Department water filter system daily mass notification - 10.26.15

On behalf of Hilda McShane/Mark Valacak the only update for today is:

This is an informational update and the Genesee County Health Department will provide these updates on a daily basis after 4 pm. We are asking all partners included in this email to provide any pertinent updates **DAILY** to Hilda McShane by 2:00pm. If you have nothing new to share, please inform Hilda that you have no updates at this time.

- 20 water filters delivered to Grand Blanc schools
- Lead testing clinic to be held at Burton Health Center from 8am-5pm on Nov. 5
- Education and Lead testing clinic to be held Nov. 12 at Brownell/Holmes Schools from 2-7pm for ages 0-5.
- GCHD sanitarians to assist DEQ in water testing in the Flint Schools

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From: Stickler, Lisa
Sent: Friday, October 23, 2015 4:37 PM
To: McShane, Hilda; 'hcroft@cityofflint.com'; 'kboles@valleyaaa.org'; 'jboyer@co.genesee.mi.us'; Brickey, Tamara; 'Jamie Gaskin'; 'Holmes, Virginia (DHHS)'; 'showard@co.genesee.mi.us'; 'skammer@cityofflint.com'; 'Andy Leavitt'; 'moses@mi.gov'; 'neeleyrep34@gmail.com'; 'ioliver@cfgf.org'; 'mpurcell@co.genesee.mi.us'; 'schoenowk@michigan.gov'; 'thelenr4@michigan.gov'; Valacak, Mark; 'Jamie-Lee Venable'; Cupal, Suzanne; Henry, James; Hallwood, Dawn; Swartout, April; Stickler, Lisa; LaRocco, Toni; 'EisnerJ@michigan.gov'; 'WellsE3@michigan.gov'; 'millerm1@michigan.gov'; 'roachb@michigan.gov'; 'ThompsonS2@michigan.gov'; Johnson, M.D., Gary; 'tsitko@flintschools.org'; 'plevine@gcms.org'; 'ksmith@flint.org'; 'mhanna1@hurleymc.com'; 'gonzalezj6@michigan.gov'; 'morans@michigan.gov'; 'robinsonm18@michigan.gov'; 'lrey52@gmail.com'
Subject: Genesee County Health Department water filter system daily mass notification - 10.23.15

On behalf of Hilda McShane/Mark Valacak the only update for today is:

A meeting will be held at the Department of Education Administration Building in Flint at 10:30am on Monday, Oct. 26 to discuss community education through the schools and future community testing.

From: McShane, Hilda
Sent: Tuesday, October 20, 2015 5:08 PM
To: hcroft@cityofflint.com; kboles@valleyaaa.org; jboyer@co.genesee.mi.us; Brickey, Tamara; Jamie Gaskin; Holmes, Virginia (DHHS); showard@co.genesee.mi.us; skammer@cityofflint.com; Andy Leavitt; moses@mi.gov; neeleyrep34@gmail.com; ioliver@cfgf.org; mpurcell@co.genesee.mi.us; schoenowk@michigan.gov; thelenr4@michigan.gov; Valacak, Mark; Jamie-Lee Venable; Cupal, Suzanne; Henry, James; Hallwood, Dawn; Swartout, April; lstickler@gchd.us; LaRocco, Toni; EisnerJ@michigan.gov; WellsE3@michigan.gov; millerm1@michigan.gov; roachb@michigan.gov; ThompsonS2@michigan.gov; Johnson, M.D., Gary; tsitko@flintschools.org; plevine@gcms.org; ksmith@flint.org; mhanna1@hurleymc.com; gonzalezj6@michigan.gov; morans@michigan.gov; robinsonm18@michigan.gov; irey52@gmail.com
Subject: Genesee County Health Department water filter system daily mass notification - 10.20.15

This is an informational update and the Genesee County Health Department will provide these updates on a daily basis after 4 pm. We are asking all partners included in this email to provide any pertinent updates **DAILY** to Hilda McShane by 2:00pm. If you have nothing new to share, please inform Hilda that you have no updates at this time.

- Genesee County Health Department Community Health Director, Tamara Brickey, connected Chris Mann (GCHD IT consultant) with Ed Berger from MTA to reference the water filter database for an upcoming water filter distribution to disabled clients.

- Tamara Brickey, spoke with Vicki Austin Sacharski from the Disability Network for the purpose of connecting Disability Network clients with water filters. DN will track information of those clients who call in with questions about filters and get the information to GCHD. We will pass that information along to MTA for delivery. GCCARD may be able to assist with installation.

- Tamara is reaching out to a regional representative from DaVita Dialysis to help coordinate the distribution of water filters.

- Department of Health and Human Services has distributed the following:
  113 filters (of which 1 went to daycares)
  10 – 8 cup pitcher
  1 – 23 cup pitcher- to daycare
  Total distributed 124

- Flint Community Schools Superintendent, Bilal Tawab met on Friday, October 16, 2015 with representatives of MDEQ, LARA, and DHHS to discuss a new round of water testing at each of the Flint Community Schools starting on Wednesday, October 21,2015.

From: McShane, Hilda
Sent: Monday, October 19, 2015 4:30 PM
To: 'hcroft@cityofflint.com'; 'kboles@valleyaaa.org'; 'jboyer@co.genesee.mi.us'; Brickey, Tamara; 'Jamie Gaskin'; 'Holmes, Virginia (DHHS)'; 'showard@co.genesee.mi.us'; 'skammer@cityofflint.com'; 'Andy Leavitt'; 'moses@mi.gov'; 'neeleyrep34@gmail.com'; 'ioliver@cfgf.org'; 'mpurcell@co.genesee.mi.us'; 'schoenowk@michigan.gov'; 'thelenr4@michigan.gov'; Valacak, Mark; 'Jamie-Lee Venable'; Cupal, Suzanne; Henry, James; Hallwood, Dawn; Swartout, April; 'lstickler@gchd.us'; LaRocco, Toni; 'EisnerJ@michigan.gov'; 'WellsE3@michigan.gov'; 'millerm1@michigan.gov'; 'roachb@michigan.gov'; 'ThompsonS2@michigan.gov'; Johnson, M.D., Gary; 'tsitko@flintschools.org'; 'plevine@gcms.org'; 'ksmith@flint.org'; 'mhanna1@hurleymc.com'; 'gonzalezj6@michigan.gov'; 'morans@michigan.gov';

'robinsonm18@michigan.gov'; 'lrey52@gmail.com'
Subject: RE: Genesee County Health Department water filter system daily mass notification - 10.19.15

This is an informational update and the Genesee County Health Department will provide these updates on a daily basis after 4 pm. We are asking all partners included in this email to provide any pertinent updates **DAILY** to Hilda McShane by 2:00pm. If you have nothing new to share, please inform Hilda that you have no updates at this time.

- 100 water filters were delivered to Burton location of Planned Parenthood for distribution by GCHD.
- Tamara Brickey (GCHD Community Health Director) and Hilda McShane (GCHD Marketing Specialist), met with MTA about reaching disabled and dialysis patients. MTA will work with GCHD to determine which MTA Your Ride clients may be in need of water filters.
- Another dialysis provider in Flint has requested 30 filters for patients.
- Toni (Nursing Director, GCHD), Jori July (GCHD Immunizations Supervisor) and Hilda McShane met this AM with Molina. Further arrangements with Molina will be made. No date set at this time.
- GCHD is still awaiting communication from Total Health Care.
- Department of Education has come out with a statement that all school age kids in Flint should be lead tested. Our state colleagues along with Toni will work on getting education out to the schools/families regarding getting kids tested.
- Diplomat has a program that they do with physicians about vitamins for kids. Dr. Mona Hanna-Attisha (Hurley) is talking to them about changing the formulary of the vitamin to help with lead issues in kids.
- Jim Henry (GCHD Environmental Health Supervisor) met with DEQ representatives on Friday. DEQ is proposing starting a new round of water testing in all schools receiving Flint water as of Wednesday, October 21, 2015. DEQ is proposing a stakeholder meeting every Friday to discuss updates.

From: McShane, Hilda
Sent: Friday, October 16, 2015 4:36 PM
To: 'hcroft@cityofflint.com'; 'kboles@valleyaaa.org'; 'jboyer@co.genesee.mi.us'; Brickey, Tamara; 'Jamie Gaskin'; 'Holmes, Virginia (DHHS)'; 'showard@co.genesee.mi.us'; 'skammer@cityofflint.com'; 'Andy Leavitt'; 'moses@mi.gov'; 'neeleyrep34@gmail.com'; 'ioliver@cfgf.org'; 'mpurcell@co.genesee.mi.us'; 'schoenowk@michigan.gov'; 'thelenr4@michigan.gov'; Valacak, Mark; 'Jamie-Lee Venable'; Cupal, Suzanne; Henry, James; Hallwood, Dawn; Swartout, April; 'lstickler@gchd.us'; LaRocco, Toni; 'EisnerJ@michigan.gov'; 'WellsE3@michigan.gov'; 'millerm1@michigan.gov'; 'roachb@michigan.gov'; 'ThompsonS2@michigan.gov'; Johnson, M.D., Gary; 'tsitko@flintschools.org'; 'plevine@gcms.org'; 'ksmith@flint.org'; 'mhanna1@hurleymc.com'; 'gonzalezj6@michigan.gov'; 'morans@michigan.gov'; 'robinsonm18@michigan.gov'; 'lrey52@gmail.com'
Subject: Genesee County Health Department water filter system daily mass notification - 10.16.15

This is an informational update and the Genesee County Health Department will provide these updates on a daily basis after 4 pm. We are asking all partners included in this email to provide any pertinent updates **DAILY** to Hilda McShane by 2:00pm. If you have nothing new to share, please inform Hilda that you have no updates at this time.

- The attached document was provided, emailed, and mailed to 346 licensed food establishments using City of Flint Water by the Genesee County Health Department (GCHD). The Michigan Department of Agriculture and Rural Development (MDARD) emailed and mailed the attached document to: grocery, food processing establishments, and party stores using City of Flint water. This document is available at www.gchd.us.

- Michigan Department of Health and Human Services (MDHHS) and Genesee County Community Action Resource Department (GCCARC) distributed 247 water filter systems and 11 water pitchers on 10.15.15.

- The Michigan Childhood Lead Poisoning Prevention Program (CLPPP) created a toolkit to help agency partners, primary care providers and community advocates prepare for lead week, October 25-31, 2015. The Michigan toolkit contains ideas for local lead week activities, a sample press release, sample social media posts and a sample news article. Several CLPPP brochures have also been revised in anticipation of lead week, including the handout for parents, "Is Your Child Safe From Lead?" and a new handout for pregnant and breastfeeding mothers. A CLPPP program profile and a quick reference guide for primary care providers is also in the toolkit.

- Genesee County Health Department Nursing Director, Toni La Rocco, will meet with Molina Healthcare of Michigan representative, Omar Sims, to plan a lead clinic in the near future.

- DaVita Dialysis' Hurley location received 100 water filter systems on 10.16.15 from the Genesee County Health Department.

- Planned Parenthood is scheduled to receive 100 water filter systems on 10.19.15 from the Genesee County Health Department.

- Genesee County Health Department is working with Flint Mass Transit Authority (MTA) to distribute the water filter system to disabled and kidney dialysis YOUR RIDE customers.

- Chris Mann will have additional conversations with the State to discuss updates to the database for tracking filter distribution.

- Genesee County Environmental Health Supervisor, Jim Henry, is meeting with the DEQ laboratory director to discuss future samplings.

From: McShane, Hilda
Sent: Thursday, October 15, 2015 4:15 PM
To: 'hcroft@cityofflint.com'; 'kboles@valleyaaa.org'; 'jboyer@co.genesee.mi.us'; Brickey, Tamara; 'Jamie Gaskin'; 'Holmes, Virginia (DHHS)'; 'showard@co.genesee.mi.us'; 'skammer@cityofflint.com'; 'Andy Leavitt'; 'moses@mi.gov'; 'neeleyrep34@gmail.com'; 'ioliver@cfgf.org'; 'mpurcell@co.genesee.mi.us'; 'schoenowk@michigan.gov'; 'thelenr4@michigan.gov'; Valacak, Mark; 'Jamie-Lee Venable'; Cupal, Suzanne; Henry, James; Hallwood, Dawn; Swartout, April; 'lstickler@gchd.us'; LaRocco, Toni; 'EisnerJ@michigan.gov'; 'WellsE3@michigan.gov'; 'millerm1@michigan.gov'; 'roachb@michigan.gov'; 'ThompsonS2@michigan.gov'; Johnson, M.D., Gary; 'tsitko@flintschools.org'; 'plevine@gcms.org'; 'ksmith@flint.org'; 'mhanna1@hurleymc.com'; 'gonzalezj6@michigan.gov'; 'morans@michigan.gov'; 'robinsonm18@michigan.gov'; 'lrey52@gmail.com'
Subject: RE: Genesee County Health Department water filter system daily mass notification - 10.14.15

This is an informational update and the Genesee County Health Department will provide these updates on a daily basis after 4 pm. We are asking all partners included in this email to provide any pertinent updates **DAILY** to Hilda McShane by 2:00pm. If you have nothing new to share, please inform Hilda that you have no updates at this time.

- As requested by the state of Michigan, Chris Mann of GCHD made all the requested changes to the water filter system database.
- DaVita Dialysis Center has requested 100 water filter systems. Filters will be dropped off Wednesday, October 14.
- Genesee County Health Department will be delivering 100 water filters to Planned Parenthood on Monday, October 19.
- City of Flint Schools' Superintendent is reaching out to his principals requesting input on the distribution of the water filter system to staff and families.
- Dr. Laura Carravallah reached out to Marc Edwards of Virginia Tech regarding the copper levels in the Flint water. Marc did test the Flint water and copper levels in the water are within EPA standards.
- Nursing Director, Toni LaRocco, is finalizing plans for an upcoming lead clinic with McLaren Health Plan on November 5. Toni and staff are in talks with Molina Healthcare of Michigan to schedule another lead clinic.

From: McShane, Hilda
Sent: Wednesday, October 14, 2015 5:06 PM
To: 'hcroft@cityofflint.com'; 'kboles@valleyaaa.org'; 'jboyer@co.genesee.mi.us'; Brickey, Tamara; 'Jamie Gaskin'; 'Holmes, Virginia (DHHS)'; 'showard@co.genesee.mi.us'; 'skammer@cityofflint.com'; 'Andy Leavitt'; 'moses@mi.gov'; 'neeleyrep34@gmail.com'; 'ioliver@cfgf.org'; 'mpurcell@co.genesee.mi.us'; 'schoenowk@michigan.gov'; 'thelenr4@michigan.gov'; Valacak, Mark; 'Jamie-Lee Venable'; Cupal, Suzanne; Henry, James; Hallwood, Dawn; Swartout, April; 'lstickler@gchd.us'; LaRocco, Toni; 'EisnerJ@michigan.gov'; 'WellsE3@michigan.gov'; 'millerm1@michigan.gov'; 'roachb@michigan.gov'; 'ThompsonS2@michigan.gov'; Johnson, M.D., Gary; 'tsitko@flintschools.org'
Subject: RE: Genesee County Health Department water filter system daily mass notification - 10.14.15

This is an informational update and the Genesee County Health Department will provide these updates on a daily basis after 4 pm. We are asking all partners included in this email to provide any pertinent updates **DAILY** to Hilda McShane by 2:00pm. If you have nothing new to share, please inform Hilda that you have no updates at this time.

- Chris Mann and GCHD Community Health Director, Tamara Brickey, are working with the State to insert more field information to the current Excel water filter database.

- GCCARD's Lippincott location does not have stable internet connection and because of this, staff are not using the most up-to-date water filter system Excel file. The State is gathering this information and will send Genesee County Health Department their Excel database and we will upload the data on a daily basis.

- Tamara has made contact with Flint Schools. She will make arrangement with staff and student's families to receive a water filter system. A date for the filter distribution to staff and student's families has not been set.

- Jim Henry, GCHD Environmental Health Supervisor got a call from State. They are looking for our staff to do another round of sampling at all Flint schools who receive city of Flint water.

- Planned Parenthood will receive 100 water filters for distribution to their clients.

- GCHD will be making contact with the Disability Network to continue planning to reach the disabled population within Flint that need assistance obtaining a water filter.

- MDEQ reached out to the CDC regarding the effects of bathing in water contaminated with lead. The experts are looking further into this matter. See attached FAQ Flint Water Fact sheet.

- Dr. Caravella of GCHD's Board of Health is concerned whether the distributed water filter systems will remove copper. She is concerned about individuals in the community who have a rare condition related to copper.

- Jim Henry is working to receive lab results in a timely manner.

- GCHD Director of Nursing, Toni LaRocco had a conversation with various individuals from the State regarding blood lead clinic. Toni is working to implement an upcoming lead clinic for children, 0-5 scheduled with McLaren Health Plan. Toni is reaching out to the University of Michigan – Flint to have students and faculty present at all clinics. Toni is working on other locations to host clinics with other health plans. The first message for people should be that the first choice in testing should be at their primary care provider.

- FAQs regarding lead and water for providers and public will be released in future from MDHHS.

- As of October 13 the total distribution for both DHHS and GCCARD is 8447.

- 336 filters and pitchers were distributed on 10/13 by DHHS and GCCARD.

- Daycares also began picking up filters and pitchers on yesterday as well from GCCARD.

From: McShane, Hilda
Sent: Tuesday, October 13, 2015 5:24 PM
To: 'hcroft@cityofflint.com'; 'kboles@valleyaaa.org'; 'jboyer@co.genesee.mi.us'; Brickey, Tamara; Jamie Gaskin; 'Holmes, Virginia (DHHS)'; 'showard@co.genesee.mi.us'; 'skammer@cityofflint.com'; Andy Leavitt; 'moses@mi.gov'; 'neeleyrep34@gmail.com'; 'ioliver@cfgf.org'; 'mpurcell@co.genesee.mi.us'; 'schoenowk@michigan.gov'; tsitko@flintschool.org; 'thelenr4@michigan.gov'; 'thompson52@mi.gov'; Valacak, Mark; Jamie-Lee Venable; Cupal, Suzanne; Henry, James; Hallwood, Dawn; Swartout, April; 'lstickler@gchd.us'; LaRocco, Toni; 'EisnerJ@michigan.gov'; 'WellsE3@michigan.gov'; 'millerm1@michigan.gov'; 'roachb@michigan.gov'
Subject: Genesee County Health Department water filter system daily mass notification - 10.13.15

This is an informational update and the Genesee County Health Department will provide these updates on a daily basis after 4 pm. We are asking all partners included in this email to provide any pertinent updates **DAILY** to Hilda McShane by 2:00pm. If you have nothing new to share, please inform Hilda that you have no updates at this time.

- 20,000 filters + 9,000 replacement filters have been delivered to Genesee County Community Action Resource Department (GCARD) and Michigan Department Health Human Services (MDHHHS).

- We are reminding partners to blackout the barcode on filter boxes before distribution.

- As of 10.13.15 Flint Housing Commission has distributed water filters to all of its housing units.

- Valley Area Agency on Aging (VAAA) is creating a list of homebound seniors. Three (3) state employees and Five (5) GCCARD employees are working through that list and will help with home installation.

- Distribution has been completed at Rosehaven Manor, Court Street Commons, Riverfront Dorms, Job Corp, and University of Michigan-Flint international student population

- Municipalities with residents that receive Flint City water will be contacted and asked to be the distribution point for the water filter system in their area by the City of Flint.

- Eileen Tomasi from Flint Schools has asked to use the elementary schools as water filter distribution points for both staff living in Flint and parents of school children. GCHD is awaiting a follow up conversation with the Flint Community Schools.

- Genesee County Health Department (GCHD) is starting to see an increase in requests for blood lead testing. GCHD Nursing Director, Toni LaRocco, is working with McLaren Health Plan to develop a lead clinic in November. University of Michigan-Flint has offered nursing students to assist at the clinic. Adults can use the Genesee County Health Department's Primary Care Clinic and the Health Department will bill insurance, or go on standing orders.

- Total filters distributed by MDHHS and GCCARD, 8,000. Genesee County Health Department has distributed 4,000 filters, which include approximately 2,700 to the public, 100 to Wellness Services, 100 to GCHD Primary Care Clinic, 100 to WIC, 100 to Reverence, and 375 to Hurley Maternal Infant Health Home Visiting Services.

Hilda McShane
Marketing Specialist
Genesee County Health Department
Phone: 810.341.7661
FAX: 810.257.3147
hmcshane@gchd.us

Genesee County Health Department

Genesee County Health Department

Frequently Asked Questions About Lead & Your Body

MDHHS Michigan Department of Health & Human Services

Pregnant Woman

If you are exposed to lead when pregnant, the lead can be passed on to your fetus, possibly causing:

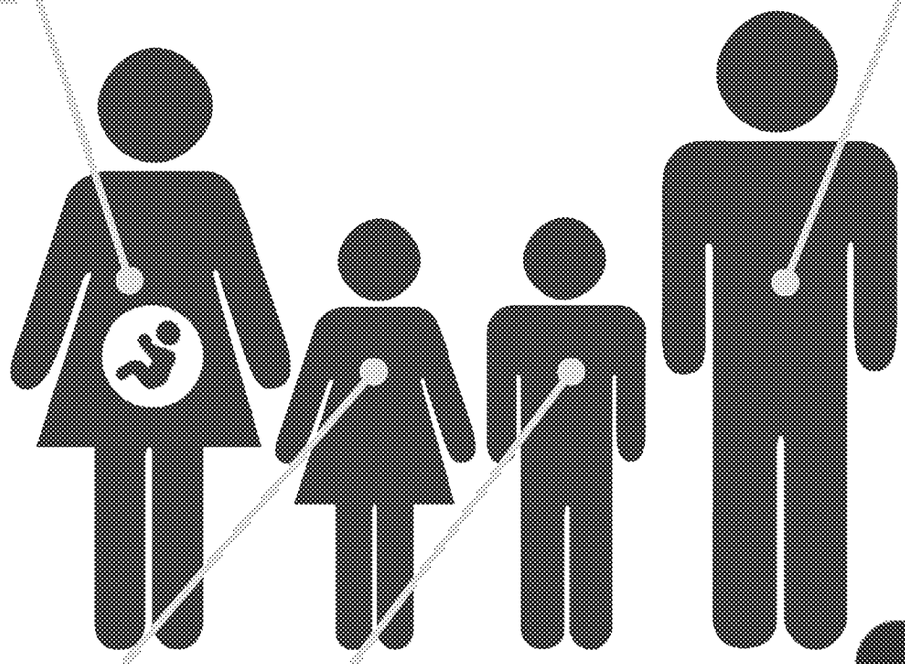
- premature birth
- a smaller baby
- learning difficulties
- slower growth in young kids

Healthy Adult

You are at lower risk of health problems from small amounts of lead.

Most health problems that come from lead in adults are because they are exposed to a lot of it at their job - whether they are in painting or construction or work at a factory where lead is used in a product.

If you work with lead, you should have regular blood tests to make sure you're not getting too much into your body.



Kids

Even small amounts of lead can harm kids' health. Your doctor can do a simple blood test to find out if your child has been exposed to lead. Some possible signs of lead poisoning include:

- a bad stomachache
- muscle weakness
- paleness (caused by anemia)

Over time lead can affect a kid's

- brain development
- growth rate

How Does Lead Get Into Your Body?

Eating and breathing lead dust is the most common way lead gets into your body.

- When kids accidentally eat lead, up to 50% can be absorbed into their bodies, compared to 3 to 10% for adults. This is why protecting kids from even small amounts of lead is important.

Lead does not absorb into your skin quickly or at high levels.

- The CDC reviewed a study where a cream with high levels of lead was put on the skin of adults. The cream was left on their skin for 12 hours. The amount of lead that soaked into their skin was very, very small (less than 0.3 percent).
- Taking a shower or bath in water containing lead at levels found in most tap water in Michigan is unlikely to be a problem for anyone, including kids.

If you think you or your children have been exposed to lead, please talk to your doctor or health department about getting a simple blood test to measure how much lead might be in your body.

For more information on protecting yourself and your family from lead, please visit: www.michigan.gov/lead, or you can call the Michigan Department of Health and Human Services at 1-800-648-6942. We will help direct you to the best department that can answer your questions about lead in your home.

You can also call the Flint Water Department at 810-787-6537 to request a free or low-cost water test.
If you use City of Flint water, you can call 211 to find out where you can pick up a free NSF-approved water filter.

Genesee County Health Department

Frequently Asked Questions About Lead in Flint Water

MDHHS Michigan Department of Health & Human Services

- Lead is hard to avoid completely. It can be found in old paint, water pipes and brass water faucets, in dirt, at some job sites, and in metal used for some hobbies.
- The amount of lead found in some Flint homes' drinking water could affect kids' health.
  - Even small amounts of lead can harm kids' health because they are little and still growing.
  - Adults are less likely to be harmed by the levels found in the water.
- Filter your drinking water using a NSF-approved filter.
  - Find a NSF-approved filter at http://www.gchd.us/docs/lead_filter_information.pdf.
  - If you use City of Flint water, you can call 211 to find out where you can pick up a free water filter.
- Some filters can remove up to 99% of the lead in water when used properly. To be sure your filter is removing as much lead as it can, carefully follow the instructions that came with it.
  - Change the filter cartridge as often as you should.
  - Run only cold water through the filter.
- Even after changes to the water system, it may take a while before lead levels in your home's water drop. Use the tips below to know when it's best to use filtered water:

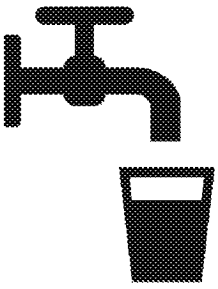
Lead in Water

Although your water may be a different color sometimes, it is not caused by lead. It's important to remember:

- **You can't see, smell, or taste lead in water.**
- **Lead won't change the color of your water.**
- **The only way to know what your home's lead levels are is by having your water tested in a lab.**

Please call the Flint Water Department at 810-787-6537 to request a free or low-cost water test.

In The Kitchen



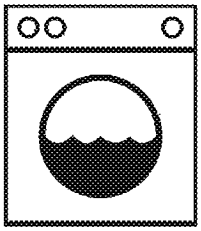
Use filtered tap water for:

- Drinking (including making coffee, drink mixes, juice, baby formula)
- Cooking (even if you boil the water, the lead will stay in the water and food)
- Washing fruits and vegetables

You can use unfiltered tap water for:

- Washing your hands
- Washing dishes
- Wiping down countertops

Cleaning



You can use unfiltered tap water for:

- Mopping floors
- Washing clothes

Your washing machine and dryer won't put lead from the water into the air of your home.

In the Bathroom

Use <u>filtered</u> tap water for:

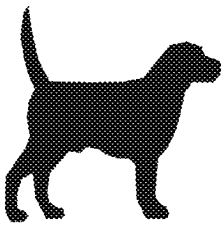
- Brushing kids' teeth

You can use <u>unfiltered</u> tap water for:

- Showers
- Baths (don't let kids drink the water as they play in the tub)
- Brushing your teeth (if you are an adult)

Lead will not cause rashes or other skin problems. However, if chlorine levels or other cleaners are high in the water, it may cause itchy or dry skin (similar to what can happen when you swim in a pool).

Caring for Pets



Use <u>filtered</u> tap water for:

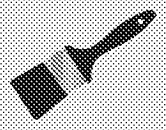
- Pets' water bowls

You can use <u>unfiltered</u> tap water for:

- Baths

If you notice your pet acting differently than normal, please contact your vet.

Other Sources of Lead in Your Home



Lead Paint

- Homes built before 1978 likely have lead paint, both inside and outside.
- Old paint is the most common way that kids are exposed to lead.

Dirt

- If you live in the city, there may be lead in the dirt outside your home.
- Before 1996, gas and the exhaust from cars contained lead. More lead will be found in dirt in busy traffic areas.

Dust

- The dust in your home can contain tiny amounts of both the paint and the dirt that contain lead.

Hobbies & Jobs

- Solder, fishing sinkers, bullets, and stained glass framing materials are some of the items in your home that may contain lead. You could also track home lead dust from your job site.

Have Questions?

For more information about protecting yourself and your family from lead, please visit:

<u>www.michigan.gov/lead</u>

Or you can call the Michigan Department of Health and Human Services at:

1-800-648-6942

The staff at this number will help direct you to the best department that can answer your questions about lead in your home.

To request a free or low-cost water test, please call the Flint Water Department at:

1-810-787-6537

To find out if you can get a free water filter, please call 211.

MDHHS

Michigan Department of Health & Human Services

From: Wells, Eden (DHHS)
Sent: Friday, October 30, 2015 11:04 AM
To: Laura Carravallah
Cc: 'Lawrence Reynolds';'gdn2@aol.com';Peter Levine;Mark Valacak
Subject: RE: Breast feeding and maternal lead exposure
Attachments: deq-flintwater-breastfeedingandlead_503281_7.pdf

Here is the flyer from the interagency website, attached.

From: Laura Carravallah [mailto:Laura.Carravallah@hc.msu.edu]
Sent: Friday, October 30, 2015 10:51 AM
To: Wells, Eden (DHHS)
Cc: 'Lawrence Reynolds'; 'gdn2@aol.com'; Peter Levine; Mark Valacak
Subject: Breast feeding and maternal lead exposure

Dear Eden,

Our county medical society is in the process of drafting a "fact sheet" specifically for our physician members to try and help them help their patients. We are endeavoring to keep the content consistent with the other messaging going out, but to use as many channels as we can, and to make this very easy for physicians to digest (i.e. brief and pertinent to their patients). I am attaching our draft to this email, as well as some of the articles that we have found.

One of the questions that came up is what to tell lead-exposed mothers who are pregnant or breastfeeding. We have pulled a number of articles that talk about lower maternal BLLs, but these are usually in the context of lower lead levels in drinking water. We are not sure if these recommendations still hold in our situation: the water is variable, the mothers are not routinely tested (should they be?), and lead is released from maternal bone for a long time. We also read that the lead levels fluctuate. All of this is to say, we are not certain that breastfeeding is safer than using filtered water in our situation (though it pains us as pediatricians and family docs to suggest this) and also, what the safe BLL is for a mother? The MDHHS recommendation of 40 in the recent Lead Week Toolkits seemed high, considering the fluctuating BLL and bone storage.

You had previously asked your toxicologist about the copper levels for us, and I was hoping you might pose this question to them as well.

Thank you for your help!

Laura Carravallah, MD

PREGNANT AND NURSING MOTHERS

WHAT YOU NEED TO KNOW ABOUT LEAD POISONING

What causes lead poisoning?

There are many factors that can put a pregnant woman or nursing mother at risk for lead poisoning.

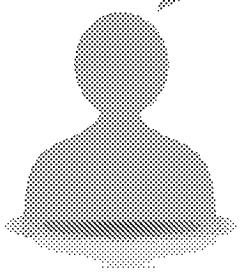
In Michigan, lead paint is still the #1 cause of lead poisoning. It is often found in homes built before 1978 and the older the home, the more likely that painted surfaces like windows, cupboards, doors and porches will contain lead paint.

Other sources of exposure may include soil and water or jobs and hobbies using lead such as factory work, soldering, ammunitions or jewelry making. Some pottery glazes, imported spices and home remedies may also contain lead.

Should I get tested?

Routine blood testing is NOT recommended for all pregnant women or nursing mothers. Talk to your doctor or local health department to learn more.

If I test positive for lead poisoning, can I continue to breastfeed?



In most cases, breastfeeding is safe. However, if your blood lead level goes above 40 ug/dl *or* your level is greater than 20 ug/dl and your baby has a level above 5 ug/dl, you should talk with your doctor about continuing to breastfeed.

Childhood LEAD POISONING prevention program

What can I do to protect myself from lead?

- Wash hands, bottles, pacifiers and toys often.
- Always take off shoes before going into the house.
- Flush your pipes before drinking, and only use cold water for drinking or mixing formula. Flush pipes by running the water for approximately 5 minutes.
- Watch your diet carefully. Foods high in calcium and iron help keep lead from being absorbed by your body.
- Avoid using power sanders, open-flame torches, heat guns, dry scrapers and dry sandpaper on painted surfaces.
- Fix peeling or chipping paint.
- Use a certified Repair and Remodeling Professional when making updates to your home.
- Practice safe cleaning methods.

To learn more about lead poisoning prevention and blood lead testing, call:

(888) 322-4453

MDHHS

Michigan Department of Health & Human Services

GRETCHEN WHITMER, GOVERNOR | NICK LYON, DIRECTOR

Message

From: Wells, Eden (DHHS) [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=F3A10E41478E4A4E9E9595DF85DCCF97-WELLS EDEN]
Sent: 10/30/2015 6:17:17 PM
To: Mona Hanna-Attisha [MHanna1@hurleymc.com]; PPI gmail.com; plevine@gcms.org; Laura.Carravallah@hc.msu.edu
Subject: Fwd: Provider Letter and Attachments
Attachments: ProviderQuickReference_Sept2015.pdf; ATT00001.htm; Pregnant and Nursing Mothers and Lead.pdf; ATT00002.htm; Handout_Parent_Is Your Child Safe from Lead.pdf; ATT00003.htm; FightLead_HealthyDiet.pdf; ATT00004.htm; 2015-10-21 - Lead - Flint Water FINAL (1).pdf; ATT00005.htm; Provider Letter FINAL.pdf; ATT00006.htm

Please distribute far and wide amongst your provider colleagues.

Sent from my iPhone

Begin forwarded message:
From: "Minicuci, Angela (DHHS)" <MinicuciA@michigan.gov>
Date: October 30, 2015 at 1:59:49 PM EDT
To: "Valacak, Mark" <MVALACAK@gchd.us>, "Sandlin, Mary" <MSANDLIN@gchd.us>
Cc: "Wells, Eden (DHHS)" <WellsE3@michigan.gov>, "Eisner, Jennifer (DHHS)" <EisnerJ@michigan.gov>, "Lasher, Geralyn (DHHS)" <lasherg@michigan.gov>
Subject: Provider Letter and Attachments
Good afternoon,

Attached is the final letter and attachments for the providers for distribution.

Thank you,

Angela Minicuci
Office of External Relations and Communications
Michigan Department of Health and Human Services
Office: (517) 241-2112
Mobile: PPI
minicucia@michigan.gov
www.michigan.gov/mdhhs

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CHILDHOOD LEAD POISONING

Blood Lead Level (BLL) Quick Reference for Primary Care Providers

Not Yet Tested

Consider screening ALL children between ages 1-6

Need for testing can be based on risk factors

REMINDER: Medicaid requires all children to be tested at ages 1 & 2. Children who were not tested between 1 & 2 must be tested at least once between 3 & 6.

BLL <5

Review lead levels with family

Provide anticipatory guidance

REMINDER: Medicaid requires all children to be tested at ages 1 & 2. Children who were not tested between 1 & 2 must be tested at least once between 3 & 6.

BLL 5-14

Review lead levels with family

Confirm results with venous blood sample

Review venous sample with family

Perform environmental history. Consider other children who may be exposed

Consider iron sufficiency, provide nutritional counseling r/t calcium and iron

Provide anticipatory guidance

Refer to case management

FOLLOW UP: Retest venous sample within 1-3 months to ensure BLL is not rising

REMINDER: Medicaid requires all children to be tested at ages 1 & 2. Children who were not tested between 1 & 2 must be tested at least once between 3 & 6.

BLL 15-44

Review lead levels with family

Confirm results with venous blood sample

Perform environmental history. Consider other children who may be exposed

Consider if a specific evaluation of the child is necessary such as an abdominal x-ray. Gut decontamination may be needed if leaded foreign bodies are visualized in x-ray

Consider iron sufficiency, provide nutritional counseling r/t calcium and iron

Refer to case management

FOLLOW UP: Retest venous sample monthly until levels are <15, repeat every 1-3 months until levels are <5

REMINDER: Medicaid requires all children to be tested at ages 1 & 2. Children who were not tested between 1 & 2 must be tested at least once between 3 & 6.

BLL >44

Review lead levels with family

Confirm results with venous blood sample

Review venous sample with family

Any treatment at this level should be performed in consultation with an expert at Children's Hospital of Michigan in Detroit.

FOLLOW UP: As directed by expert. Monthly venous samples will be required.

REMINDER: Medicaid requires all children to be tested at ages 1 & 2. Children who were not tested between 1 & 2 must be tested at least once between 3 & 6.

Questions? Contact us at (888) 322-4453 or (517) 335-8885

Michigan Department of Health & Human Services

RICK SNYDER, GOVERNOR | NICK LYON, DIRECTOR

This Document is a Non-Responsive Attachment.

PREGNANT AND NURSING MOTHERS

WHAT YOU NEED TO KNOW ABOUT LEAD POISONING

What causes lead poisoning?

There are many factors that can put a pregnant woman or nursing mother at risk for lead poisoning.

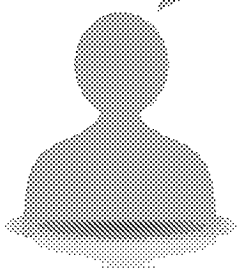
In Michigan, lead paint is still the #1 cause of lead poisoning. It is often found in homes built before 1978 and the older the home, the more likely that painted surfaces like windows, cupboards, doors and porches will contain lead paint.

Other sources of exposure may include soil and water or jobs and hobbies using lead such as factory work, soldering, ammunitions or jewelry making. Some pottery glazes, imported spices and home remedies may also contain lead.

Should I get tested?

Routine blood testing is NOT recommended for all pregnant women or nursing mothers. Talk to your doctor or local health department to learn more.

If I test positive for lead poisoning, can I continue to breastfeed?



In most cases, breastfeeding is safe. However, if your blood lead level goes above 40 ug/dl *or* your level is greater than 20 ug/dl and your baby has a level above 5 ug/dl, you should talk with your doctor about continuing to breastfeed.

What can I do to protect myself from lead?

- Wash hands, bottles, pacifiers and toys often.
- Always take off shoes before going into the house.
- Flush your pipes before drinking, and only use cold water for drinking or mixing formula. Flush pipes by running the water for approximately 5 minutes.
- Watch your diet carefully. Foods high in calcium and iron help keep lead from being absorbed by your body.
- Avoid using power sanders, open-flame torches, heat guns, dry scrapers and dry sandpaper on painted surfaces.
- Fix peeling or chipping paint.
- Use a certified Repair and Remodeling Professional when making updates to your home.
- Practice safe cleaning methods.

To learn more about lead poisoning prevention and blood lead testing, call:

(888) 322-4453

Childhood LEAD POISONING prevention program

MDHHS

Michigan Department of Health & Human Services

RICK SNYDER, GOVERNOR | NICK LYON, DIRECTOR

This Document is a Non-Responsive Attachment.

IS YOUR CHILD SAFE FROM LEAD POISONING?

LEARN HOW TO PROTECT YOUR FAMILY:

CREATE A LEAD SAFE HOME

What causes lead poisoning?

There are many places in a home that can put babies and children in danger of lead poisoning.

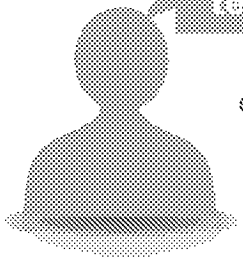
Lead paint is the #1 cause of lead poisoning in Michigan and is often found in homes built before 1978. The older the home, the more likely that painted surfaces like windows, cupboards, doors and porches will contain lead paint.

Lead poisoning occurs most often when children come in contact with lead in the air, in dust and in lead paint. Lead can also be found in soil, drinking water if supplied by lead pipes, certain home remedies and is used in some hobbies and occupations.

Exposure to lead is a serious health threat. Carefully consider where your child spends time (childcare, relatives, your home) when thinking about lead poisoning hazards.

How can I tell if my child has lead poisoning?

Talk to your doctor about testing your child's blood for lead poisoning.



When should my child be tested for lead poisoning?

Children should be tested at one and two years of age or if you think your child has been exposed to a lead.

To learn more about lead poisoning prevention and blood lead testing, call the Childhood Lead Poisoning Prevention Project:

(517) 335-8885

(888) 322-4453

Take this quiz to see if your child may have lead poisoning:

Symptoms of lead poisoning can be silent—and hard to recognize. Preventing lead poisoning before it happens is the best way to keep your family safe. Take this quiz to see if your child may be at risk.

Does your child currently live in a home built before 1950 or have they lived in a home built before 1950 in the recent past? Do they spend time at or often visit a home built before 1950?

Yes No Don't know

Does your child currently live in a home built before 1978 that was recently remodeled? Have they lived in or often visited a home built before 1978 that was recently remodeled?

Yes No Don't know

Does your child have a brother, sister or playmate with lead poisoning?

Yes No Don't know

Does your child live with an adult whose job or hobby involves lead?

Yes No Don't know

Do you or your child's caregiver use home remedies that may contain lead?

Yes No Don't know

If you answered NO to all of these questions, your child is probably not at risk for lead poisoning.

If you answered YES or DON'T KNOW to any of these questions, talk to your doctor about testing your child for lead poisoning.

MAKE EVERY DAY LEAD SAFE

Safe Cleaning.

Use these steps to help keep your home clean and reduce your child's risk of exposure. Use these tips to clean your windows, doors, floors, porches, stairs and child pay areas.

Put on rubber gloves. If you do not have rubber gloves, wash your hands well after cleaning.

Use the right cleaners and supplies you can throw away. Use soapy cleaners or products made to remove lead dust.

Remove paint chips first. Window areas and porches often have peeling paint and lead dust. Pick up paint chips you can see and throw them away in a plastic bag.

Always wet-mop floors and window sills. Do not broom lead dust. Throw away cloths after wiping each area. Replace mop water frequently.

Don't use a vacuum unless it is a HEPA vacuum. A regular vacuum will spread lead dust into the air you breathe. Some health departments have HEPA vacuums available to borrow

Rinse after cleaning. Use clean water and a new mop head or fresh paper towels to wipe away suds.

Always empty wash water down a toilet.

Repeat these steps weekly, or when dirt and dust appear on floors, porches, window wells, window sills, stairs and children's play areas.

For Homes with Lead Pipes

If you use a water filter, be sure it meets NSF/ANSI 53 standards for lead reduction.

✓**Flush your pipes before drinking**, and only use cold water for cooking and mixing formula. Flush pipes by running the water for approximately 5 minutes.

✓**Test.** Consider contacting your local water authority to have your water tested.

Daily Lead Safe Practices

- Wash hands, bottles, pacifiers and toys often.
- Always take off shoes before going into the house.
- Watch your child's diet. Foods high in calcium and iron help keep lead from being absorbed by a child's body.
- Avoid using power sanders, open-flame torches, heat guns, dry scrapers and dry sandpaper or heat guns on painted surfaces.
- Paint over peeling or chipping paint.
- Use a certified Repair and Remodeling Professional when making updates to your home.
- Always use the safe cleaning methods listed above.

Thinking about remodeling your home? Need advice about identifying and removing lead paint? Call the Lead and Healthy Homes Section: 866-691-LEAD.

www.michigan.gov/lead

MDHHS
Michigan Department of Health & Human Services

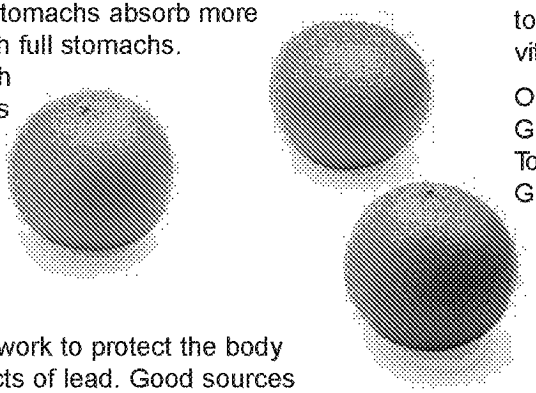
Childhood LEAD POISONING prevention program

This Document is a Non-Responsive Attachment.

Help Fight Lead Poisoning with a Healthy Diet

Regularly Eat Healthy Foods

Children with empty stomachs absorb more lead than children with full stomachs. Provide your child with four to six small meals during the day. The following nutrients can help protect your child from lead poisoning:



Iron-Rich Foods
Normal levels of iron work to protect the body from the harmful effects of lead. Good sources of dietary iron include:

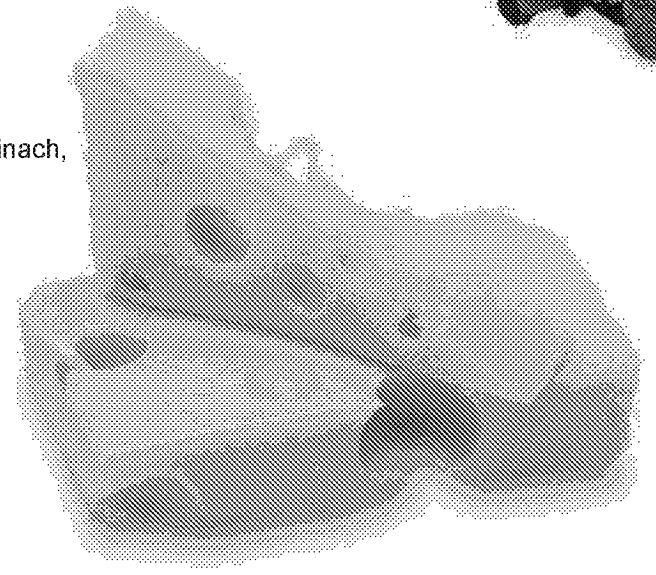
Lean red meats, fish, and chicken
Iron-fortified cereals
Dried fruits (raisins, prunes)

Calcium-Rich Foods
Calcium reduces lead absorption and also helps make teeth and bones strong. Good sources of dietary calcium include:

Milk
Yogurt
Cheese
Green leafy vegetables (spinach, kale, collard greens)

Vitamin C-Rich Foods
Vitamin C and iron-rich foods work together to reduce lead absorption. Good sources of vitamin C include:

Oranges, orange juice
Grapefruits, grapefruit juice
Tomatoes, tomato juice
Green peppers

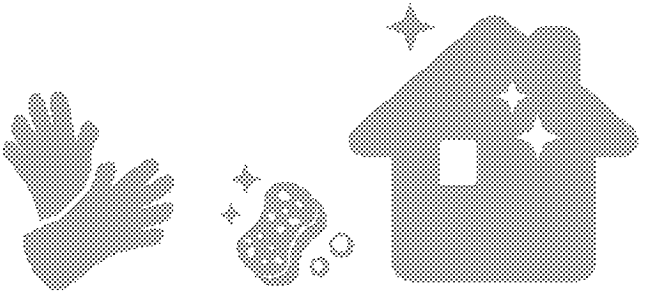


Simple Steps You Can Take

to Protect Your Family from Lead Hazards

If you think your home has high levels of lead:

- Make sure your children eat healthy, low-fat foods high in iron, calcium, and vitamin C.
- Get your children tested for lead, even if they seem healthy.
- Get your home tested for lead if it was built before 1978. Call 1-800-424-LEAD for more information.
- Always wash your hands before eating.
- Wash children's hands, bottles, pacifiers, and toys.
- Do not use imported pottery to store or serve food.
- Let tap water run for one minute before using.
- Use only cold water for making your baby's formula, drinking, and cooking.
- Regularly clean floors, windowsills, and other surfaces using wet methods that control dust.
- Wipe or remove shoes before entering your house.
- If you rent, it is your landlord's job to keep paint in good shape. Report peeling or chipping paint to your landlord and call your health department if the paint is not repaired safely.
- Take precautions to avoid exposure to lead dust when remodeling or renovating.
- Don't try to remove paint yourself!



For more information on childhood lead poisoning prevention:

Call

- Your child's pediatrician
- Genessee County Health Department Lead Program (810) 257-3833
- WIC (810) 237-4537
- Michigan Childhood Lead Poisoning Prevention (888) 322-4453
- Michigan Department of Health & Human Services (517) 373-3740

Visit

- Michigan Department of Health & Human Services http://www.michigan.gov/mdhhs
- Michigan Childhood Lead Poisoning Prevention www.michigan.gov/lead
- Genessee County Health Department Lead Program http://www.gchd.us/new_other_services/childhood_lead_poisoning_prevention_program.php

MDHHS

Childhood LEAD POISONING prevention program

This Document is a Non-Responsive Attachment.

Genesee County Health Department

Frequently Asked Questions About Lead in Flint Water

MDHHS Michigan Department of Health & Human Services

- Lead is hard to avoid completely. It can be found in old paint, water pipes and brass water faucets, in dirt, at some job sites, and in metal used for some hobbies.
- The amount of lead found in some Flint homes' drinking water could affect kids' health.
  - Even small amounts of lead can harm kids' health because they are little and still growing.
  - Adults are less likely to be harmed by the levels found in the water.
- Filter your drinking water using a NSF-approved filter.
  - Find a NSF-approved filter at http://www.gchd.us/docs/lead_filter_information.pdf.
  - If you use City of Flint water, you can call 211 to find out where you can pick up a free water filter.
- Some filters can remove up to 99% of the lead in water when used properly. To be sure your filter is removing as much lead as it can, carefully follow the instructions that came with it.
  - Change the filter cartridge as often as you should.
  - Run only cold water through the filter.
- Even after changes to the water system, it may take a while before lead levels in your home's water drop. Use the tips below to know when it's best to use filtered water:

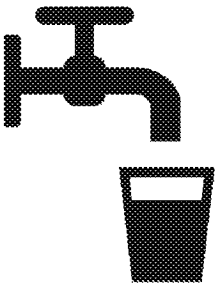
Lead in Water

Although your water may be a different color sometimes, it is not caused by lead. It's important to remember:

- **You can't see, smell, or taste lead in water.**
- **Lead won't change the color of your water.**
- **The only way to know what your home's lead levels are is by having your water tested in a lab.**

Please call the Flint Water Department at 810-787-6537 to request a free or low-cost water test.

In The Kitchen



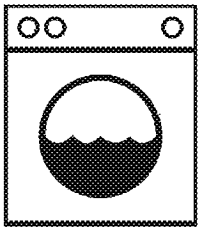
Use filtered tap water for:

- Drinking (including making coffee, drink mixes, juice, baby formula)
- Cooking (even if you boil the water, the lead will stay in the water and food)
- Washing fruits and vegetables

You can use unfiltered tap water for:

- Washing your hands
- Washing dishes
- Wiping down countertops

Cleaning



You can use unfiltered tap water for:

- Mopping floors
- Washing clothes

Your washing machine and dryer won't put lead from the water into the air of your home.

In the Bathroom

Use <u>filtered</u> tap water for:

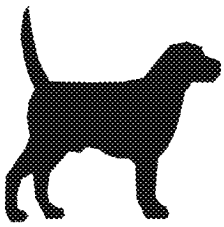
- Brushing kids' teeth

You can use <u>unfiltered</u> tap water for:

- Showers
- Baths (don't let kids drink the water as they play in the tub)
- Brushing your teeth (if you are an adult)

Lead will not cause rashes or other skin problems. However, if chlorine levels or other cleaners are high in the water, it may cause itchy or dry skin (similar to what can happen when you swim in a pool).

Caring for Pets



Use <u>filtered</u> tap water for:

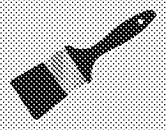
- Pets' water bowls

You can use <u>unfiltered</u> tap water for:

- Baths

If you notice your pet acting differently than normal, please contact your vet.

Other Sources of Lead in Your Home



Lead Paint

- Homes built before 1978 likely have lead paint, both inside and outside.
- Old paint is the most common way that kids are exposed to lead.

Dirt

- If you live in the city, there may be lead in the dirt outside your home.
- Before 1996, gas and the exhaust from cars contained lead. More lead will be found in dirt in busy traffic areas.

Dust

- The dust in your home can contain tiny amounts of both the paint and the dirt that contain lead.

Hobbies & Jobs

- Solder, fishing sinkers, bullets, and stained glass framing materials are some of the items in your home that may contain lead. You could also track home lead dust from your job site.

Have Questions?

For more information about protecting yourself and your family from lead, please visit:

<u>www.michigan.gov/lead</u>

Or you can call the Michigan Department of Health and Human Services at:

1-800-648-6942

The staff at this number will help direct you to the best department that can answer your questions about lead in your home.

To request a free or low-cost water test, please call the Flint Water Department at:

1-810-787-6537

To find out if you can get a free water filter, please call 211.

MDHHS

Michigan Department of Health & Human Services

This Document is a Non-Responsive Attachment.

October 30, 2015

Dear Provider:

As you may be aware from recent news reports, elevated levels of lead have been found in lead pipes within the City of Flint's water system.

To help protect the children of Flint from the current lead in water exposure, the Genesee County Health Department and Michigan Department of Health and Human Services are contacting you to assist you in providing guidance to support your families.

Children can be exposed to lead from drinking water in that runs through lead pipes, old lead paint, soil, pottery, cosmetics and toys and some home remedies. Adult jobs and hobbies, like auto repair, stained glass and jewelry making, and ammunitions handling can also put children at risk if they touch clothing or play in areas where lead is found.

As a primary care provider, you play a critical role in helping to ensure that children and families exposed to lead receive the care and reassurances they need to manage the potential health impacts of lead poisoning.

Identification. Children suffering from lead poisoning often fail to present outward symptoms. However, early clinical symptoms can include anemia, anorexia, abdominal pain and constipation. Lead is a neuro-toxin, and exposure can result in violent and aggressive behaviors, lead to learning disorders, may cause Attention Deficit Hyperactivity Disorder (ADHD) and has been known to reduce IQ by as many as 5-8 points with levels as low as 10 ug/dL. Lead is metabolized through the gastrointestinal system similar to iron and calcium, with uptake rates depending on the size and weight of the child. The blood half-life of lead is short (approximately 1 month) but the bone half-life can extend into decades.

Due to multiple risk factors facing many residents in the City of Flint (including aging housing conditions and water quality), we recommend that all children under age 6 living in the City of Flint or living in homes that use Flint water, attending school or childcare in Flint, or who spend time with a caregiver in the City of Flint, receive a blood lead test. Blood lead testing should be done through a child's primary care doctor to ensure adequate short-term and long-term follow-up. ***Families should be encouraged to have their children tested immediately either at their doctor's office or the Genesee County Health Department***.

Management of Blood Lead Levels. The following guidance is provided for management of childhood blood lead levels:

- **BLL < 5 ug/dL**
  - A lead level of less than 5 mcg/dL is not typically cause for concern.
  - Provide education and anticipatory guidance to ensure that lead levels do not rise.
  - Consider retesting in 12 months based on risk factors or concerns.

- **BLL >5 ug/dL**
  - **Children with capillary results of 5 ug/dL and higher must have a confirmatory venous blood draw.**
  - Families should receive anticipatory guidance, nutrition counseling, instruction on safe cleaning techniques and appropriate follow-up care from their primary care provider.
  - In-home services including case management and environmental investigations are available for all children with lead levels greater than 5 ug/dL. Refer patients to the Genesee County Health Department for this service.
  - Children with confirmed venous testing results greater than 5ug/dL within the past 18 months must be retested based on Medicaid policy and AAP guidelines. (See attached "Provider Quick Reference). If a child has not been retested within these timeframes, retesting is recommended as soon as possible.
- **BLL > 44 ug/dL.**
  - **Children with capillary results of 5 ug/dL and higher must have a confirmatory venous blood draw.**
  - Lead levels over 44 ug/dL may require hospitalization. Consult with an expert at the Children's Hospital of Michigan in Detroit for additional guidance.
  - Families should receive anticipatory guidance, nutrition counseling, instruction on safe cleaning techniques and appropriate follow-up care from their primary care provider.
  - In-home services including case management and environmental investigations are available for all children with lead levels greater than 5 ug/dL. Refer patients to the Genesee County Health Department for this service.
  - Children with confirmed venous testing results greater than 5ug/dL within the past 18 months must be retested based on Medicaid policy and AAP guidelines. (See attached "Provider Quick Reference). If a child has not been retested within these timeframes, retesting is recommended as soon as possible.

  Reminder: All children covered by Medicaid must be tested at age 1 and 2.

Follow-up Care. As providers, there are steps you can take to help support your families:

1. Continue to inform and educate families regarding lead risks and preventative steps that they can take to minimize their risks.
2. Encourage your families to use filtered water for drinking, mixing formula and washing dishes. Families can contact 2-1-1 for information on free NSF Certified water filters.
3. Healthy nutrition is critical for lead-exposed children. Make sure your patients are consuming balanced diets high in iron, calcium and Vitamin C. If you have concerns about their nutrition, consider recommending a multivitamin with iron. WIC and SNAP provide assistance to parents and children who need fresh and healthy foods. Contact the Genesee County WIC office at (810) 237-4537 to learn more. In addition, SNAP offers a Double Bucks program that can provide healthy foods for less.
4. Breastfeeding is highly protective and encouraged. However, if the mother's blood lead level rises above 40ug/dL or her level is greater than 20 ug/dL and the baby has a level above 5 ug/dL breastfeeding is not recommended.

5. Because lead is a neuro-toxin, children with lead poisoning need longitudinal follow-up and may require developmental and behavioral health intervention services. Continue monitoring your patients' development at every visit.
6. Consider additional wrap-around and support services that will benefit your patients such as early childhood home visiting programs, early head start and head start. Call 2-1-1 for more information.

Local Resources. Several local resources are available to you and your patients:

- Blood Testing. Patients are encouraged to contact their primary care provider for testing. The Genesee County Health Department also administers lead tests. Patients in need of transportation should contact 2-1-1 for assistance.
- Water Testing. Water testing is free through the City of Flint Water Testing Plant. Patients can call 810-787-6537 to learn more.
- WIC and SNAP provide assistance to parents and children who need fresh and healthy foods. Contact the Genesee County WIC office at (810) 237-4537 to learn more.
- Child Development. If you have concerns about a child's growth, development or learning contact 2-1-1 for a Home Visiting Program in your area.

Websites and contact information.

- Genesee County Health Department Lead Program
  (810) 257-3833
  www.gchd.us

- Michigan Department of Health and Human Services
  Childhood Lead Poisoning Prevention Program
  (888) 322-4453
  www.michigan.gov/lead

- Michigan Department of Health and Human Services
  Lead Poisoning Prevention Video for Primary Care Providers
  http://www.youtube.com/watch?v=AnkjCW_yGaU&feature=youtu.be

- United States Environmental Protection Agency
  www.epa.gov/lead

- U.S. Centers for Disease Control and Prevention (CDC) Web site
  www.cdc.gov/nceh/lead

These recommendations will stay in effect until the Genesee County Health Department lifts the restrictions on water usage.

Sincerely,

Eden V. Wells, MD, MPH, FACPM
Chief Medical Executive
Michigan Department of Health and Human Services

Gary K. Johnson, MD, MPH
Medical Director
Genesee County Health Department

This Document is a Non-Responsive Attachment.

From: Wells, Eden (DHHS)
Sent: Friday, October 30, 2015 2:18 PM
To: Valacak, Mark
Subject: Re: Breast feeding and maternal lead exposure

Well said, Mark!

Sent from my iPhone

On Oct 30, 2015, at 1:53 PM, Valacak, Mark <MVALACAK@gchd.us> wrote:

> In adults when we see high levels it is generally an occupational exposure and inhalation of lead fumes in industrial exposure settings like battery manufacturing, lead smelting, and stained lead glass.
>
> A couple of factors are important to remember when we are talking about lead exposure in adults versus children. Absorptions rates from gastrointestinal exposure are lower in adults versus children. So where a toddler might absorb about 50%, absorption rates decline in adults to 3-10%. About 90% of lead will end up in the bone where it mimics calcium. It causes less harm there then if it went to soft tissues like the liver or kidneys. The problem is that under circumstances that cause calcium mobilization, lead stored in the bone may remobilize and circulate in the blood, elevating blood lead levels. The mobilization of stored lead with pregnancy, menopause, and aging is a cause for concern. So to help mitigate that there should be an emphasis on good nutrition and a calcium rich diet. Pregnant and breastfeeding woman should be sure to take their vitamins to minimize calcium mobilization from the bones.
>
> Reinforcing these messages would help minimize exposure.

Mark Valacak, MPH, Health Officer
Genesee County Health Department,
630 S. Saginaw St. Suite 4 Flint, MI 48502-1540
Phone 810-257-3588 Fax 810 257-3147
E-mail mvalacak@gchd.us

<image001.jpg>

Please consider the environment before printing this e-mail.

"There are two lasting bequests we can hope to give our children: one is roots; the other is wings." Hodding Carter
*NOTICE: This e-mail, including attachments, is intended for the exclusive use of the addressee and may contain proprietary, confidential or privileged information. If you are not the intended recipient, any disclosure, use, distribution, copying, or taking of any action in reliance of the contents of this e-mail is strictly prohibited. If you have received this e-mail in error, please notify me via e-mail and permanently delete the original and destroy all copies. Thank you.

For a copy of the Health Department's Notice of Information Practices, contact the Health Department or visit the Health Department's website at http://www.gchd.us/

From: Wells, Eden (DHHS) [mailto:WellsE3@michigan.gov]
Sent: Friday, October 30, 2015 12:02 PM
To: Laura Carravallah
Cc: Lawrence Reynolds; PPI; Peter Levine; Valacak, Mark
Subject: Re: Breast feeding and maternal lead exposure

Looping I our toxicologist, as we ha e discussed this. Note that anyone should be using filtered or bottled water now, so that the issue of which house and which risk should already be addressed. Also- we do not have any data supporting adults with blood lead levels that high (Off top of my head) and none have been in the 40's or higher since Long before April 2014.

Regardless, Linda and I had talked about breastfeeding moms... She can help.

Eden

Sent from my iPhone

On Oct 30, 2015, at 11:33 AM, Laura Carravallah <Laura.Carravallah@hc.msu.edu> wrote:

> Thank you for your quick answer!
>
> This makes sense for pregnant moms, as there is no choice as to how the baby will get its nourishment. However, for breastfeeding moms in households in which filters will be provided, **do we know that breast milk (with possible higher maternal BLLs secondary to bone release from chronic exposure) is preferable to filtered tap water?** Does anybody know what the range of breast milk lead levels are in women who have BLLs around 30 or 35? In the data that Dr. Reynolds and I looked at (previously attached) the BLLs didn't go that high, and it said that the breast milk levels fluctuated.
>
> In the Ettinger paper the highest maternal BLL with a breast milk sample was 29.9 (Table 1), which is less than the level of 40 recommended in the MDHHS handout. The article said that "Breast milk lead expressed as percentage of maternal blood lead ranged from 0.4 to 9.2% (mean = 1.6%, SD = 1.2%)" – p 929. The means a less an issue than the outliers, considering some of the extremely high water lead levels that have been found in the city and also the difficulty of predicting which houses might be most at risk.
>
> I'm not sure if there is other, better data out there that might shed some light on this? Also, your attached pamphlet does deflect patients back to their doctors, but I'm not sure that those of us in the GCMS feel that we have adequate information to advise people further.
>
> Laura
>
> ---
>
> **From:** Wells, Eden (DHHS) [mailto:WellsE3@michigan.gov]
> **Sent:** Friday, October 30, 2015 11:02 AM
> **To:** Laura Carravallah
> **Cc:** 'Lawrence Reynolds'; '[redacted]'; Peter Levine; Mark Valacak
> **Subject:** RE: Breast feeding and maternal lead exposure
>
> Good morning,
>
> Note that MDHHS/GCHD is about to send out (by emails and hopefully you all can disseminate at will to your colleagues?) a provider letter with provider resources, which will also all be on the webpage we are using. Parent letters with resources for them will be going out in hard copy through schools and daycares---all of this will be occurring in the next couple of days. Note that there is already a flyer on the Michigan.gov/flintwater webpage for pregnant moms and breastfeeding---note that,

like all others including children, treatment only occurs for levels over 45, but removing lead from any environmental sources is important at all times.

We have already gotten information regarding pregnancy and lead levels from CDC: (Mary Jean Brown): "Pregnant women who work with lead should be tested (occupational, hobby, shooting ranges, renovation exposures). Worried women who want to be tested should not be refused but if their only exposure is the water the only intervention is to stop drinking the water from the river and it is my understanding that that has been accomplished. There is no medical treatment for pregnant women (chelation therapy) in the first trimester because of teratogenic concerns. At blood lead levels >=45 in later trimesters, chelation may be considered to protect the fetus but should only be done in consultation with someone familiar with chelation in early childhood and high risk pregnancies. A general alert to area OB/Gyn's and maternity clinics that patients should not drink water from the river, would be advisable."

Eden

Eden V. Wells, MD, MPH, FACPM
Chief Medical Executive
Michigan Department of Health and Human Services
201 Townsend St., 5th Floor CVB
Lansing, MI 48913

From: Laura Carravallah [mailto:Laura.Carravallah@hc.msu.edu]
Sent: Friday, October 30, 2015 10:51 AM
To: Wells, Eden (DHHS)
Cc: 'Lawrence Reynolds'; [redacted]; Peter Levine; Mark Valacak
Subject: Breast feeding and maternal lead exposure

Dear Eden,

Our county medical society is in the process of drafting a "fact sheet" specifically for our physician members to try and help them help their patients. We are endeavoring to keep the content consistent with the other messaging going out, but to use as many channels as we can, and to make this very easy for physicians to digest (i.e. brief and pertinent to their patients). I am attaching our draft to this email, as well as some of the articles that we have found.

One of the questions that came up is what to tell lead-exposed mothers who are pregnant or breastfeeding. We have pulled a number of articles that talk about lower maternal BLLs, but these are usually in the context of lower lead levels in drinking water. We are not sure if these recommendations still hold in our situation: the water is variable, the mothers are not routinely tested (should they be?), and lead is released from maternal bone for a long time. We also read that the lead levels fluctuate. All of this is to say, we are not certain that breastfeeding is safer than using filtered water in our situation (though it pains us as pediatricians and family docs to suggest this) and also, what the safe BLL is for a mother? The MDHHS recommendation of 40 in the

recent Lead Week Toolkits seemed high, considering the fluctuating BLL and bone storage.

You had previously asked your toxicologist about the copper levels for us, and I was hoping you might pose this question to them as well.

Thank you for your help!

Laura Carravallah, MD

<deq-flintwater-breastfeedingandlead_503281_7.pdf>

Message

From: Wells, Eden (DHHS) [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=F3A10E41478E4A4E9E9595DF85DCCF97-WELLS EDEN]
Sent: 10/30/2015 6:21:28 PM
To: Sienko Dean [Dean.Sienko@hc.msu.edu]
Subject: Fwd: Provider Letter and Attachments
Attachments: ProviderQuickReference_Sept2015.pdf; ATT00001.htm; Pregnant and Nursing Mothers and Lead.pdf; ATT00002.htm; Handout_Parent_Is Your Child Safe from Lead.pdf; ATT00003.htm; FightLead_HealthyDiet.pdf; ATT00004.htm; 2015-10-21 - Lead - Flint Water FINAL (1).pdf; ATT00005.htm; Provider Letter FINAL.pdf; ATT00006.htm

FYI

Sent from my iPhone

Begin forwarded message:
From: "Minicuci, Angela (DHHS)" <MinicuciA@michigan.gov>
Date: October 30, 2015 at 1:59:49 PM EDT
To: "Valacak, Mark" <MVALACAK@gchd.us>, "Sandlin, Mary" <MSANDLIN@gchd.us>
Cc: "Wells, Eden (DHHS)" <WellsE3@michigan.gov>, "Eisner, Jennifer (DHHS)" <EisnerJ@michigan.gov>, "Lasher, Geralyn (DHHS)" <lasherg@michigan.gov>
Subject: Provider Letter and Attachments
Good afternoon,

Attached is the final letter and attachments for the providers for distribution.

Thank you,

Angela Minicuci
Office of External Relations and Communications
Michigan Department of Health and Human Services
Office: (517) 241-2112
Mobile: PPI
minicucia@michigan.gov
www.michigan.gov/mdhhs

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CHILDHOOD LEAD POISONING

Blood Lead Level (BLL) Quick Reference for Primary Care Providers

Not Yet Tested

Consider screening ALL children between ages 1-6

Need for testing can be based on risk factors

REMINDER: Medicaid requires all children to be tested at ages 1 & 2. Children who were not tested between 1 & 2 must be tested at least once between 3 & 6.

BLL <5

Review lead levels with family

Provide anticipatory guidance

REMINDER: Medicaid requires all children to be tested at ages 1 & 2. Children who were not tested between 1 & 2 must be tested at least once between 3 & 6.

BLL 5-14

Review lead levels with family

Confirm results with venous blood sample

Review venous sample with family

Perform environmental history. Consider other children who may be exposed

Consider iron sufficiency, provide nutritional counseling r/t calcium and iron

Provide anticipatory guidance

Refer to case management

FOLLOW UP: Retest venous sample within 1-3 months to ensure BLL is not rising

REMINDER: Medicaid requires all children to be tested at ages 1 & 2. Children who were not tested between 1 & 2 must be tested at least once between 3 & 6.

BLL 15-44

Review lead levels with family

Confirm results with venous blood sample

Perform environmental history. Consider other children who may be exposed

Consider if a specific evaluation of the child is necessary such as an abdominal x-ray. Gut decontamination may be needed if leaded foreign bodies are visualized in x-ray

Consider iron sufficiency, provide nutritional counseling r/t calcium and iron

Refer to case management

FOLLOW UP: Retest venous sample monthly until levels are <15, repeat every 1-3 months until levels are <5

REMINDER: Medicaid requires all children to be tested at ages 1 & 2. Children who were not tested between 1 & 2 must be tested at least once between 3 & 6.

BLL >44

Review lead levels with family

Confirm results with venous blood sample

Review venous sample with family

Any treatment at this level should be performed in consultation with an expert at Children's Hospital of Michigan in Detroit.

FOLLOW UP: As directed by expert. Monthly venous samples will be required.

REMINDER: Medicaid requires all children to be tested at ages 1 & 2. Children who were not tested between 1 & 2 must be tested at least once between 3 & 6.

Questions? Contact us at (888) 322-4453 or (517) 335-8885

MDHHS
Michigan Department of Health & Human Services
RICK SNYDER, GOVERNOR | NICK LYON, DIRECTOR

Childhood LEAD POISONING prevention program

This Document is a Non-Responsive Attachment.

PREGNANT AND NURSING MOTHERS

WHAT YOU NEED TO KNOW ABOUT LEAD POISONING

What causes lead poisoning?

There are many factors that can put a pregnant woman or nursing mother at risk for lead poisoning.

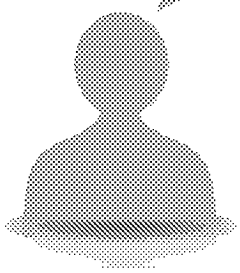
In Michigan, lead paint is still the #1 cause of lead poisoning. It is often found in homes built before 1978 and the older the home, the more likely that painted surfaces like windows, cupboards, doors and porches will contain lead paint.

Other sources of exposure may include soil and water or jobs and hobbies using lead such as factory work, soldering, ammunitions or jewelry making. Some pottery glazes, imported spices and home remedies may also contain lead.

Should I get tested?

Routine blood testing is NOT recommended for all pregnant women or nursing mothers. Talk to your doctor or local health department to learn more.

If I test positive for lead poisoning, can I continue to breastfeed?



In most cases, breastfeeding is safe. However, if your blood lead level goes above 40 ug/dl *or* your level is greater than 20 ug/dl and your baby has a level above 5 ug/dl, you should talk with your doctor about continuing to breastfeed.

What can I do to protect myself from lead?

- Wash hands, bottles, pacifiers and toys often.
- Always take off shoes before going into the house.
- Flush your pipes before drinking, and only use cold water for drinking or mixing formula. Flush pipes by running the water for approximately 5 minutes.
- Watch your diet carefully. Foods high in calcium and iron help keep lead from being absorbed by your body.
- Avoid using power sanders, open-flame torches, heat guns, dry scrapers and dry sandpaper on painted surfaces.
- Fix peeling or chipping paint.
- Use a certified Repair and Remodeling Professional when making updates to your home.
- Practice safe cleaning methods.

To learn more about lead poisoning prevention and blood lead testing, call:

(888) 322-4453

Childhood LEAD POISONING prevention program

MDHHS

Michigan Department of Health & Human Services

RICK SNYDER, GOVERNOR | NICK LYON, DIRECTOR

This Document is a Non-Responsive Attachment.

IS YOUR CHILD SAFE FROM LEAD POISONING?

LEARN HOW TO PROTECT YOUR FAMILY:

CREATE A LEAD SAFE HOME

What causes lead poisoning?

There are many places in a home that can put babies and children in danger of lead poisoning.

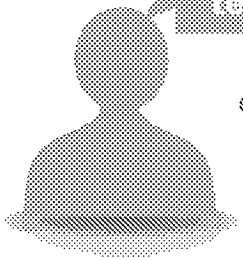
Lead paint is the #1 cause of lead poisoning in Michigan and is often found in homes built before 1978. The older the home, the more likely that painted surfaces like windows, cupboards, doors and porches will contain lead paint.

Lead poisoning occurs most often when children come in contact with lead in the air, in dust and in lead paint. Lead can also be found in soil, drinking water if supplied by lead pipes, certain home remedies and is used in some hobbies and occupations.

Exposure to lead is a serious health threat. Carefully consider where your child spends time (childcare, relatives, your home) when thinking about lead poisoning hazards.

How can I tell if my child has lead poisoning?

Talk to your doctor about testing your child's blood for lead poisoning.



When should my child be tested for lead poisoning?

Children should be tested at one and two years of age or if you think your child has been exposed to a lead.

To learn more about lead poisoning prevention and blood lead testing, call the Childhood Lead Poisoning Prevention Project:

(517) 335-8885

(888) 322-4453

Take this quiz to see if your child may have lead poisoning:

Symptoms of lead poisoning can be silent—and hard to recognize. Preventing lead poisoning before it happens is the best way to keep your family safe. Take this quiz to see if your child may be at risk.

Does your child currently live in a home built before 1950 or have they lived in a home built before 1950 in the recent past? Do they spend time at or often visit a home built before 1950?

Yes No Don't know

Does your child currently live in a home built before 1978 that was recently remodeled? Have they lived in or often visited a home built before 1978 that was recently remodeled?

Yes No Don't know

Does your child have a brother, sister or playmate with lead poisoning?

Yes No Don't know

Does your child live with an adult whose job or hobby involves lead?

Yes No Don't know

Do you or your child's caregiver use home remedies that may contain lead?

Yes No Don't know

If you answered NO to all of these questions, your child is probably not at risk for lead poisoning.

If you answered YES or DON'T KNOW to any of these questions, talk to your doctor about testing your child for lead poisoning.

MAKE EVERY DAY LEAD SAFE

Safe Cleaning.

Use these steps to help keep your home clean and reduce your child's risk of exposure. Use these tips to clean your windows, doors, floors, porches, stairs and child pay areas.

Put on rubber gloves. If you do not have rubber gloves, wash your hands well after cleaning.

Use the right cleaners and supplies you can throw away. Use soapy cleaners or products made to remove lead dust.

Remove paint chips first. Window areas and porches often have peeling paint and lead dust. Pick up paint chips you can see and throw them away in a plastic bag.

Always wet-mop floors and window sills. Do not broom lead dust. Throw away cloths after wiping each area. Replace mop water frequently.

Don't use a vacuum unless it is a HEPA vacuum. A regular vacuum will spread lead dust into the air you breathe. Some health departments have HEPA vacuums available to borrow

Rinse after cleaning. Use clean water and a new mop head or fresh paper towels to wipe away suds.

Always empty wash water down a toilet.

Repeat these steps weekly, or when dirt and dust appear on floors, porches, window wells, window sills, stairs and children's play areas.

For Homes with Lead Pipes

If you use a water filter, be sure it meets NSF/ANSI 53 standards for lead reduction.

✓**Flush your pipes before drinking**, and only use cold water for cooking and mixing formula. Flush pipes by running the water for approximately 5 minutes.

✓**Test.** Consider contacting your local water authority to have your water tested.

Daily Lead Safe Practices

- Wash hands, bottles, pacifiers and toys often.
- Always take off shoes before going into the house.
- Watch your child's diet. Foods high in calcium and iron help keep lead from being absorbed by a child's body.
- Avoid using power sanders, open-flame torches, heat guns, dry scrapers and dry sandpaper or heat guns on painted surfaces.
- Paint over peeling or chipping paint.
- Use a certified Repair and Remodeling Professional when making updates to your home.
- Always use the safe cleaning methods listed above.

Thinking about remodeling your home? Need advice about identifying and removing lead paint? Call the Lead and Healthy Homes Section: 866-691-LEAD.

www.michigan.gov/lead

MDHHS
Michigan Department of Health & Human Services

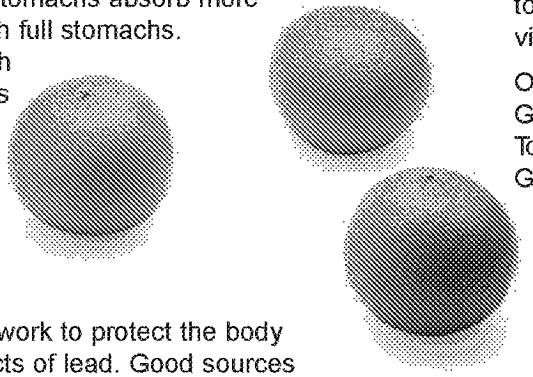
Childhood LEAD POISONING prevention program

This Document is a Non-Responsive Attachment.

Help Fight Lead Poisoning with a Healthy Diet

Regularly Eat Healthy Foods

Children with empty stomachs absorb more lead than children with full stomachs. Provide your child with four to six small meals during the day. The following nutrients can help protect your child from lead poisoning:



Iron-Rich Foods
Normal levels of iron work to protect the body from the harmful effects of lead. Good sources of dietary iron include:

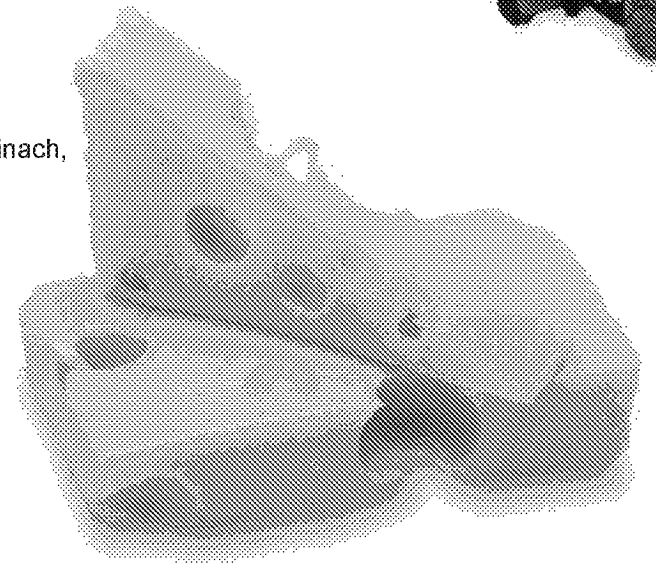
Lean red meats, fish, and chicken
Iron-fortified cereals
Dried fruits (raisins, prunes)

Calcium-Rich Foods
Calcium reduces lead absorption and also helps make teeth and bones strong. Good sources of dietary calcium include:

Milk
Yogurt
Cheese
Green leafy vegetables (spinach, kale, collard greens)

Vitamin C-Rich Foods
Vitamin C and iron-rich foods work together to reduce lead absorption. Good sources of vitamin C include:

Oranges, orange juice
Grapefruits, grapefruit juice
Tomatoes, tomato juice
Green peppers



Simple Steps You Can Take

to Protect Your Family from Lead Hazards

If you think your home has high levels of lead:

- Make sure your children eat healthy, low-fat foods high in iron, calcium, and vitamin C.
- Get your children tested for lead, even if they seem healthy.
- Get your home tested for lead if it was built before 1978. Call 1-800-424-LEAD for more information.
- Always wash your hands before eating.
- Wash children's hands, bottles, pacifiers, and toys.
- Do not use imported pottery to store or serve food.
- Let tap water run for one minute before using.
- Use only cold water for making your baby's formula, drinking, and cooking.
- Regularly clean floors, windowsills, and other surfaces using wet methods that control dust.
- Wipe or remove shoes before entering your house.
- If you rent, it is your landlord's job to keep paint in good shape. Report peeling or chipping paint to your landlord and call your health department if the paint is not repaired safely.
- Take precautions to avoid exposure to lead dust when remodeling or renovating.
- Don't try to remove paint yourself!

For more information on childhood lead poisoning prevention:

Call

- Your child's pediatrician
- Genessee County Health Department Lead Program (810) 257-3833
- WIC (810) 237-4537
- Michigan Childhood Lead Poisoning Prevention (888) 322-4453
- Michigan Department of Health & Human Services (517) 373-3740

Visit

- Michigan Department of Health & Human Services http://www.michigan.gov/mdhhs
- Michigan Childhood Lead Poisoning Prevention www.michigan.gov/lead
- Genessee County Health Department Lead Program http://www.gchd.us/new_other_services/childhood_lead_poisoning_prevention_program.php

MDHHS

Childhood LEAD POISONING prevention program

This Document is a Non-Responsive Attachment.

Genesee County Health Department

Frequently Asked Questions About Lead in Flint Water

MDHHS Michigan Department of Health & Human Services

- Lead is hard to avoid completely. It can be found in old paint, water pipes and brass water faucets, in dirt, at some job sites, and in metal used for some hobbies.
- The amount of lead found in some Flint homes' drinking water could affect kids' health.
  - Even small amounts of lead can harm kids' health because they are little and still growing.
  - Adults are less likely to be harmed by the levels found in the water.
- Filter your drinking water using a NSF-approved filter.
  - Find a NSF-approved filter at http://www.gchd.us/docs/lead_filter_information.pdf.
  - If you use City of Flint water, you can call 211 to find out where you can pick up a free water filter.
- Some filters can remove up to 99% of the lead in water when used properly. To be sure your filter is removing as much lead as it can, carefully follow the instructions that came with it.
  - Change the filter cartridge as often as you should.
  - Run only cold water through the filter.
- Even after changes to the water system, it may take a while before lead levels in your home's water drop. Use the tips below to know when it's best to use filtered water:

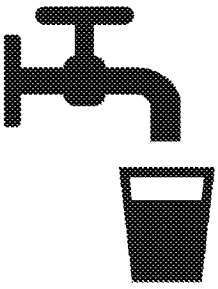
Lead in Water

Although your water may be a different color sometimes, it is not caused by lead. It's important to remember:

- **You can't see, smell, or taste lead in water.**
- **Lead won't change the color of your water.**
- **The only way to know what your home's lead levels are is by having your water tested in a lab.**

Please call the Flint Water Department at 810-787-6537 to request a free or low-cost water test.

In The Kitchen



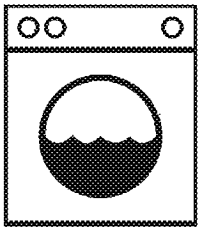
Use filtered tap water for:

- Drinking (including making coffee, drink mixes, juice, baby formula)
- Cooking (even if you boil the water, the lead will stay in the water and food)
- Washing fruits and vegetables

You can use unfiltered tap water for:

- Washing your hands
- Washing dishes
- Wiping down countertops

Cleaning



You can use unfiltered tap water for:

- Mopping floors
- Washing clothes

Your washing machine and dryer won't put lead from the water into the air of your home.

In the Bathroom

Use <u>filtered</u> tap water for:

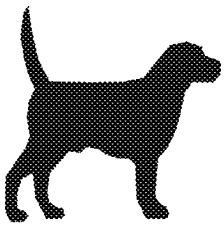
- Brushing kids' teeth

You can use <u>unfiltered</u> tap water for:

- Showers
- Baths (don't let kids drink the water as they play in the tub)
- Brushing your teeth (if you are an adult)

Lead will not cause rashes or other skin problems. However, if chlorine levels or other cleaners are high in the water, it may cause itchy or dry skin (similar to what can happen when you swim in a pool).

Caring for Pets



Use <u>filtered</u> tap water for:

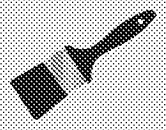
- Pets' water bowls

You can use <u>unfiltered</u> tap water for:

- Baths

If you notice your pet acting differently than normal, please contact your vet.

Other Sources of Lead in Your Home



Lead Paint

- Homes built before 1978 likely have lead paint, both inside and outside.
- Old paint is the most common way that kids are exposed to lead.

Dirt

- If you live in the city, there may be lead in the dirt outside your home.
- Before 1996, gas and the exhaust from cars contained lead. More lead will be found in dirt in busy traffic areas.

Dust

- The dust in your home can contain tiny amounts of both the paint and the dirt that contain lead.

Hobbies & Jobs

- Solder, fishing sinkers, bullets, and stained glass framing materials are some of the items in your home that may contain lead. You could also track home lead dust from your job site.

Have Questions?

For more information about protecting yourself and your family from lead, please visit:

<u>www.michigan.gov/lead</u>

Or you can call the Michigan Department of Health and Human Services at:

1-800-648-6942

The staff at this number will help direct you to the best department that can answer your questions about lead in your home.

To request a free or low-cost water test, please call the Flint Water Department at:

1-810-787-6537

To find out if you can get a free water filter, please call 211.

MDHHS

Michigan Department of Health & Human Services

This Document is a Non-Responsive Attachment.

October 30, 2015

Dear Provider:

As you may be aware from recent news reports, elevated levels of lead have been found in lead pipes within the City of Flint's water system.

To help protect the children of Flint from the current lead in water exposure, the Genesee County Health Department and Michigan Department of Health and Human Services are contacting you to assist you in providing guidance to support your families.

Children can be exposed to lead from drinking water in that runs through lead pipes, old lead paint, soil, pottery, cosmetics and toys and some home remedies. Adult jobs and hobbies, like auto repair, stained glass and jewelry making, and ammunitions handling can also put children at risk if they touch clothing or play in areas where lead is found.

As a primary care provider, you play a critical role in helping to ensure that children and families exposed to lead receive the care and reassurances they need to manage the potential health impacts of lead poisoning.

Identification. Children suffering from lead poisoning often fail to present outward symptoms. However, early clinical symptoms can include anemia, anorexia, abdominal pain and constipation. Lead is a neuro-toxin, and exposure can result in violent and aggressive behaviors, lead to learning disorders, may cause Attention Deficit Hyperactivity Disorder (ADHD) and has been known to reduce IQ by as many as 5-8 points with levels as low as 10 ug/dL. Lead is metabolized through the gastrointestinal system similar to iron and calcium, with uptake rates depending on the size and weight of the child. The blood half-life of lead is short (approximately 1 month) but the bone half-life can extend into decades.

Due to multiple risk factors facing many residents in the City of Flint (including aging housing conditions and water quality), we recommend that all children under age 6 living in the City of Flint or living in homes that use Flint water, attending school or childcare in Flint, or who spend time with a caregiver in the City of Flint, receive a blood lead test. Blood lead testing should be done through a child's primary care doctor to ensure adequate short-term and long-term follow-up. **Families should be encouraged to have their children tested immediately *either at their doctor's office or the Genesee* County Health Department**.

Management of Blood Lead Levels. The following guidance is provided for management of childhood blood lead levels:

- **BLL < 5 ug/dL**
  - A lead level of less than 5 mcg/dL is not typically cause for concern.
  - Provide education and anticipatory guidance to ensure that lead levels do not rise.
  - Consider retesting in 12 months based on risk factors or concerns.

- **BLL >5 ug/dL**
  - **Children with capillary results of 5 ug/dL and higher must have a confirmatory venous blood draw.**
  - Families should receive anticipatory guidance, nutrition counseling, instruction on safe cleaning techniques and appropriate follow-up care from their primary care provider.
  - In-home services including case management and environmental investigations are available for all children with lead levels greater than 5 ug/dL. Refer patients to the Genesee County Health Department for this service.
  - Children with confirmed venous testing results greater than 5ug/dL within the past 18 months must be retested based on Medicaid policy and AAP guidelines. (See attached "Provider Quick Reference). If a child has not been retested within these timeframes, retesting is recommended as soon as possible.
- **BLL > 44 ug/dL.**
  - **Children with capillary results of 5 ug/dL and higher must have a confirmatory venous blood draw.**
  - Lead levels over 44 ug/dL may require hospitalization. Consult with an expert at the Children's Hospital of Michigan in Detroit for additional guidance.
  - Families should receive anticipatory guidance, nutrition counseling, instruction on safe cleaning techniques and appropriate follow-up care from their primary care provider.
  - In-home services including case management and environmental investigations are available for all children with lead levels greater than 5 ug/dL. Refer patients to the Genesee County Health Department for this service.
  - Children with confirmed venous testing results greater than 5ug/dL within the past 18 months must be retested based on Medicaid policy and AAP guidelines. (See attached "Provider Quick Reference). If a child has not been retested within these timeframes, retesting is recommended as soon as possible.

  Reminder: All children covered by Medicaid must be tested at age 1 and 2.

Follow-up Care. As providers, there are steps you can take to help support your families:

1. Continue to inform and educate families regarding lead risks and preventative steps that they can take to minimize their risks.
2. Encourage your families to use filtered water for drinking, mixing formula and washing dishes. Families can contact 2-1-1 for information on free NSF Certified water filters.
3. Healthy nutrition is critical for lead-exposed children. Make sure your patients are consuming balanced diets high in iron, calcium and Vitamin C. If you have concerns about their nutrition, consider recommending a multivitamin with iron. WIC and SNAP provide assistance to parents and children who need fresh and healthy foods. Contact the Genesee County WIC office at (810) 237-4537 to learn more. In addition, SNAP offers a Double Bucks program that can provide healthy foods for less.
4. Breastfeeding is highly protective and encouraged. However, if the mother's blood lead level rises above 40ug/dL or her level is greater than 20 ug/dL and the baby has a level above 5 ug/dL breastfeeding is not recommended.

5. Because lead is a neuro-toxin, children with lead poisoning need longitudinal follow-up and may require developmental and behavioral health intervention services. Continue monitoring your patients' development at every visit.
6. Consider additional wrap-around and support services that will benefit your patients such as early childhood home visiting programs, early head start and head start. Call 2-1-1 for more information.

Local Resources. Several local resources are available to you and your patients:

- Blood Testing. Patients are encouraged to contact their primary care provider for testing. The Genesee County Health Department also administers lead tests. Patients in need of transportation should contact 2-1-1 for assistance.
- Water Testing. Water testing is free through the City of Flint Water Testing Plant. Patients can call 810-787-6537 to learn more.
- WIC and SNAP provide assistance to parents and children who need fresh and healthy foods. Contact the Genesee County WIC office at (810) 237-4537 to learn more.
- Child Development. If you have concerns about a child's growth, development or learning contact 2-1-1 for a Home Visiting Program in your area.

Websites and contact information.

- Genesee County Health Department Lead Program
  (810) 257-3833
  www.gchd.us

- Michigan Department of Health and Human Services
  Childhood Lead Poisoning Prevention Program
  (888) 322-4453
  www.michigan.gov/lead

- Michigan Department of Health and Human Services
  Lead Poisoning Prevention Video for Primary Care Providers
  http://www.youtube.com/watch?v=AnkjCW_yGaU&feature=youtu.be

- United States Environmental Protection Agency
  www.epa.gov/lead

- U.S. Centers for Disease Control and Prevention (CDC) Web site
  www.cdc.gov/nceh/lead

These recommendations will stay in effect until the Genesee County Health Department lifts the restrictions on water usage.

Sincerely,

Eden V. Wells, MD, MPH, FACPM
Chief Medical Executive
Michigan Department of Health and Human Services

Gary K. Johnson, MD, MPH
Medical Director
Genesee County Health Department

This Document is a Non-Responsive Attachment.

Message

From: Wells, Eden (DHHS) [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=F3A10E41478E4A4E9E9595DF85DCCF97-WELLS EDEN]
Sent: 10/30/2015 6:28:39 PM
To: Mona Hanna-Attisha [MHanna1@hurleymc.com]; plevine@gcms.org; lrey52@gmail.com
Subject: Fwd: Parent Letter and Attachments
Attachments: Parent Letter FINAL.pdf; ATT00001.htm; Handout_Parent_Is Your Child Safe from Lead.pdf; ATT00002.htm; FightLead_HealthyDiet.pdf; ATT00003.htm; 2015-10-21 - Lead - Flint Water FINAL (1).pdf; ATT00004.htm

You all may want to have the parent materials as well-

Sent from my iPhone

Begin forwarded message:
From: "Minicuci, Angela (DHHS)" <MinicuciA@michigan.gov>
Date: October 30, 2015 at 2:20:21 PM EDT
To: "Valacak, Mark" <MVALACAK@gchd.us>, "Sandlin, Mary" <MSANDLIN@gchd.us>
Cc: "Eisner, Jennifer (DHHS)" <EisnerJ@michigan.gov>, "Lasher, Geralyn (DHHS)" <lasherg@michigan.gov>, "Wells, Eden (DHHS)" <WellsE3@michigan.gov>
Subject: Parent Letter and Attachments
Good afternoon,

Attached are the electronic files for the parent letter and the attachments.

Thank you,

Angela Minicuci
Office of External Relations and Communications
Michigan Department of Health and Human Services
Office: (517) 241-2112
Mobile: PPI
minicucia@michigan.gov
www.michigan.gov/mdhhs

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October 27, 2015

Dear Parent,

To help make sure the children of Flint are safe from lead exposure, the Genesee County Health Department and the Michigan Department of Health and Human Services are providing answers to the following questions:

- Where does lead come from?
- What can I do to protect my family?
- Should I get my child tested for lead?
- Where can I find more information about lead?

Where does lead come from?

Elevated levels of lead have been found in the drinking water from lead pipes in the City of Flint. Kids can also be exposed to lead from old lead paint, soil, pottery, cosmetics and toys and some home remedies. Adult jobs and hobbies, like auto repair, stained glass, jewelry making and ammunitions handling can also put children at risk if they touch clothing or play in areas where lead is found. Lead is a serious health hazard, especially for small children who become lead poisoned when they eat, drink or breathe lead.

Should my child get a blood lead test? Children who live in the City of Flint, live in a home using City of Flint water, or who attend school, childcare or often spend time with a caregiver in the City of Flint should be tested for lead poisoning.
This should be done as soon as possible.

Where should I go to get a blood lead test for my child?

The best place to get your child's blood lead test is your doctor's office. Tests are covered by most health plans. Your doctor will follow up with you on lab tests and provide you with information on what to do next. Your child can also get a free lead test at the Genesee County Health Department. If you need transportation, contact 2-1-1 for help.

Understanding your child's lead test result.

A lead level below 5 means there is a little lead in your child's blood. Use the tips below to help keep your child safe. Your doctor may suggest retesting your child within the next 12 months to make sure the level does not go up.

A lead level of 5-44 means that your child has had some exposure to lead. Work with your doctor and local health department for further guidance on how to limit your lead exposure. Your doctor may retest your child in 1-3 months to make sure the level does not go up.

Children with very high levels of lead **(over 44)** may require treatment at the hospital.

What Can I Do to Keep My Family Safe?

The following steps should be taken right away to help protect you and your child.

Protecting your family from lead in the water:

- Get your water tested for lead. It's free. Call (810) 787-6537 to learn more.
- Use a water filter in your home. Call 2-1-1 for information on free NSF Certified water filters.
- Run only cold water through the filter.
- If you do not have a water filter, use bottled water for drinking and mixing formula.
- Use filtered or bottled water for drinking (including making coffee, drink mixes, juice, baby formula), and cooking (even if you boil the water, the lead will stay in the water and food).
- You can use unfiltered tap water for washing your hands and washing dishes.
- If you have to use unfiltered water for drinking or cooking, run the tap for five minutes before using the water.

Safe cleaning:

Safe cleaning is important. Keeping your home clean and safe from lead hazards will help to protect your family.

- Buildings built before 1978 could have lead paint in them.Use wet paper towels to clean up paint chips and dust in these older buildings. Be sure to clean around windows, play areas, and floors.
- Wash hands and toys often with soap and water.
- You can use unfiltered tap water to wipe down countertops, mop floors, and wash clothes.

Good nutrition:

Some foods will help keep lead from being stored in a child's body. These are foods with a lot of calcium, iron and vitamin C. These foods include:

Calcium Rich Foods	**Iron Rich Foods**	**Foods with Vitamin C**
➢ Milk	➢ Beans	➢ Oranges
➢ Cheese	➢ Lean meats like fish and chicken	➢ Orange juice
➢ Yogurt	➢ Whole grain cereals	➢ Grapefruits
➢ Tofu	➢ Peanut butter	➢ Tomatoes
➢ Spinach		➢ Green peppers

Always wash your fruits with filtered water. If you are concerned about your child's diet, talk with your doctor who may also recommend a daily multivitamin.

WIC and SNAP provide assistance to parents and children who need fresh and healthy foods. Contact the **Genesee County WIC office at (810) 237-4537** to learn more. SNAP also offers a Double Bucks program to purchase even more healthy food for no additional costs.

Where can I get more information on lead?

- Genesee County Health Department Lead Program
  (810) 257-3833
  www.gchd.us
- Michigan Department of Health and Human Services
  Childhood Lead Poisoning Prevention Program
  (888) 322-4453
  www.michigan.gov/lead
- United States Environmental Protection Agency
  www.epa.gov/lead
- U.S. Centers for Disease Control and Prevention (CDC) Web site
  www.cdc.gov/nceh/lead

These recommendations will stay in effect until the Genesee County Health Department lifts the restrictions on water usage.

Sincerely,

Eden V. Wells, MD, MPH, FACPM
Chief Medical Executive
Michigan Department of Health and Human Services

Gary K. Johnson, MD, MPH
Medical Director
Genesee County Health Department

This Document is a Non-Responsive Attachment.

IS YOUR CHILD SAFE FROM LEAD POISONING?

LEARN HOW TO PROTECT YOUR FAMILY:

CREATE A LEAD SAFE HOME

What causes lead poisoning?

There are many places in a home that can put babies and children in danger of lead poisoning.

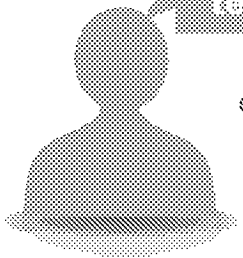
Lead paint is the #1 cause of lead poisoning in Michigan and is often found in homes built before 1978. The older the home, the more likely that painted surfaces like windows, cupboards, doors and porches will contain lead paint.

Lead poisoning occurs most often when children come in contact with lead in the air, in dust and in lead paint. Lead can also be found in soil, drinking water if supplied by lead pipes, certain home remedies and is used in some hobbies and occupations.

Exposure to lead is a serious health threat. Carefully consider where your child spends time (childcare, relatives, your home) when thinking about lead poisoning hazards.

How can I tell if my child has lead poisoning?

Talk to your doctor about testing your child's blood for lead poisoning.



When should my child be tested for lead poisoning?

Children should be tested at one and two years of age or if you think your child has been exposed to a lead.

To learn more about lead poisoning prevention and blood lead testing, call the Childhood Lead Poisoning Prevention Project:

(517) 335-8885

(888) 322-4453

Take this quiz to see if your child may have lead poisoning:

Symptoms of lead poisoning can be silent—and hard to recognize. Preventing lead poisoning before it happens is the best way to keep your family safe. Take this quiz to see if your child may be at risk.

Does your child currently live in a home built before 1950 or have they lived in a home built before 1950 in the recent past? Do they spend time at or often visit a home built before 1950?

Yes No Don't know

Does your child currently live in a home built before 1978 that was recently remodeled? Have they lived in or often visited a home built before 1978 that was recently remodeled?

Yes No Don't know

Does your child have a brother, sister or playmate with lead poisoning?

Yes No Don't know

Does your child live with an adult whose job or hobby involves lead?

Yes No Don't know

Do you or your child's caregiver use home remedies that may contain lead?

Yes No Don't know

If you answered NO to all of these questions, your child is probably not at risk for lead poisoning.

If you answered YES or DON'T KNOW to any of these questions, talk to your doctor about testing your child for lead poisoning.

MAKE EVERY DAY LEAD SAFE

Safe Cleaning.

Use these steps to help keep your home clean and reduce your child's risk of exposure. Use these tips to clean your windows, doors, floors, porches, stairs and child pay areas.

Put on rubber gloves. If you do not have rubber gloves, wash your hands well after cleaning.

Use the right cleaners and supplies you can throw away. Use soapy cleaners or products made to remove lead dust.

Remove paint chips first. Window areas and porches often have peeling paint and lead dust. Pick up paint chips you can see and throw them away in a plastic bag.

Always wet-mop floors and window sills. Do not broom lead dust. Throw away cloths after wiping each area. Replace mop water frequently.

Don't use a vacuum unless it is a HEPA vacuum. A regular vacuum will spread lead dust into the air you breathe. Some health departments have HEPA vacuums available to borrow

Rinse after cleaning. Use clean water and a new mop head or fresh paper towels to wipe away suds.

Always empty wash water down a toilet.

Repeat these steps weekly, or when dirt and dust appear on floors, porches, window wells, window sills, stairs and children's play areas.

For Homes with Lead Pipes

If you use a water filter, be sure it meets NSF/ANSI 53 standards for lead reduction.

✓**Flush your pipes before drinking**, and only use cold water for cooking and mixing formula. Flush pipes by running the water for approximately 5 minutes.

✓**Test.** Consider contacting your local water authority to have your water tested.

Daily Lead Safe Practices

- Wash hands, bottles, pacifiers and toys often.
- Always take off shoes before going into the house.
- Watch your child's diet. Foods high in calcium and iron help keep lead from being absorbed by a child's body.
- Avoid using power sanders, open-flame torches, heat guns, dry scrapers and dry sandpaper or heat guns on painted surfaces.
- Paint over peeling or chipping paint.
- Use a certified Repair and Remodeling Professional when making updates to your home.
- Always use the safe cleaning methods listed above.

Thinking about remodeling your home? Need advice about identifying and removing lead paint? Call the Lead and Healthy Homes Section: 866-691-LEAD.

www.michigan.gov/lead

MDHHS
Michigan Department of Health & Human Services

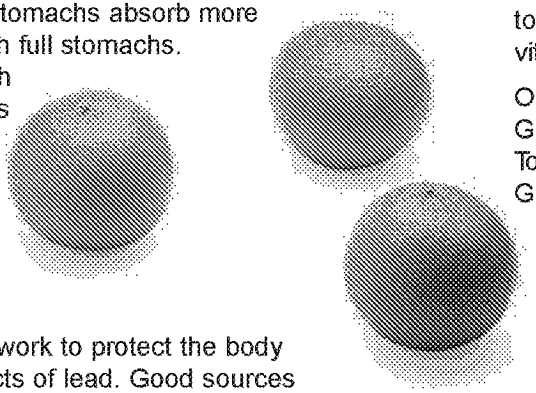
Childhood LEAD POISONING prevention program

This Document is a Non-Responsive Attachment.

Help Fight Lead Poisoning with a Healthy Diet

Regularly Eat Healthy Foods

Children with empty stomachs absorb more lead than children with full stomachs. Provide your child with four to six small meals during the day. The following nutrients can help protect your child from lead poisoning:



Iron-Rich Foods
Normal levels of iron work to protect the body from the harmful effects of lead. Good sources of dietary iron include:

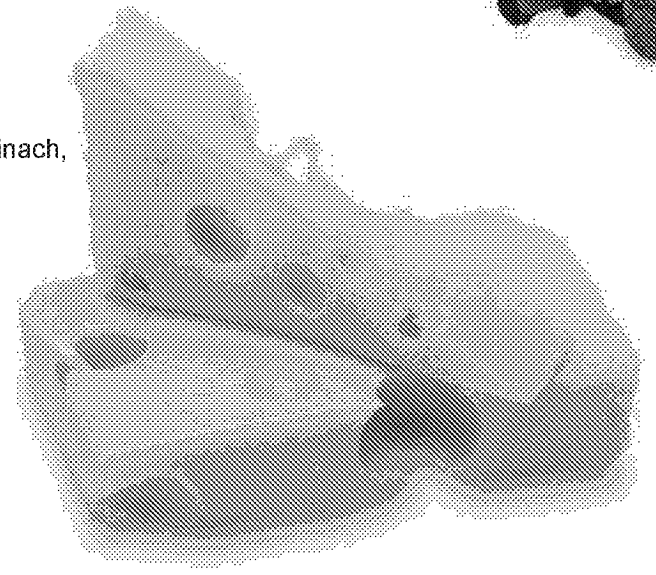
Lean red meats, fish, and chicken
Iron-fortified cereals
Dried fruits (raisins, prunes)

Calcium-Rich Foods
Calcium reduces lead absorption and also helps make teeth and bones strong. Good sources of dietary calcium include:

Milk
Yogurt
Cheese
Green leafy vegetables (spinach, kale, collard greens)

Vitamin C-Rich Foods
Vitamin C and iron-rich foods work together to reduce lead absorption. Good sources of vitamin C include:

Oranges, orange juice
Grapefruits, grapefruit juice
Tomatoes, tomato juice
Green peppers

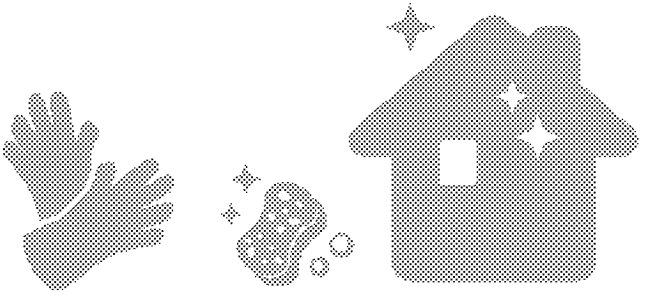


Simple Steps You Can Take

to Protect Your Family from Lead Hazards

If you think your home has high levels of lead:

- Make sure your children eat healthy, low-fat foods high in iron, calcium, and vitamin C.
- Get your children tested for lead, even if they seem healthy.
- Get your home tested for lead if it was built before 1978. Call 1-800-424-LEAD for more information.
- Always wash your hands before eating.
- Wash children's hands, bottles, pacifiers, and toys.
- Do not use imported pottery to store or serve food.
- Let tap water run for one minute before using.
- Use only cold water for making your baby's formula, drinking, and cooking.
- Regularly clean floors, windowsills, and other surfaces using wet methods that control dust.
- Wipe or remove shoes before entering your house.
- If you rent, it is your landlord's job to keep paint in good shape. Report peeling or chipping paint to your landlord and call your health department if the paint is not repaired safely.
- Take precautions to avoid exposure to lead dust when remodeling or renovating.
- Don't try to remove paint yourself!



For more information on childhood lead poisoning prevention:

Call

- Your child's pediatrician
- Genessee County Health Department Lead Program (810) 257-3833
- WIC (810) 237-4537
- Michigan Childhood Lead Poisoning Prevention (888) 322-4453
- Michigan Department of Health & Human Services (517) 373-3740

Visit

- Michigan Department of Health & Human Services http://www.michigan.gov/mdhhs
- Michigan Childhood Lead Poisoning Prevention www.michigan.gov/lead
- Genessee County Health Department Lead Program http://www.gchd.us/new_other_services/childhood_lead_poisoning_prevention_program.php

MDHHS

Childhood LEAD POISONING prevention program

This Document is a Non-Responsive Attachment.

Genesee County Health Department

Frequently Asked Questions About Lead in Flint Water

MDHHS Michigan Department of Health & Human Services

- Lead is hard to avoid completely. It can be found in old paint, water pipes and brass water faucets, in dirt, at some job sites, and in metal used for some hobbies.
- The amount of lead found in some Flint homes' drinking water could affect kids' health.
  - Even small amounts of lead can harm kids' health because they are little and still growing.
  - Adults are less likely to be harmed by the levels found in the water.
- Filter your drinking water using a NSF-approved filter.
  - Find a NSF-approved filter at http://www.gchd.us/docs/lead_filter_information.pdf.
  - If you use City of Flint water, you can call 211 to find out where you can pick up a free water filter.
- Some filters can remove up to 99% of the lead in water when used properly. To be sure your filter is removing as much lead as it can, carefully follow the instructions that came with it.
  - Change the filter cartridge as often as you should.
  - Run only cold water through the filter.
- Even after changes to the water system, it may take a while before lead levels in your home's water drop. Use the tips below to know when it's best to use filtered water:

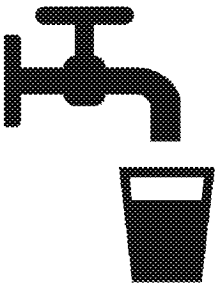
Lead in Water

Although your water may be a different color sometimes, it is not caused by lead. It's important to remember:

- **You can't see, smell, or taste lead in water.**
- **Lead won't change the color of your water.**
- **The only way to know what your home's lead levels are is by having your water tested in a lab.**

Please call the Flint Water Department at 810-787-6537 to request a free or low-cost water test.

In The Kitchen



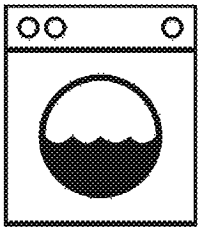
Use filtered tap water for:

- Drinking (including making coffee, drink mixes, juice, baby formula)
- Cooking (even if you boil the water, the lead will stay in the water and food)
- Washing fruits and vegetables

You can use unfiltered tap water for:

- Washing your hands
- Washing dishes
- Wiping down countertops

Cleaning



You can use unfiltered tap water for:

- Mopping floors
- Washing clothes

Your washing machine and dryer won't put lead from the water into the air of your home.

In the Bathroom

Use <u>filtered</u> tap water for:

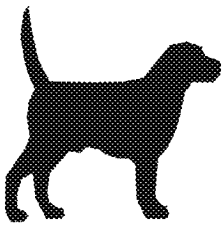
- Brushing kids' teeth

You can use <u>unfiltered</u> tap water for:

- Showers
- Baths (don't let kids drink the water as they play in the tub)
- Brushing your teeth (if you are an adult)

Lead will not cause rashes or other skin problems. However, if chlorine levels or other cleaners are high in the water, it may cause itchy or dry skin (similar to what can happen when you swim in a pool).

Caring for Pets



Use <u>filtered</u> tap water for:

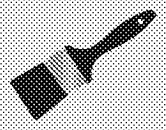
- Pets' water bowls

You can use <u>unfiltered</u> tap water for:

- Baths

If you notice your pet acting differently than normal, please contact your vet.

Other Sources of Lead in Your Home



Lead Paint

- Homes built before 1978 likely have lead paint, both inside and outside.
- Old paint is the most common way that kids are exposed to lead.

Dirt

- If you live in the city, there may be lead in the dirt outside your home.
- Before 1996, gas and the exhaust from cars contained lead. More lead will be found in dirt in busy traffic areas.

Dust

- The dust in your home can contain tiny amounts of both the paint and the dirt that contain lead.

Hobbies & Jobs

- Solder, fishing sinkers, bullets, and stained glass framing materials are some of the items in your home that may contain lead. You could also track home lead dust from your job site.

Have Questions?

For more information about protecting yourself and your family from lead, please visit:

<u>www.michigan.gov/lead</u>

Or you can call the Michigan Department of Health and Human Services at:

1-800-648-6942

The staff at this number will help direct you to the best department that can answer your questions about lead in your home.

To request a free or low-cost water test, please call the Flint Water Department at:

1-810-787-6537

To find out if you can get a free water filter, please call 211.

MDHHS

Michigan Department of Health & Human Services

This Document is a Non-Responsive Attachment.

Message

From: Wells, Eden (DHHS) [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=F3A10E41478E4A4E9E9595DF85DCCF97-WELLS EDEN]
Sent: 10/30/2015 6:29:07 PM
To: PPI @gmail.com
Subject: Fwd: Parent Letter and Attachments
Attachments: Parent Letter FINAL.pdf; ATT00001.htm; Handout_Parent_Is Your Child Safe from Lead.pdf; ATT00002.htm; FightLead_HealthyDiet.pdf; ATT00003.htm; 2015-10-21 - Lead - Flint Water FINAL (1).pdf; ATT00004.htm

Sent from my iPhone

Begin forwarded message:
From: "Minicuci, Angela (DHHS)" <MinicuciA@michigan.gov>
Date: October 30, 2015 at 2:20:21 PM EDT
To: "Valacak, Mark" <MVALACAK@gchd.us>, "Sandlin, Mary" <MSANDLIN@gchd.us>
Cc: "Eisner, Jennifer (DHHS)" <EisnerJ@michigan.gov>, "Lasher, Geralyn (DHHS)" <lasherg@michigan.gov>, "Wells, Eden (DHHS)" <WellsE3@michigan.gov>
Subject: Parent Letter and Attachments
Good afternoon,

Attached are the electronic files for the parent letter and the attachments.

Thank you,

Angela Minicuci
Office of External Relations and Communications
Michigan Department of Health and Human Services
Office: (517) 241-2112
Mobile: PPI
minicucia@michigan.gov
www.michigan.gov/mdhhs

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October 27, 2015

Dear Parent,

To help make sure the children of Flint are safe from lead exposure, the Genesee County Health Department and the Michigan Department of Health and Human Services are providing answers to the following questions:

- Where does lead come from?
- What can I do to protect my family?
- Should I get my child tested for lead?
- Where can I find more information about lead?

Where does lead come from?

Elevated levels of lead have been found in the drinking water from lead pipes in the City of Flint. Kids can also be exposed to lead from old lead paint, soil, pottery, cosmetics and toys and some home remedies. Adult jobs and hobbies, like auto repair, stained glass, jewelry making and ammunitions handling can also put children at risk if they touch clothing or play in areas where lead is found. Lead is a serious health hazard, especially for small children who become lead poisoned when they eat, drink or breathe lead.

Should my child get a blood lead test? Children who live in the City of Flint, live in a home using City of Flint water, or who attend school, childcare or often spend time with a caregiver in the City of Flint should be tested for lead poisoning.
This should be done as soon as possible.

Where should I go to get a blood lead test for my child?

The best place to get your child's blood lead test is your doctor's office. Tests are covered by most health plans. Your doctor will follow up with you on lab tests and provide you with information on what to do next. Your child can also get a free lead test at the Genesee County Health Department. If you need transportation, contact 2-1-1 for help.

Understanding your child's lead test result.

A lead level below 5 means there is a little lead in your child's blood. Use the tips below to help keep your child safe. Your doctor may suggest retesting your child within the next 12 months to make sure the level does not go up.

A lead level of 5-44 means that your child has had some exposure to lead. Work with your doctor and local health department for further guidance on how to limit your lead exposure. Your doctor may retest your child in 1-3 months to make sure the level does not go up.

Children with very high levels of lead **(over 44)** may require treatment at the hospital.

What Can I Do to Keep My Family Safe?

The following steps should be taken right away to help protect you and your child.

Protecting your family from lead in the water:

- Get your water tested for lead. It's free. Call (810) 787-6537 to learn more.
- Use a water filter in your home. Call 2-1-1 for information on free NSF Certified water filters.
- Run only cold water through the filter.
- If you do not have a water filter, use bottled water for drinking and mixing formula.
- Use filtered or bottled water for drinking (including making coffee, drink mixes, juice, baby formula), and cooking (even if you boil the water, the lead will stay in the water and food).
- You can use unfiltered tap water for washing your hands and washing dishes.
- If you have to use unfiltered water for drinking or cooking, run the tap for five minutes before using the water.

Safe cleaning:

Safe cleaning is important. Keeping your home clean and safe from lead hazards will help to protect your family.

- Buildings built before 1978 could have lead paint in them.Use wet paper towels to clean up paint chips and dust in these older buildings. Be sure to clean around windows, play areas, and floors.
- Wash hands and toys often with soap and water.
- You can use unfiltered tap water to wipe down countertops, mop floors, and wash clothes.

Good nutrition:

Some foods will help keep lead from being stored in a child's body. These are foods with a lot of calcium, iron and vitamin C. These foods include:

Calcium Rich Foods	**Iron Rich Foods**	**Foods with Vitamin C**
➢ Milk	➢ Beans	➢ Oranges
➢ Cheese	➢ Lean meats like fish and chicken	➢ Orange juice
➢ Yogurt	➢ Whole grain cereals	➢ Grapefruits
➢ Tofu	➢ Peanut butter	➢ Tomatoes
➢ Spinach		➢ Green peppers

Always wash your fruits with filtered water. If you are concerned about your child's diet, talk with your doctor who may also recommend a daily multivitamin.

WIC and SNAP provide assistance to parents and children who need fresh and healthy foods. Contact the **Genesee County WIC office at (810) 237-4537** to learn more. SNAP also offers a Double Bucks program to purchase even more healthy food for no additional costs.

Where can I get more information on lead?

- Genesee County Health Department Lead Program
  (810) 257-3833
  www.gchd.us
- Michigan Department of Health and Human Services
  Childhood Lead Poisoning Prevention Program
  (888) 322-4453
  www.michigan.gov/lead
- United States Environmental Protection Agency
  www.epa.gov/lead
- U.S. Centers for Disease Control and Prevention (CDC) Web site
  www.cdc.gov/nceh/lead

These recommendations will stay in effect until the Genesee County Health Department lifts the restrictions on water usage.

Sincerely,

Eden V. Wells, MD, MPH, FACPM
Chief Medical Executive
Michigan Department of Health and Human Services

Gary K. Johnson, MD, MPH
Medical Director
Genesee County Health Department

This Document is a Non-Responsive Attachment.

IS YOUR CHILD SAFE FROM LEAD POISONING?

LEARN HOW TO PROTECT YOUR FAMILY:

CREATE A LEAD SAFE HOME

What causes lead poisoning?

There are many places in a home that can put babies and children in danger of lead poisoning.

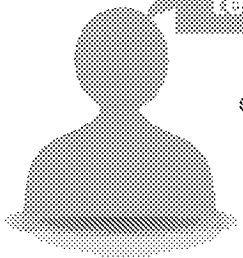
Lead paint is the #1 cause of lead poisoning in Michigan and is often found in homes built before 1978. The older the home, the more likely that painted surfaces like windows, cupboards, doors and porches will contain lead paint.

Lead poisoning occurs most often when children come in contact with lead in the air, in dust and in lead paint. Lead can also be found in soil, drinking water if supplied by lead pipes, certain home remedies and is used in some hobbies and occupations.

Exposure to lead is a serious health threat. Carefully consider where your child spends time (childcare, relatives, your home) when thinking about lead poisoning hazards.

How can I tell if my child has lead poisoning?

Talk to your doctor about testing your child's blood for lead poisoning.



When should my child be tested for lead poisoning?

Children should be tested at one and two years of age or if you think your child has been exposed to a lead.

To learn more about lead poisoning prevention and blood lead testing, call the Childhood Lead Poisoning Prevention Project:

(517) 335-8885

(888) 322-4453

Take this quiz to see if your child may have lead poisoning:

Symptoms of lead poisoning can be silent—and hard to recognize. Preventing lead poisoning before it happens is the best way to keep your family safe. Take this quiz to see if your child may be at risk.

Does your child currently live in a home built before 1950 or have they lived in a home built before 1950 in the recent past? Do they spend time at or often visit a home built before 1950?

Yes No Don't know

Does your child currently live in a home built before 1978 that was recently remodeled? Have they lived in or often visited a home built before 1978 that was recently remodeled?

Yes No Don't know

Does your child have a brother, sister or playmate with lead poisoning?

Yes No Don't know

Does your child live with an adult whose job or hobby involves lead?

Yes No Don't know

Do you or your child's caregiver use home remedies that may contain lead?

Yes No Don't know

If you answered NO to all of these questions, your child is probably not at risk for lead poisoning.

If you answered YES or DON'T KNOW to any of these questions, talk to your doctor about testing your child for lead poisoning.

MAKE EVERY DAY LEAD SAFE

Safe Cleaning.

Use these steps to help keep your home clean and reduce your child's risk of exposure. Use these tips to clean your windows, doors, floors, porches, stairs and child pay areas.

Put on rubber gloves. If you do not have rubber gloves, wash your hands well after cleaning.

Use the right cleaners and supplies you can throw away. Use soapy cleaners or products made to remove lead dust.

Remove paint chips first. Window areas and porches often have peeling paint and lead dust. Pick up paint chips you can see and throw them away in a plastic bag.

Always wet-mop floors and window sills. Do not broom lead dust. Throw away cloths after wiping each area. Replace mop water frequently.

Don't use a vacuum unless it is a HEPA vacuum. A regular vacuum will spread lead dust into the air you breathe. Some health departments have HEPA vacuums available to borrow

Rinse after cleaning. Use clean water and a new mop head or fresh paper towels to wipe away suds.

Always empty wash water down a toilet.

Repeat these steps weekly, or when dirt and dust appear on floors, porches, window wells, window sills, stairs and children's play areas.

For Homes with Lead Pipes

If you use a water filter, be sure it meets NSF/ANSI 53 standards for lead reduction.

✓**Flush your pipes before drinking**, and only use cold water for cooking and mixing formula. Flush pipes by running the water for approximately 5 minutes.

✓**Test.** Consider contacting your local water authority to have your water tested.

Daily Lead Safe Practices

- Wash hands, bottles, pacifiers and toys often.
- Always take off shoes before going into the house.
- Watch your child's diet. Foods high in calcium and iron help keep lead from being absorbed by a child's body.
- Avoid using power sanders, open-flame torches, heat guns, dry scrapers and dry sandpaper or heat guns on painted surfaces.
- Paint over peeling or chipping paint.
- Use a certified Repair and Remodeling Professional when making updates to your home.
- Always use the safe cleaning methods listed above.

Thinking about remodeling your home? Need advice about identifying and removing lead paint? Call the Lead and Healthy Homes Section: 866-691-LEAD.

www.michigan.gov/lead

MDHHS
Michigan Department of Health & Human Services

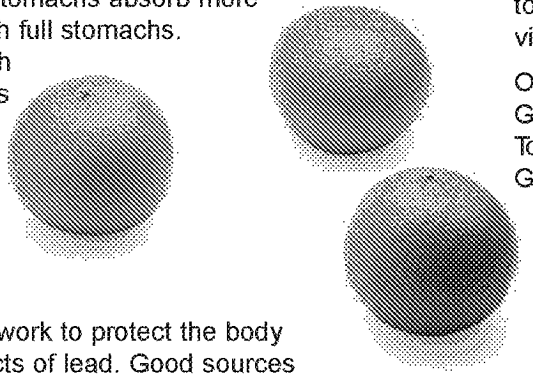
Childhood LEAD POISONING prevention program

This Document is a Non-Responsive Attachment.

Help Fight Lead Poisoning with a Healthy Diet

Regularly Eat Healthy Foods

Children with empty stomachs absorb more lead than children with full stomachs. Provide your child with four to six small meals during the day. The following nutrients can help protect your child from lead poisoning:



Iron-Rich Foods
Normal levels of iron work to protect the body from the harmful effects of lead. Good sources of dietary iron include:

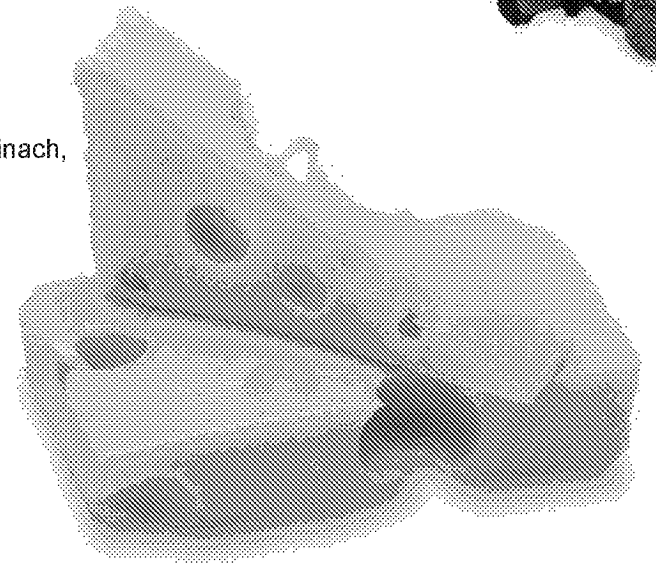
Lean red meats, fish, and chicken
Iron-fortified cereals
Dried fruits (raisins, prunes)

Calcium-Rich Foods
Calcium reduces lead absorption and also helps make teeth and bones strong. Good sources of dietary calcium include:

Milk
Yogurt
Cheese
Green leafy vegetables (spinach, kale, collard greens)

Vitamin C-Rich Foods
Vitamin C and iron-rich foods work together to reduce lead absorption. Good sources of vitamin C include:

Oranges, orange juice
Grapefruits, grapefruit juice
Tomatoes, tomato juice
Green peppers



Simple Steps You Can Take

to Protect Your Family from Lead Hazards

If you think your home has high levels of lead:

- Make sure your children eat healthy, low-fat foods high in iron, calcium, and vitamin C.
- Get your children tested for lead, even if they seem healthy.
- Get your home tested for lead if it was built before 1978. Call 1-800-424-LEAD for more information.
- Always wash your hands before eating.
- Wash children's hands, bottles, pacifiers, and toys.
- Do not use imported pottery to store or serve food.
- Let tap water run for one minute before using.
- Use only cold water for making your baby's formula, drinking, and cooking.
- Regularly clean floors, windowsills, and other surfaces using wet methods that control dust.
- Wipe or remove shoes before entering your house.
- If you rent, it is your landlord's job to keep paint in good shape. Report peeling or chipping paint to your landlord and call your health department if the paint is not repaired safely.
- Take precautions to avoid exposure to lead dust when remodeling or renovating.
- Don't try to remove paint yourself!

For more information on childhood lead poisoning prevention:

Call

- Your child's pediatrician
- Genessee County Health Department Lead Program (810) 257-3833
- WIC (810) 237-4537
- Michigan Childhood Lead Poisoning Prevention (888) 322-4453
- Michigan Department of Health & Human Services (517) 373-3740

Visit

- Michigan Department of Health & Human Services http://www.michigan.gov/mdhhs
- Michigan Childhood Lead Poisoning Prevention www.michigan.gov/lead
- Genessee County Health Department Lead Program http://www.gchd.us/new_other_services/childhood_lead_poisoning_prevention_program.php

MDHHS

Childhood LEAD POISONING prevention program

This Document is a Non-Responsive Attachment.

Genesee County Health Department

Frequently Asked Questions About Lead in Flint Water

MDHHS Michigan Department of Health & Human Services

- Lead is hard to avoid completely. It can be found in old paint, water pipes and brass water faucets, in dirt, at some job sites, and in metal used for some hobbies.
- The amount of lead found in some Flint homes' drinking water could affect kids' health.
  - Even small amounts of lead can harm kids' health because they are little and still growing.
  - Adults are less likely to be harmed by the levels found in the water.
- Filter your drinking water using a NSF-approved filter.
  - Find a NSF-approved filter at http://www.gchd.us/docs/lead_filter_information.pdf.
  - If you use City of Flint water, you can call 211 to find out where you can pick up a free water filter.
- Some filters can remove up to 99% of the lead in water when used properly. To be sure your filter is removing as much lead as it can, carefully follow the instructions that came with it.
  - Change the filter cartridge as often as you should.
  - Run only cold water through the filter.
- Even after changes to the water system, it may take a while before lead levels in your home's water drop. Use the tips below to know when it's best to use filtered water:

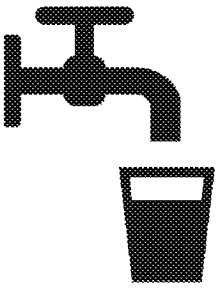
Lead in Water

Although your water may be a different color sometimes, it is not caused by lead. It's important to remember:

- **You can't see, smell, or taste lead in water.**
- **Lead won't change the color of your water.**
- **The only way to know what your home's lead levels are is by having your water tested in a lab.**

Please call the Flint Water Department at 810-787-6537 to request a free or low-cost water test.

In The Kitchen



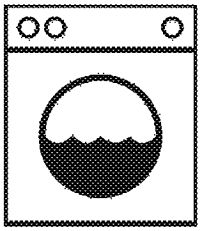
Use filtered tap water for:

- Drinking (including making coffee, drink mixes, juice, baby formula)
- Cooking (even if you boil the water, the lead will stay in the water and food)
- Washing fruits and vegetables

You can use unfiltered tap water for:

- Washing your hands
- Washing dishes
- Wiping down countertops

Cleaning



You can use unfiltered tap water for:

- Mopping floors
- Washing clothes

Your washing machine and dryer won't put lead from the water into the air of your home.

In the Bathroom

Use <u>filtered</u> tap water for:

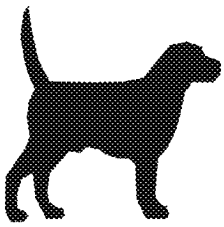
- Brushing kids' teeth

You can use <u>unfiltered</u> tap water for:

- Showers
- Baths (don't let kids drink the water as they play in the tub)
- Brushing your teeth (if you are an adult)

Lead will not cause rashes or other skin problems. However, if chlorine levels or other cleaners are high in the water, it may cause itchy or dry skin (similar to what can happen when you swim in a pool).

Caring for Pets



Use <u>filtered</u> tap water for:

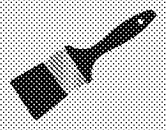
- Pets' water bowls

You can use <u>unfiltered</u> tap water for:

- Baths

If you notice your pet acting differently than normal, please contact your vet.

Other Sources of Lead in Your Home



Lead Paint

- Homes built before 1978 likely have lead paint, both inside and outside.
- Old paint is the most common way that kids are exposed to lead.

Dirt

- If you live in the city, there may be lead in the dirt outside your home.
- Before 1996, gas and the exhaust from cars contained lead. More lead will be found in dirt in busy traffic areas.

Dust

- The dust in your home can contain tiny amounts of both the paint and the dirt that contain lead.

Hobbies & Jobs

- Solder, fishing sinkers, bullets, and stained glass framing materials are some of the items in your home that may contain lead. You could also track home lead dust from your job site.

Have Questions?

For more information about protecting yourself and your family from lead, please visit:

<u>www.michigan.gov/lead</u>

Or you can call the Michigan Department of Health and Human Services at:

1-800-648-6942

The staff at this number will help direct you to the best department that can answer your questions about lead in your home.

To request a free or low-cost water test, please call the Flint Water Department at:

1-810-787-6537

To find out if you can get a free water filter, please call 211.

MDHHS

Michigan Department of Health & Human Services

This Document is a Non-Responsive Attachment.

From: Wells, Eden (DHHS)
Sent: Friday, October 30, 2015 3:36 PM
To: Dykema, Linda D. (DHHS)
Subject: Re: Breast feeding and maternal lead exposure

Ok

Sent from my iPhone

On Oct 30, 2015, at 2:26 PM, Dykema, Linda D. (DHHS) <DykemaL@michigan.gov> wrote:

> I don't have any information beyond what's in this CDC publication that I had previously shared with you.
>
> ---
>
> **From:** Wells, Eden (DHHS)
> **Sent:** Friday, October 30, 2015 2:18 PM
> **To:** Dykema, Linda D. (DHHS)
> **Subject:** Fwd: Breast feeding and maternal lead exposure
>
> Sent from my iPhone
>
> Begin forwarded message:
>
> > **From:** "Valacak, Mark" <MVALACAK@gchd.us>
> > **Date:** October 30, 2015 at 1:53:22 PM EDT
> > **To:** "Wells, Eden (DHHS)" <WellsE3@michigan.gov>, Laura Carravallah <Laura.Carravallah@hc.msu.edu>
> > **Cc:** Lawrence Reynolds <PPI>, <PPI>, Peter Levine <plevine@gcms.org>
> > **Subject: RE: Breast feeding and maternal lead exposure**
> >
> > In adults when we see high levels it is generally an occupational exposure and inhalation of lead fumes in industrial exposure settings like battery manufacturing, lead smelting, and stained lead glass.
> >
> > A couple of factors are important to remember when we are talking about lead exposure in adults versus children. Absorptions rates from gastrointestinal exposure are lower in adults versus children. So where a toddler might absorb about 50%, absorption rates decline in adults to 3-10%. About 90% of lead will end up in the bone where it mimics calcium. It causes less harm there then if it went to soft tissues like the liver or kidneys. The problem is that under circumstances that cause calcium mobilization, lead stored in the bone may remobilize and circulate in the blood, elevating blood lead levels. The mobilization of stored lead with pregnancy, menopause, and aging is a cause for concern. So to help mitigate that there should be an emphasis on good nutrition and a calcium rich diet. Pregnant and breastfeeding woman should be sure to take their vitamins to minimize calcium mobilization from the bones.

Reinforcing these messages would help minimize exposure.

Mark Valacak, MPH, Health Officer
Genesee County Health Department,

630 S. Saginaw St. Suite 4 Flint, MI 48502-1540

Phone 810-257-3588 Fax 810 257-3147
E-mail mvalacak@gchd.us

Public Health

Please consider the environment before printing this e-mail.

"There are two lasting bequests we can hope to give our children: one is roots; the other is wings." Hodding Carter

*NOTICE: This e-mail, including attachments, is intended for the exclusive use of the addressee and may contain proprietary, confidential or privileged information. If you are not the intended recipient, any disclosure, use, distribution, copying, or taking of any action in reliance of the contents of this e-mail is strictly prohibited. If you have received this e-mail in error, please notify me via e-mail and permanently delete the original and destroy all copies. Thank you.

For a copy of the Health Department's Notice of Information Practices, contact the Health Department or visit the Health Department's website at http://www.gchd.us/

From: Wells, Eden (DHHS) [mailto:WellsE3@michigan.gov]
Sent: Friday, October 30, 2015 12:02 PM
To: Laura Carravallah
Cc: Lawrence Reynolds; PPI; Peter Levine; Valacak, Mark
Subject: Re: Breast feeding and maternal lead exposure

Looping I our toxicologist, as we ha e discussed this. Note that anyone should be using filtered or bottled water now, so that the issue of which house and which risk should already be addressed. Also- we do not have any data supporting adults with blood lead levels that high (Off top of my head) and none have been in the 40's or higher since Long before April 2014.

Regardless, Linda and I had talked about breastfeeding moms... She can help.

Eden

Sent from my iPhone

On Oct 30, 2015, at 11:33 AM, Laura Carravallah <Laura.Carravallah@hc.msu.edu> wrote:

> Thank you for your quick answer!
>
> This makes sense for pregnant moms, as there is no choice as to how the baby will get its nourishment. However, for breastfeeding moms in households in which filters will be provided, **do we know that breast milk (with possible higher maternal BLLs secondary to bone release from chronic exposure) is preferable to filtered tap water?** Does anybody know what the range of breast milk lead levels are in women

who have BLLs around 30 or 35? In the data that Dr. Reynolds and I looked at (previously attached) the BLLs didn't go that high, and it said that the breast milk levels fluctuated.

In the Ettinger paper the highest maternal BLL with a breast milk sample was 29.9 (Table 1), which is less than the level of 40 recommended in the MDHHS handout. The article said that "Breast milk lead expressed as percentage of maternal blood lead ranged from 0.4 to 9.2% (mean = 1.6%, SD = 1.2%)" – p 929. The means a less an issue than the outliers, considering some of the extremely high water lead levels that have been found in the city and also the difficulty of predicting which houses might be most at risk.

I'm not sure if there is other, better data out there that might shed some light on this? Also, your attached pamphlet does deflect patients back to their doctors, but I'm not sure that those of us in the GCMS feel that we have adequate information to advise people further.

Laura

From: Wells, Eden (DHHS) [mailto:WellsE3@michigan.gov]
Sent: Friday, October 30, 2015 11:02 AM
To: Laura Carravallah
Cc: 'Lawrence Reynolds'; 'PPI'; Peter Levine; Mark Valacak
Subject: RE: Breast feeding and maternal lead exposure

Good morning,

Note that MDHHS/GCHD is about to send out (by emails and hopefully you all can disseminate at will to your colleagues?) a provider letter with provider resources, which will also all be on the webpage we are using. Parent letters with resources for them will be going out in hard copy through schools and daycares---all of this will be occurring in the next couple of days. Note that there is already a flyer on the Michigan.gov/flintwater webpage for pregnant moms and breastfeeding---note that, like all others including children, treatment only occurs for levels over 45, but removing lead from any environmental sources is important at all times.

We have already gotten information regarding pregnancy and lead levels from CDC: (Mary Jean Brown): "Pregnant women who work with lead should be tested (occupational, hobby, shooting ranges, renovation exposures). Worried women who want to be tested should not be refused but if their only exposure is the water the only intervention is to stop drinking the water from the river and it is my understanding that that has been accomplished. There is no medical treatment for pregnant women (chelation therapy) in the first trimester because of teratogenic concerns. At blood lead levels >=45 in later trimesters, chelation may be considered to protect the fetus but should only be done in consultation with someone familiar with chelation in early childhood and high risk pregnancies. A general alert to area OB/Gyn's

and maternity clinics that patients should not drink water from the river, would be advisable."

Eden

Eden V. Wells, MD, MPH, FACPM
Chief Medical Executive
Michigan Department of Health and Human Services
201 Townsend St., 5th Floor CVB
Lansing, MI 48913

From: Laura Carravallah [mailto:Laura.Carravallah@hc.msu.edu]
Sent: Friday, October 30, 2015 10:51 AM
To: Wells, Eden (DHHS)
Cc: 'Lawrence Reynolds'; '[PPI]'; Peter Levine; Mark Valacak
Subject: Breast feeding and maternal lead exposure

Dear Eden,

Our county medical society is in the process of drafting a "fact sheet" specifically for our physician members to try and help them help their patients. We are endeavoring to keep the content consistent with the other messaging going out, but to use as many channels as we can, and to make this very easy for physicians to digest (i.e. brief and pertinent to their patients). I am attaching our draft to this email, as well as some of the articles that we have found.

One of the questions that came up is what to tell lead-exposed mothers who are pregnant or breastfeeding. We have pulled a number of articles that talk about lower maternal BLLs, but these are usually in the context of lower lead levels in drinking water. We are not sure if these recommendations still hold in our situation: the water is variable, the mothers are not routinely tested (should they be?), and lead is released from maternal bone for a long time. We also read that the lead levels fluctuate. All of this is to say, we are not certain that breastfeeding is safer than using filtered water in our situation (though it pains us as pediatricians and family docs to suggest this) and also, what the safe BLL is for a mother? The MDHHS recommendation of 40 in the recent Lead Week Toolkits seemed high, considering the fluctuating BLL and bone storage.

You had previously asked your toxicologist about the copper levels for us, and I was hoping you might pose this question to them as well.

Thank you for your help!

Laura Carravallah, MD

<deq-flintwater-breastfeedingandlead_503281_7.pdf>

<leadandpregnancy CDC 2010.pdf>

From: Wells, Eden (DHHS)
Sent: Friday, October 30, 2015 3:44 PM
To: PPI ;Laura.Carravallah@hc.msu.edu;plevine@gcms.org;Valacak, Mark; PPI h;Mona Hanna-Attisha
Subject: Fwd: Tox question- Brest feeding and Pb
Attachments: leadandpregnancy CDC 2010.pdf; ATT00001.htm

Hi there all,

Attached is the guidance that CDC had about breastfeeding.see Linda's notes about where in the massive document to get the information, and you can see her summation.

E

Sent from my iPhone

Begin forwarded message:

> **From:** "Dykema, Linda D. (DCH)" <DykemaL@michigan.gov>
> **Date:** September 30, 2015 at 9:22:11 AM EDT
> **To:** "Wells, Eden (DCH)" <WellsE3@michigan.gov>
> **Cc:** "Miller, Corinne (DCH)" <MillerC39@michigan.gov>
> **Subject: RE: Tox question- Brest feeding and Pb**
>
> CDC guidance on lead exposure in pregnancy and lactation is attached. Breast milk section starts on page 97. Breast milk level is generally less than 3% of maternal BLL.
>
> Recommendations in the Executive Summary:
>
> The adverse developmental effects of ≥5 µg/dL in infant
> blood lead level was of greater concern than the risks of not breastfeeding. Thus, CDC encourages mothers
> with blood lead levels <40 µg/dL to breastfeed, however, mothers with higher blood lead levels are encouraged
> to pump and discard their breast milk until their blood lead levels drop below 40 µg/dL.
>
> In a nutshell... lead harm outweighs the benefits of breastfeeding and concerned women should talk with their Dr. and get their own blood tested.
>
> -----Original Message-----
> From: Wells, Eden (DCH)
> Sent: Tuesday, September 29, 2015 9:19 PM
> To: Dykema, Linda D. (DCH)
> Cc: Miller, Corinne (DCH)
> Subject: Tox question- Brest feeding and Pb

PH education for pregnant women? We are focused on formula-- need to know about breastfeeding risks in case question comes up...
E
Sent from my iPhone

GUIDELINES FOR THE IDENTIFICATION AND MANAGEMENT OF LEAD EXPOSURE IN PREGNANT AND LACTATING WOMEN

National Center for Environmental Health
Division of Emergency and Environmental Health Services

GUIDELINES FOR THE IDENTIFICATION AND MANAGEMENT OF LEAD EXPOSURE IN PREGNANT AND LACTATING WOMEN

Edited by
Adrienne S. Ettinger, ScD, MPH
Anne Guthrie Wengrovitz, MPH

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National Center for Environmental Health/Agency for Toxic Substances and Disease Registry
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November 2010
U.S. Department of Health and Human Services
Atlanta, GA

This document is dedicated to the memories of Michael W. Shannon, MD, MPH (1953-2009) and Kathryn R. Mahaffey, PhD (1943-2009).

Dr. Shannon was a gifted scientist, a respected leader in medicine and public health, and a tireless advocate for prevention of childhood lead poisoning. His contributions to the scientific literature documenting unrecognized sources of exposure and describing innovative management protocols did much to improve the lives of countless children both in the United States and around the world.

Dr. Mahaffey's early work to ensure that blood samples collected during the National Health and Nutrition Examination Surveys increased understanding of lead poisoning and contributed to the identification of lead in gasoline and paint as primary routes of lead exposure in children. She was actively involved in preventing lead exposure in children for over 35 years and provided invaluable assistance with this document.

The thoughtful contributions of Drs. Shannon and Mahaffey to the CDC Advisory Committee on Childhood Lead Poisoning Prevention will be deeply missed.

TABLE OF CONTENTS

Preface i

Executive Summary iii

Summary of Public Health Actions Based on Maternal and Infant Blood Lead Levels vi

Members of the Work Group on Lead and Pregnancy vii

Acknowledgments viii

Members of the Advisory Committee on Childhood Lead Poisoning Prevention ix

Glossary xiii

Chapter 1. Introduction 1

Chapter 2. Adverse Health Effects of Lead Exposure in Pregnancy 5

Chapter 3. Biokinetics and Biomarkers of Lead in Pregnancy and Lactation 27

Chapter 4. Distribution of BLLs, Risk Factors For and Sources of Lead Exposure in Pregnant and Lactating Women 35

Chapter 5. Blood Lead Testing in Pregnancy and Early Infancy 51

Chapter 6. Management of Pregnant and Lactating Women Exposed to Lead 63

Chapter 7. Nutrition and Lead in Pregnancy and Lactation 77

Chapter 8. Chelation of Pregnant Women, Fetuses, and Newborn Infants 89

Chapter 9. Breastfeeding 97

Chapter 10. Research, Policy, and Health Education Recommendations 107

Chapter 11. Resources and Referral Information 113

List of References by Chapter 116

APPENDICES

I Existing State Legislation Related to Lead and Pregnant Women 151

II Charge Questions to the Lead and Pregnancy Work Group 155

III Commonly Ingested Substances in Pregnancy-related Pica, Reasons for Use, and Country/Race-Ethnicity of Origin 159

IV List of Occupations and Hobbies that Involve Lead Exposure 163

V Alternative Cosmetics, Food Additives, and Medicines That Contain Lead 167

VI Recommendations for Medical Management of Adult Lead Exposure 171

VII Medical Management Guidelines for Lead-Exposed Adults 183

VIII Pregnancy Risk Assessment Form, NYC DOH 201

IX Assessment Interview Form, Minnesota DOH 219

X Lead-Based Paint Risk Assessment Form, Minnesota DOH 223

XI Primary Prevention Information Form, NYC DOH 233

XII Child Risk Assessment Form, NYC DOH 239

XIII Nutritional Reference Information 253

XIV Template for Letter to Construction Employer re: Occupational Exposure 263
XV Workplace Hazard Alert for Lead,
Occupational Lead Poisoning Prevention Program CA DOH. 267

LIST OF FIGURES

Chapter 1
Figure 1-1. Distribution of Blood Lead Levels in U.S. Women of Childbearing Age. 3

Chapter 3
Figure 3-1. Major Lead Exposure Pathways from Mother to Infant. 33

Chapter 5
Figure 5-1. New York City Department of Health and Mental Hygiene: Recommended
Lead Risk Assessment Questions for Pregnant Women 61

Figure 5-2. Minnesota Department of Health: Recommended Lead Risk Assessment
Questions for Pregnant Women 62

LIST OF TABLES

Chapter 2
Table 2-1. Summary of Studies Estimating Association of Prenatal Lead Exposure with
Neurodevelopmental Effects 13

Chapter 4
Table 4-1. Risk Factors for Lead Exposure in Pregnant and Lactating Women. 48
Table 4-2. Key Recommendations to Prevent or Reduce Lead Exposure in Pregnant
and Lactating Women 49

Chapter 5
Table 5-1. Follow-up of Initial Blood Lead Testing of the Neonate (<1 month of age). 58
Table 5-2. Schedule for Follow-up Blood Lead Testing in Infants (<6 months of age) 59
Table 5-3. Frequency of Maternal Blood Lead Follow-up Testing During Pregnancy 60

Chapter 6
Table 6-1. Recommended Actions by Blood Lead Level in Pregnancy 74
Table 6-2. Suggested Factors to Assess and Characterize Pica Behavior 75

Chapter 8
Table 8-1. Chelating Agents Used to Treat Lead Poisoning 93
Table 8-2. Published Experience with Chelating Agents during Pregnancy in Humans. 94
Table 8-3. Published Experience with Chelating Agents during Early Postpartum in Humans 95

Chapter 9
Table 9-1. Frequency of Maternal Blood Lead Follow-up Testing during Lactation to Assess Risk of
Infant Lead Exposure from Maternal Breast Milk 103
Table 9-2. Estimated Daily Intake of Lead from Breast Milk at Different Maternal Blood
Lead Concentrations 104
Table 9-3. Estimated Increase in Infant Blood Lead Concentration Associated with Different
Maternal Blood Lead Concentrations at 1 Month Postpartum. 105

PREFACE

Lead exposure during pregnancy and breastfeeding can result in lasting adverse health effects independent of lead exposure during other life stages. However, to date there has been limited guidance available for clinicians and the public health community regarding the screening and management of pregnant and lactating women exposed to high levels of lead. Recognizing the need for national recommendations, the Centers for Disease Control and Prevention and the Advisory Committee on Childhood Lead Poisoning Prevention convened a workgroup of recognized experts to review the existing evidence for adverse effects of past and current maternal lead exposure on maternal health and fertility and on the developing fetus, infant, and child in prenatal and postnatal states and to propose evidence-based strategies for intervention.

These *Guidelines for the Identification and Management of Lead Exposure in Pregnant and Lactating Women* are based on scientific data and practical considerations regarding preventing lead exposure during pregnancy, assessment and blood lead testing during pregnancy, medical and environmental management to reduce fetal exposure, breastfeeding, and follow up of infants and children exposed to lead *in utero*.

The guidelines also outline a research agenda that will provide crucial information for future efforts to prevent and treat lead exposure during pregnancy and lactation. Further research is needed for a better understanding of lead's effect on pregnancy outcomes and infant development; lead kinetics across the placenta and in breast milk and their relationship to long-term health effects; genetic susceptibility to damage from lead; as well as the pharmacokinetics, effectiveness, and safety of chelating agents in the pregnant woman. Research is also needed to address important clinical and public health needs including validation of risk questionnaires for pregnant women, optimal timing of blood lead testing, and effective strategies for identification and treatment of pica in pregnant women.

I wish to thank the members of the Advisory Committee on Childhood Lead Poisoning Prevention, members of the Lead in Pregnancy Workgroup, and consultants who developed this document and acknowledge their contribution to the health of the nation's children. This document was voted on and approved with one abstention at the October 21-22, 2009, meeting of the Advisory Committee on Childhood Lead Poisoning Prevention. I believe this document represents a major advance in our efforts to prevent lead exposure in those most vulnerable.

Christopher Portier, PhD
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for Toxic Substances and Disease Registry
Centers for Disease Control and Prevention

EXECUTIVE SUMMARY

Despite improvements in environmental policies and significant reductions in U.S. average blood lead levels, lead exposure remains a concern for pregnant and lactating women, particularly among certain population subgroups at increased risk for exposure.

Recent National Health and Nutrition Examination Survey (NHANES) estimates suggest that almost 1% of women of childbearing age (15-44 years) have blood lead levels greater than or equal to 5 µg/dL (Centers for Disease Control and Prevention 2008, unpublished data). As documented in these guidelines, there is good evidence that maternal lead exposure during pregnancy can cause fetal lead exposure and can adversely affect both maternal and child health across a wide range of maternal exposure levels.

However, guidance for clinicians regarding screening and managing pregnant and lactating women exposed to lead has not kept pace with the scientific evidence. There are currently no national recommendations by any medical or nursing professional association that covers lead risk assessment and management during pregnancy and lactation. Currently, New York State, New York City, and Minnesota are the only jurisdictions that have issued lead screening guidelines and follow-up requirements for pregnant women by physicians or other providers of medical care. The lack of national recommendations about testing pregnant women and managing those identified with lead exposure above background levels has created confusion in the clinical and public health sectors. In response to this need, the Centers for Disease Control and Prevention (CDC) Advisory Committee on Childhood Lead Poisoning Prevention (ACCLPP) convened the Lead and Pregnancy Work Group to review the existing evidence for adverse effects of past and current maternal lead exposure on maternal health and fertility and on the developing fetus, infant, and child in prenatal and postnatal states. This document presents ACCLPP's summary of the evidence to date from human studies, conclusions, and CDC recommendations regarding

- prevention of lead exposure for pregnant and lactating women,
- risk assessment and blood lead testing of pregnant women,
- medical and environmental management,
- breastfeeding, and
- follow up of infants and children of mothers with blood lead levels exceeding national norms.

In instances where there is an absence of clear and convincing evidence, recommendations are based on the combined clinical, practical, and research experience of ACCLPP and work group members. This document also identifies research, policy, and health education needs to inform policy and improve care of pregnant and lactating women with lead exposure above background levels. The guidelines do not address all women of childbearing age, nor does it address male reproductive health issues associated with lead exposure.

The evidence that prenatal lead exposure impairs children's neurodevelopment, placing them at increased risk for developmental delay, reduced IQ, and behavioral problems, is convincing. The research also suggests, but is inconclusive, that fetal lead exposure at levels found in the United States results in low birth weight or adverse health conditions in adults who were exposed to lead *in utero*, among others. Further research is needed for a better understanding of several biomedical issues, including pregnancy outcomes and infant development associated with maternal lead exposure during pregnancy, lead kinetics across the placenta and in breast milk and their relationship to long-term health effects, genetic susceptibility to damage from lead, pharmacokinetics and effectiveness of chelating agents in the pregnant woman, among others. Research is also needed to address important clinical and public health needs, like validation of risk questionnaires for pregnant women, optimal timing of blood lead testing during pregnancy, and effective strategies for identification and treatment of pica in pregnant women.

This document provides guidance based on current knowledge regarding blood lead testing and follow-up care for pregnant and lactating women with lead exposure above background levels. Because there is no apparent threshold below which adverse effects of lead do not occur, CDC has not identified an allowable exposure level, level of concern, or any other bright line intended to connote a safe or unsafe level of exposure for either mother or fetus. Instead, CDC is applying public health principles of prevention in recommending follow-up blood lead testing and interventions when prudent. These guidelines recommend follow-up activities and interventions beginning at blood lead levels (BLLs) ≥5 µg/dL in pregnant women. Unlike the BLL level of concern of 10 µg/dL for children, which is a communitywide action level, a BLL of 5 µg/dL in pregnant women serves a different purpose: it flags the occurrence of prior or ongoing lead exposure above background levels, which may not otherwise be recognized. The vulnerability of a developing fetus to adverse effects and the possibility of preventing additional exposures postnatally justify intervention for pregnant women showing evidence of lead exposure above background levels.

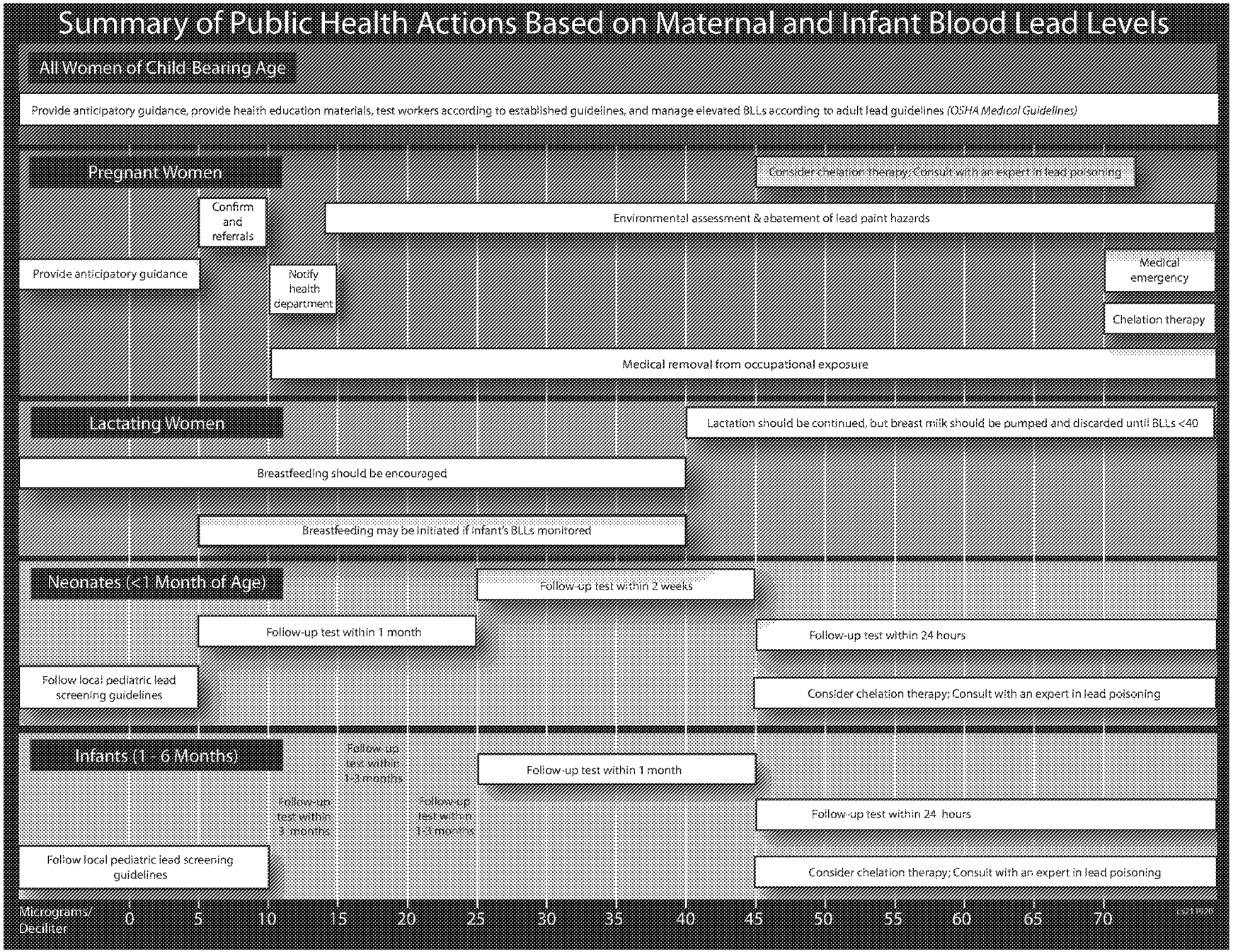
CDC does not recommend blood lead testing of all pregnant women in the United States. State or local public health departments should identify populations at increased risk for lead exposure and provide community-specific risk factors to guide clinicians in determining the need for population-based blood lead testing. Routine blood lead testing of pregnant women is recommended in clinical settings that serve populations with specific risk factors for lead exposure. Health care providers serving lower risk communities should consider the possibility of lead exposure in individual pregnant women by evaluating risk factors for exposure as part of a comprehensive occupational, environmental, and lifestyle health risk assessment of the pregnant woman, and perform blood lead testing if a single risk factor is identified. Assessment for lead exposure, based on risk factor questionnaires or blood lead testing, should take place at the earliest contact with the pregnant patient.

For all patients, but especially those with known lead exposures, health care providers should provide guidance regarding sources of lead and help identify potential sources of lead in the patient's environment. Risk factors for lead exposure above background levels in pregnant women differ from those described in young children. Important risk factors for lead exposure in pregnant women include recent immigration, pica practices, occupational exposure, nutritional status, culturally specific practices such as the use of traditional remedies or imported cosmetics, and the use of traditional lead-glazed pottery for cooking and storing food. Lead-based paint is less likely to be an important exposure source for pregnant women than it is for children, except during renovation or remodeling in older homes. Pregnant women with blood lead concentrations of 10 µg/dL or higher should be removed from occupational lead exposure.

Follow-up testing; increased patient education; and environmental, nutritional, and behavioral interventions are indicated for all pregnant women with blood lead levels greater than or equal to 5 µg/dL in order to prevent undue exposure to the fetus and newborns. Since lead exposure at these levels affects only approximately 1% of U.S. women of childbearing age, the recommendations in this guidance document should not significantly impact many individuals or clinical practices.

The essential activity in management of pregnant women with blood lead levels ≥5 µg/dL is removal of the lead source, disruption of the route of exposure, or avoidance of the lead-containing substance or activity. Source identification beyond obtaining a thorough environmental and occupational history should be conducted for BLLs ≥15 µg/dL in collaboration with the local health department, which will conduct an environmental investigation of the home environment in most jurisdictions and an investigation of the work environment (in some jurisdictions). Women who engage in pica behavior, regardless of the substance consumed, may benefit from nutritional counseling. Pregnant and lactating women with a current or past BLL ≥5 µg/dL should be assessed for the adequacy of their diet and provided with prenatal vitamins and nutritional advice emphasizing adequate calcium and iron intake. Chelation therapy during pregnancy or early infancy may be warranted in certain circumstances where the maternal or neonatal blood lead exceeds ≥45 µg/dL and in consultation with an expert in lead poisoning. Insufficient data exist regarding the advisability of chelation for

pregnant women with BLL <45 µg/dL. CDC recognizes the important benefits of breastfeeding for both the mother and child and considered the adverse health and developmental effects associated with lead exposure compared to those associated with not breastfeeding. The adverse developmental effects of ≥5 µg/dL in infant blood lead level was of greater concern than the risks of not breastfeeding. Thus, CDC encourages mothers with blood lead levels <40 µg/dL to breastfeed, however, mothers with higher blood lead levels are encouraged to pump and discard their breast milk until their blood lead levels drop below 40 µg/dL. These recommendations are made for the U.S. population and are not appropriate in countries where infant mortality from infectious diseases is high. Specific recommendations regarding appropriate follow-up blood lead testing of the mother and infant are provided.


Summary of Public Health Actions Based on Maternal and Infant Blood Lead Levels
All Women of Child-Bearing Age
Provide anticipatory guidance, provide health education materials, test workers according to established guidelines, and manage elevated BLLs according to adult lead guidelines (OSHA Medical Guidelines)
Pregnant Women
Consider chelation therapy; Consult with an expert in lead poisoning
Confirm and referrals
Environmental assessment & abatement of lead paint hazards
Provide anticipatory guidance
Notify health department
Medical emergency
Chelation therapy
Medical removal from occupational exposure
Lactating Women
Lactation should be continued, but breast milk should be pumped and discarded until BLLs <40
Breastfeeding should be encouraged
Breastfeeding may be initiated if infant's BLLs monitored
Neonates (<1 Month of Age)
Follow-up test within 2 weeks
Follow-up test within 1 month
Follow-up test within 24 hours
Follow local pediatric lead screening guidelines
Consider chelation therapy; Consult with an expert in lead poisoning
Infants (1 - 6 Months)
Follow-up test within 1-3 months
Follow-up test within 1 month
Follow-up test within 3 months
Follow-up test within 1-3 months
Follow-up test within 24 hours
Follow local pediatric lead screening guidelines
Consider chelation therapy; Consult with an expert in lead poisoning
Micrograms/ Deciliter
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70

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abatement: any set of measures designed to permanently eliminate lead-based paint or lead-based paint hazards.

ABLES: Adult Blood Lead Epidemiology and Surveillance program, a CDC-funded state-based program to track laboratory-reported BLLs in adults.

ACCLPP: CDC Advisory Committee on Childhood Lead Poisoning Prevention.

ACOG: American College of Obstetrics and Gynecology.

acute: having or experiencing a rapid onset and short duration.

AI (adequate intake): a recommended average daily nutrient intake level, based on estimations of average nutrient intakes by groups healthy people.

alternative medicines: for these guidelines, alternative medicines are defined as nonstandard therapies not sanctioned in modern Western medicine; typically from other countries; and usually unregulated in the United States, including folk, traditional, botanic, herbal, alternative, and complementary therapies, medicines, agents, and remedies (also "traditional medicines").

anemia: a condition in which there is a reduction of the number or volume of red blood cells or of the total amount of hemoglobin in the bloodstream

antenatal: occurring or existing before birth (also "prenatal").

antepartum: pertaining to the period before delivery or birth.

anticipatory guidance: practical information given to individuals to promote health before a certain milestone, such as pregnancy, is reached.

antioxidant: any substance that reduces damage due to oxygen in the body.

AOEC: Association of Occupational and Environmental Clinics.

apoptosis: a form of cell death in which a programmed sequence of events leads to the elimination of cells without releasing harmful substances into the surrounding area.

asymptomatic: without observable signs or reportable symptoms of illness.

at-risk populations: populations with characteristics, behaviors, or lifestyles (including home, work, and hobbies) that put them at increased risk for lead exposure.

ayurveda: one of India's traditional systems of medicine, involving a holistic system of healing and natural (herbal) medicines, that has been practiced for over 5,000 years.

bioavailable: readily absorbed and used by the body.

biokinetics: the study of movements of or within organisms.

biomarker (biological marker): a measure of exposure to lead, or other substance, that is measured in human tissue and corresponds to absorbed dose.

BLL (blood lead level): the concentration of lead in a sample of blood expressed in micrograms per deciliter (µg/dL) or micromoles per liter (µmol/L) (1 µg/dL = 0.048 µmol/L).

breast milk lead: levels of lead in breast milk; the concentration of lead in a sample of maternal breast milk is usually expressed in micrograms per liter (µg/L).

bone lead: long-lived stores of lead from past exposure that is accumulated in the body's skeletal system; measured in micrograms (µg) of lead/gram bone mineral.

bone mobilization or bone turnover: the process by which the body dissolves part of the bone in the skeleton in order to maintain or raise the levels of circulating calcium in the blood or for pathological reasons, such as immobilization, age-related osteoporosis, or hyperthyroidism.

bone resorption: the break down and wearing away of bone tissue that results in the release of bone minerals into circulation.

care coordination: the formal coordination of the care of a mother or infant with a BLL that exceeds a specific value and making available existing services as needed to the mother-infant pair.

case management: the follow-up care of a pregnant/lactating woman with a blood lead level ≥5 µg/dL, and her newborn infant, if necessary. Case management includes a) client identification and outreach, b) individual assessment and diagnosis, c) service planning and resource identification, d) linkage of clients to needed services, e) service implementation and coordination, f) monitoring of service delivery, g) advocacy, and h) evaluation.

casein: the main protein found in milk and other dairy products.

CDC (Centers for Disease Control and Prevention): part of the U.S. Department of Health and Human Services.

chelation therapy: the use of a chelating agent (chemical compounds that bind to metals) to remove toxic metals, such as lead, from the body.

chronic: being long-lasting and recurrent.

CI (confidence interval): an interval estimate that defines and upper and lower limit with an associated probability.

clearance standards: maximum allowable lead dust levels (established by the U.S. Department of Housing and Urban Development and the U.S. Environmental Protection Agency) on floors and interior window sills after a residence has undergone lead hazard control work.

CLPPP (Childhood Lead Poisoning Prevention Program): CDC-funded state or local program to prevent childhood lead poisoning.

conception: union of the sperm and the egg which marks the onset of pregnancy (also "fertilization").

confirmatory test: a venous blood lead test performed after a previous capillary, filter paper, or venous blood lead test to verify the results before interventions occur.

congenital anomaly: a structural or functional abnormality of the human body that develops before birth but is usually identified in the period just after birth or in early life.

contraindication: a condition that makes a particular treatment or medical procedure inadvisable.

creatinine: a chemical waste product generated from muscle processes that create and use energy in the human body; measured to determine if kidneys are functioning properly.

cumulative: increasing by successive additions over a period of time.

dyad: two individuals or units regarded as a pair, such as the mother-infant pair.

DRI (dietary reference intake): a set of dietary reference values introduced in the 1990s with the primary goal of preventing nutrient deficiencies, but also reducing the risk for chronic diseases such as osteoporosis, cancer, and cardiovascular disease.

EAR (estimated average requirement): nutrient intake levels expected to satisfy the needs of 50% of the people in a particular age group.

encephalopathy: any diffuse disease of the brain that alters brain function or structure. Lead exposure is one of many possible causes of encephalopathy. Lead encephalopathy is a life-threatening emergency associated with high blood lead levels and often characterized by coma, seizures, ataxia, apathy, bizarre behavior, and poor physical condition.

endogenous: developing or originating from within the body.

endothelium: a thin layer of cells that line the body's hollow organs including blood vessels.

environmental investigation: an investigation of the residence (or other place where person spends significant amounts of time) by trained personnel to identify lead hazards.

exchange transfusion: simultaneous withdrawal of the recipient's blood and transfusion with the donor's blood.

exogenous: developing or originating from outside the body.

EPA (U.S. Environmental Protection Agency; U.S. EPA): federal agency charged with protecting human health and the environment by writing and enforcing regulations based on laws passed by Congress.

FDA (U.S. Food and Drug Administration; U.S. FDA): federal agency responsible for assuring the safety, efficacy, and security of human and veterinary drugs, biological products, medical devices, the U.S. food supply, cosmetics, and products that emit radiation.

fecundity: the potential reproductive capacity of an organism or population, as measured by the number of reproductive cells capable of reproducing (e.g., eggs and sperm).

ferritin: the body's major iron-carrying protein, which is measured to monitor iron status.

fertility: the ability to conceive and have children through normal sexual activity.

Fetal Origins of Adult Disease (or Barker) hypothesis: the suggestion that prenatal adverse nutritional or environmental conditions affect fetal development and have lifelong health and developmental consequences.

fetus: the unborn human offspring from the end of the 8th week after conception (when the major structures have formed) until birth.

first trimester (of pregnancy): time period extending from the first day of the last menstrual period through 12 weeks of gestation. The first trimester is a critical window of fetal development that is important for the formation and development of organs and organ systems.

follow-up test: a blood lead test used to monitor the status of a person with a previously blood test indicating excessive exposure to lead.

gestation: period of time from conception to birth.

gestational age: the age of a fetus or newborn, counting from the time of fertilization, usually measured in weeks, and calculated from the first day of the last menstrual period.

gestational hypertension: a type of high blood pressure that first occurs during pregnancy.

hemoglobin: a protein in red blood cells that transports oxygen.

hematopoiesis: the formation or production of all types of blood cells.

HUD (U.S. Department of Housing and Urban Development): federal agency that develops and executes policies on housing and cities.

hyperuricemia: a buildup of excess uric acid (a waste product) in the blood.

immigration: the one-way inward movement of individuals into a population or population area, usually to a country or region, to which one is not originally born.

infant: a child in the earliest period of life (for the purposes of this document, from 0 to 6 months of age).

IOM (Institute of Medicine): a nonprofit agency established in 1970 under the charter of the National Academy of Sciences that provides independent, objective, evidence-based advice to policymakers, health professionals, the private sector, and the public.

interim controls: a set of measures designed to temporarily reduce human exposure to lead-based paint hazards.

in utero: "within the uterus" (womb) where the unborn baby develops.

iron deficiency: a disorder that occurs when there is not enough iron in the body, causing problems with red blood cell production, muscle function, and numerous other effects, including growth and developmental impairment.

K-x-ray fluorescence: a noninvasive (outside the body) technique for the measurement of lead in bone.

lactation: the period after childbirth when milk is produced and secreted from the mother's breasts to provide nourishment to the baby.

lead-based paint: paint or other surface coating that contains lead equal to or exceeding 1.0 milligram per square centimeter or 0.5 percent by weight (5,000 parts per million), as defined by 302(c) of the Lead-Poisoning Prevention Act (42 U.S.C. 4822(c)) and TSCA section 401(9) (15 U.S.C. 2681(9)).

lead-based paint hazard: any condition that causes exposure to lead from lead-contaminated dust, lead-contaminated soil, or lead-contaminated paint that is deteriorated or present in accessible surfaces, friction surfaces, or impact surfaces that would result in adverse human health effects as established by the appropriate federal agency.

lead-glazed ceramic pottery: ceramic ware or pottery manufactured mainly by artisans and small family businesses using a centuries-old tradition of low-temperature-fired lead glazes to vitrify the surface and color the objects, and often imported from Mexico and other countries.

lead-safe: housing or building units with no lead-based paint hazards as determined by a lead risk assessment or by dust sampling at the conclusion of lead hazard control activities.

lead-safe work practices: low-technology/best practices techniques, methods, and processes that minimize the amount of dust and debris created during the remodeling, renovation, rehabilitation, or repair of pre-1978 housing that are used to control, contain, and clean up lead dust and deteriorated lead-based paint hazards in a manner that protects both the workers and the occupants of the unit.

low birth weight: a baby that weighs less than 2,500 grams at birth.

LPWG (Lead and Pregnancy Work Group): subgroup of the CDC Advisory Committee on Childhood Lead Poisoning Prevention.

medical management: for this guidelines, medical management is the care provided by a health care provider to a pregnant/lactating woman or infant whose blood lead levels indicate exposure to lead above background levels. Medical management includes clinical evaluation for complications of lead exposure, family lead education and referrals, chelation therapy if appropriate, follow-up testing at appropriate intervals, and communication with local health department as necessary.

µg/dL (micrograms per deciliter): a unit of measure for blood lead concentration.

milk-to-plasma ratio: used to express the relative efficiency of passive transfer of a chemical from the blood into milk.

neonate: a newborn infant, less than 1 month of age.

neurodevelopment: normal growth and progression of the nervous system during the life of an organism, measurement of which usually incorporates aspects of intellectual and behavioral attainment.

normotensive: blood pressure in the normal range for a healthy individual given their age.

nutrient: substances that are vital to health and give us energy, growth, help repair body tissues, and regulate body functions. The two major nutrient groups are macronutrients (protein, carbohydrates, fat) and micronutrients (vitamins, minerals).

nutrition: the way the human body takes in and uses foods. Substances or ingredients in food that are sources of nutrition are called nutrients.

NHANES (National Health and Nutrition Examination Survey): a periodic assessment of the health and nutritional status of a representative sample of adults and children in the United States conducted by the CDC National Center for Health Statistics.

NIOSH (National Institute for Occupational Safety and Health): the part of CDC responsible for conducting research and making recommendations for the prevention of work-related illnesses and injuries.

OSHA (Occupational Safety and Health Administration): the main federal agency charged with promulgation and enforcement of safety and health regulations.

observational study: a type of study in which free-living individuals are observed and certain outcomes are measured with no attempt made to affect the outcome (for example, no treatment is given).

organogenesis: the formation of organs within a developing fetus that occurs within the first trimester of pregnancy (prior to 16 weeks gestation).

PCP (primary care provider): the health professional who oversees a patient's care, usually a physician, nurse practitioner, or physician's assistant.

pica: a pattern of deliberate ingestion of nonfood items.

placenta: a temporary organ joining the mother and fetus; it is attached to the wall of the uterus (womb) to transfer oxygen and nutrients to the baby during pregnancy.

plasma: the protein-containing fluid portion of the blood.

plasma lead: lead in the protein-containing fluid portion of the blood and available to cross cell membranes.

postnatal: the time period that occurs after birth, usually referring to the baby.

postpartum: the time period that occurs after birth, usually referring to the mother.

ppb (parts per billion): Represents the concentration of something in water or soil. One ppb represents one microgram of something per liter of water (µg/L), or one microgram of something per kilogram of soil (µg/kg).

ppm (parts per million): Represent the concentration of something in water or soil. One ppm represents one milligram of something per liter of water (mg/L) or 1 milligram of something per kilogram soil (mg/kg).

preeclampsia: a condition in pregnancy characterized by a sharp rise in blood pressure, protein in the mother's urine, and swelling of the hands and feet; this condition has negative consequences for both the mother and baby if not identified and treated promptly.

pregnancy: the period from conception to birth when a woman carries a developing fetus (baby) in her uterus (womb), usually lasting about 9 months (40 weeks).

pre- (or post-) menopause: before (or after) the end of a woman's reproductive years; regular menstrual periods stop in menopause.

preterm delivery: the birth of a baby before 37 weeks gestation.

prevalence: the proportion of individuals in a population having a specific health condition.

primary prevention: preventing a problem before it occurs. Primary prevention of lead poisoning eliminates lead sources before exposure, thus preventing exposure.

primigravid: a woman who is pregnant for the first time.

primiparous: relating to a woman who has given birth only once.

proteinuria: excess protein in the urine.

puberty: onset of the biological capacity for reproduction

RCT (randomized [placebo-controlled] clinical trial): a study in which participants are assigned by chance to different treatment groups and the outcomes between the groups are compared.

RD (registered dietician): a certified professional with the combined education and experience to conduct dietary assessments and advise clients on issues related to diet and nutrition.

RDA (recommended dietary allowance): used from 1941 until 1989 to evaluate food choices that would meet the nutrient requirements of groups or populations with the primary goal of preventing diseases caused by nutrient deficiencies.

renal: having to do with the kidneys.

renovation: construction and/or home or building improvement measures (e.g., window replacement, weatherization, remodeling, repairing).

risk factor questionnaire: a set of questions designed to elicit responses from an individual that can identify their characteristics that can increase that person's chances of, in these guidelines, being exposed to lead from various sources.

screening (blood lead screening): for lead poisoning, a laboratory test for lead that is performed on the blood of an asymptomatic person to determine if that person has evidence of lead exposure above background levels.

secondary prevention: responding to a problem after it has been detected. Secondary prevention of lead poisoning involves identifying persons with confirmed lead exposure and eliminating or reducing additional lead exposure.

spontaneous abortion (or miscarriage): the loss of a fetus before the 20th week of pregnancy.

Tanner scale or Tanner stage: used to define physical measurements of a child's development based on external primary and secondary sex characteristics, such as the size of the breasts or genitalia and development of pubic hair.

targeted screening: blood lead testing of some, but not all, individuals in a population or group designated as being at increased risk for lead exposure.

threshold: an established dose or level below which an effect does not occur.

TTDI (maximum total tolerable daily intake): a term used by the FDA to caution against excessive intake of nutrients that can be harmful in large amounts.

toxicokinetics: the fate and transport of chemicals in the human body.

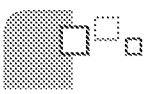
traditional medicines: see alternative medicines.

umbilical cord: the tubal structure (consisting of two arteries and one vein) that connects the fetus (baby) to the placenta, supplying blood, oxygen and nutrients to the baby during pregnancy.

universal screening: the blood lead testing of all persons in a population or group, such as pregnant women or city residents.

U.S. PHSTF (U.S. Preventive Health Services Task Force): An independent panel of experts in primary care and prevention that systematically reviews the evidence of effectiveness and develops recommendations for clinical preventive services.

WIC: Special Supplemental Nutrition Program for Women, Infants, and Children.



KEY POINTS

- Lead exposure remains a public health problem for certain groups of women of childbearing age and for the developing fetus and nursing infant. Prenatal lead exposure has known influences on maternal health and infant birth and neurodevelopmental outcomes.
- Bone lead stores are mobilized in pregnancy and lactation for women with prior lead exposure, which is a concern since lead released into maternal blood and breast milk can adversely affect the fetus or newborn.
- Certain population subgroups of women at increased risk for exposure have been identified and may be highly exposed, particularly the following: workers in certain occupations; foreign-born recent immigrants; and those practicing certain behaviors associated with lead exposure, such as pica or renovation of older homes.
- Identifying pregnant women with a history of lead poisoning or who are currently exposed to lead above background levels and preventing additional lead exposure can help prevent adverse health outcomes in these children.

Despite improvements in environmental policies and significant reductions in U.S. average population blood lead levels, lead exposure remains a concern for pregnant and lactating women among certain population subgroups at increased risk for exposure. There is increasing awareness that unintended exposures to environmental contaminants, such as lead, adversely affect maternal and infant health, including the ability to become pregnant, maintain a healthy pregnancy, and have a healthy baby. In the United States, women of childbearing age represent approximately 42% of the total population (American Community Survey 2004) and at any given time almost 9% are pregnant (Crocetti et al. 1990). In the 2003-2006 National Health and Nutrition Examination Survey (NHANES) survey, the 95th percentile for blood lead levels among women aged 15-49 was 2.4 micrograms per deciliter (µg/dL). As Figure 1-1 indicates, blood lead levels among women aged 15-49 have dropped substantially since the 1976-1980 NHANES. Recent NHANES estimates suggest that almost 1% of women of childbearing age (15-49 years) have blood lead levels greater than or equal to 5 µg/dL (Centers for Disease Control and Prevention 2008, unpublished data).

Lead exposure remains a public health problem for subpopulations of women of childbearing age and for the developing fetus and nursing infant for several important reasons. First, prenatal lead exposure has known influences on maternal health and infant birth and neurodevelopmental outcomes (Bellinger 2005). Research findings suggest that prenatal lead exposure can adversely affect maternal and child health across a wide range of maternal exposure levels. In addition, adverse effects of lead are being identified at lower levels of exposure than previously recognized in both child and adult populations (Canfield et al. 2003; Jusko et al. 2008; Lanphear et al. 2005; Menke et al. 2006; Navas-Acien et al. 2007; Tellez-Rojo et al. 2006).

Second, bone lead stores are mobilized during periods of increased bone turnover such as pregnancy and lactation. Over 90% of lead in the adult human body is stored in bone (Barry 1975; Barry and Mossman 1970), and may result in redistribution of cumulative lead stores from bone into blood during periods of heightened bone turnover, such as pregnancy and lactation (Gulson et al. 2003; Roberts and Silbergeld 1995). Since bone lead stores persist for decades, women and their infants may be at risk for continued exposure long after exposure to external environmental sources has been terminated.

Finally, there is evidence that a significant number of pregnant women, and presumably their infants, are being exposed to lead in the United States today. It is clear that exposed subgroups do exist and some may be highly exposed, particularly recent immigrants (Graber et al. 2006; Klitzman et al. 2002); workers in specific high-risk occupations (Calvert and Roscoe 2007); and those practicing certain behaviors, such as pica (Hackley and Katz-Jacobson 2003; Shannon 2003), use of culturally-specific remedies and products (Centers for Disease Control and Prevention 2004; Saper et al. 2004, 2008), and renovating older homes (Marino et al. 1990; Jacobs et al. 2002). Women living near hazardous wastes site or active smelters (Garcia-Vargas et al. 2001) and residents in countries still using leaded gasoline (Albalak et al. 2003) may also be highly exposed.

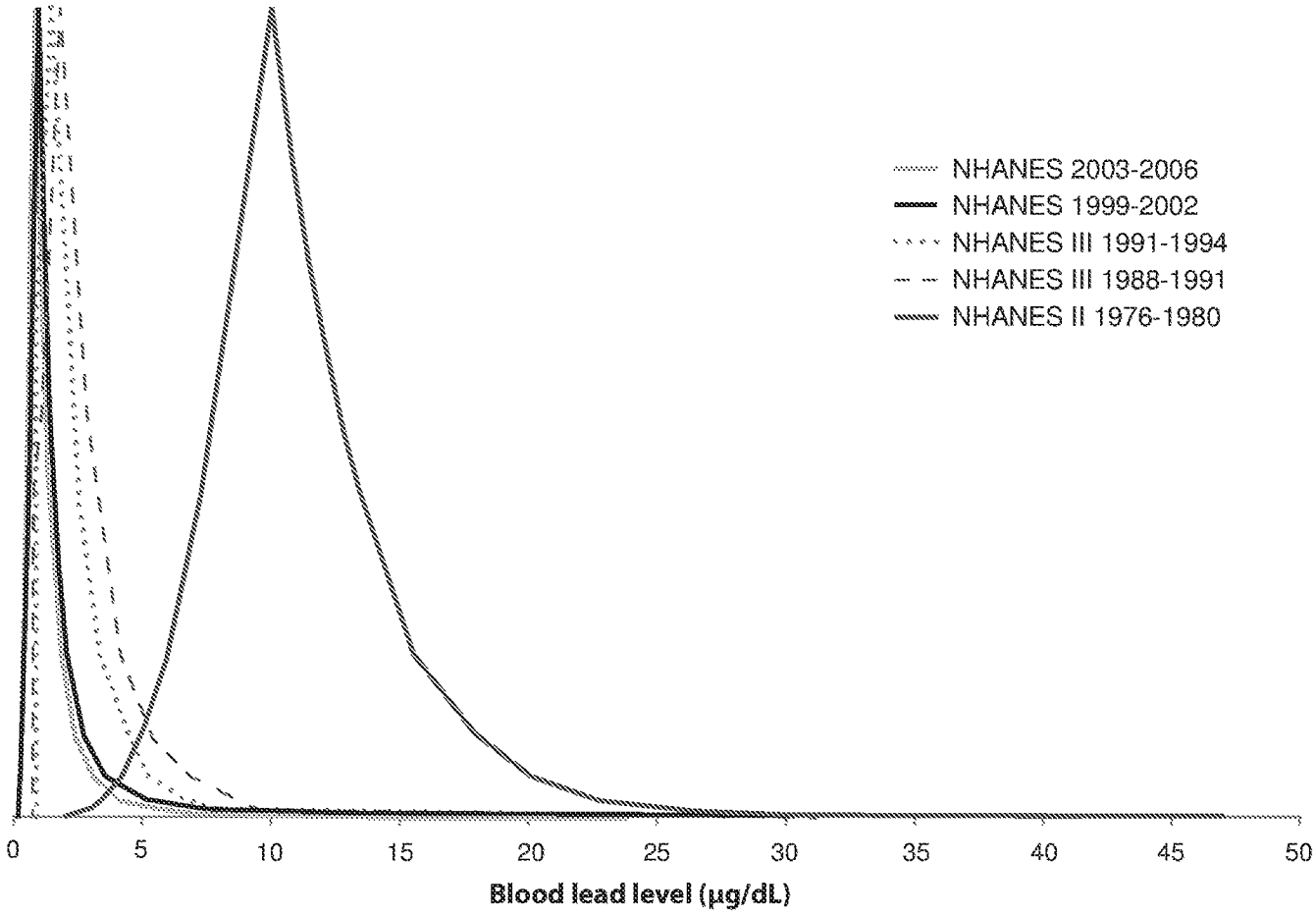
Although lead exposure remains an important potential risk to the fetus, until now, little emphasis has been placed on developing guidelines for prenatal health care providers and women of childbearing age. There are currently no national recommendations or guidelines by any obstetric, family practice, pediatric, or nursing groups that cover lead risk assessment and management during pregnancy and lactation. Currently, New York State, New York City, and Minnesota are the only jurisdictions known to have issued lead screening regulations and follow-up recommendations for pregnant women by physicians or other health care providers (Minnesota Department of Health 2004; New York City Department of Health and Mental Hygiene 2006) [see Appendix I]. Other states have considered implementation of similar regulations or guidelines, and federal legislation has also been proposed. However, scientific discussion in this area has been limited.

Because no national recommendations exist, the Centers for Disease Control and Prevention (CDC) and local and state lead poisoning prevention programs have not been able to consistently respond to concerns from medical providers about when to test pregnant or lactating women for lead exposure and how to manage pregnant or lactating women who have been identified with lead exposure above background levels that have resulted from widespread ambient lead contamination and naturally occurring lead in the earth's crust. In response to this need, the Lead and Pregnancy Work Group was convened in April 2004 by the CDC Advisory Committee on Childhood Lead Poisoning Prevention (ACCLPP) to review the existing evidence for adverse effects of past and current maternal lead exposure on maternal health and fertility and on the developing fetus, infant, and child, and to develop recommendations on blood lead testing and management for pregnant and lactating women with lead exposure above background levels.

For the purposes of the review of existing scientific literature, the work group was divided into three subgroups: Prevalence, Risk, and Screening; Maternal, Pregnancy, and Child Outcomes; and Management, Treatment, and Other Interventions. The subgroups were asked to review the literature, summarize findings, and address the issues outlined in Appendix II. These guidelines do not include findings from animal studies, except when there are limited human data and consistent findings confirmed from multiple animal studies.

This document presents ACCLPP's summary of the evidence, provides guidance for preventing and treating lead exposure in pregnant and lactating women, and identifies research, policy, and education needs to improve health outcomes and care provided to pregnant women and their infants. These guidelines do not address all women of childbearing age, nor do they address male reproductive health issues associated with lead exposure.

Figure 1-1. Distribution of Blood Lead Levels in U.S. Women of Childbearing Age (15-49 Years)



KEY POINTS

- For centuries, exposure to high concentrations of lead has been known to pose health hazards. Recent evidence suggests that chronic low-level lead exposure also has adverse health effects in both adults and children and no blood lead threshold level for these effects has been identified.
- CDC has not identified an allowable exposure level, level of concern, or any other bright line intended to connote a safe or unsafe level of exposure for either mother or fetus. Instead, CDC is applying public health principles of prevention to intervene when prudent.
- Epidemiologic and experimental evidence suggest that lead is a potent developmental toxicant, but many details regarding lead's mechanism of action have not been determined.
- Recent epidemiologic cohort studies suggest that prenatal lead exposure, even with maternal blood lead levels below 10 µg/dL, is inversely related to fetal growth and neurodevelopment independent of the effects of postnatal exposure, though the exact mechanism(s) by which low-level lead exposure, whether incurred prenatally or postnatally, might adversely affect child development remains uncertain.
- Lead may adversely impact sexual maturation in the developing female and may reduce fertility, but the scientific evidence is limited.
- Lead exposure has been associated with increased risk for gestational hypertension, but the magnitude of the effect, the exposure level at which risk begins to increase, and whether risk is more associated with acute or cumulative exposure, remain uncertain.
- Evidence is limited to support an association between blood lead levels from 10-30 µg/dL and spontaneous abortion. There are also few and inconsistent studies on the association between blood lead levels and preterm delivery.
- The available data are inadequate to establish the presence or absence of an association between maternal lead exposure and major congenital anomalies in the fetus.

INTRODUCTION

For centuries, exposure to high concentrations of lead has been known to pose health hazards. High levels of exposure can result in delirium, seizures, stupor, coma, or even death. Other overt signs and symptoms may include hypertension, peripheral neuropathy, ataxia, tremor, headache, loss of appetite, weight loss, fatigue, muscle and joint aches, changes in behavior and concentration, gout, nephropathy, lead colic, and anemia. In general, symptoms tend to increase with increasing blood lead levels. A substantial body of recent epidemiologic and toxicologic research demonstrates that multiple health effects can occur at low to moderate blood lead levels previously without recognized harm. Health effects of chronic low-level exposure in adults include cognitive decline, hypertension and other cardiovascular effects, decrements in renal function, and adverse reproductive outcome (Agency for Toxic Substances and Disease Registry 2007).

This chapter focuses on the effects of maternal lead exposure on reproductive health, maternal health, pregnancy outcome, infant growth, and child neurodevelopment. Although the studies described in this chapter

focus on maternal exposures, paternal influences may also influence reproductive outcomes. Issues related to male-mediated reproductive toxicity for lead have been reviewed elsewhere (Apostoli et al. 1998; Jensen et al. 2006). In these guidelines, the discussion of scientific literature focuses on findings in humans. However, there also exists an extensive body of literature on the health effects of lead in experimental animals, which, while not cited, generally supports the human data. The reader is referred to other sources (Agency for Toxic Substances and Disease Registry 2007; U.S. Environmental Protection Agency 2006) for recent reviews of the experimental animal data.

An area of active study is the relationship between toxic exposures (such as lead) and fetal programming of growth and chronic disease. According to the Barker hypothesis (Barker 1990), now known more broadly as "fetal origins of adult disease," poor development *in utero*—for example, low birth weight—increases the risk for obesity, hypertension, and cardiovascular disease during adulthood (Barker 1995; Khan et al. 2003). These epidemiologic findings highlight the importance of the intrauterine environment and are consistent with experimental evidence of long-term "programming" in early life. For example, because exposure to developmental toxicants, including lead, is associated with low birth weight, lead exposure to the fetus may increase the risk for later cardiovascular disease. Evidence supporting the fetal origins hypothesis is mounting rapidly (Ingelfinger and Schnaper 2005). However, evidence of effects from *in utero* lead exposure on adult disease are currently too limited to provide conclusive information.

IMPACT OF LEAD EXPOSURE ON SEXUAL MATURATION AND FERTILITY

Few studies have examined possible lead-related effects on sexual maturation and fertility. Delay in puberty is an important yet understudied health outcome that may be associated with relatively low blood lead levels. Two studies have examined this outcome using cross-sectional data from the third NHANES (NHANES III). Selevan et al. (2003) analyzed blood lead and pubertal development by race in girls ages 8-18 years of age. Blood lead levels as low as 3 µg/dL were associated with 2 to 6 month delays in Tanner stage measurements (breast and pubic-hair development) and menarche in African-American and Mexican-American girls, while Non-Hispanic white girls experienced non-statistically significant delays in all pubertal measures. Wu et al. (2003) found that higher blood lead levels were significantly associated with delayed attainment of menarche and pubic hair development, but not breast development, even after adjustment for race/ethnicity, age, family size, residence, income, and body mass index. The cross-sectional design of NHANES III limits the ability to assess the temporal relation between blood lead and markers of puberty.

The studies on time-to-pregnancy associated with lead exposure have not been conclusive. One study of time-to-pregnancy did not suggest adverse effects of lead on fecundity at maternal blood lead concentrations less than 29 µg/dL. However, above this level, an association with longer time-to-pregnancy was found, but this was based on eight subjects (Sallmen et al. 1995). In a study of environmental lead exposure and reproductive health in Mexico City, no association was observed between maternal blood lead levels (mean = 9 µg/dL) and time-to-pregnancy in the first year (Guerra-Tamayo et al. 2003). However, in the subset of women with blood lead levels above 10 µg/dL, the likelihood of not achieving pregnancy after one year was five times higher (95% confidence interval [CI] 1.9-19.1) compared to women with blood lead levels below 10 µg/dL.

Summary of Evidence: Sexual Maturation and Fertility

Although studies are limited, there is some suggestion that blood lead at relatively low levels may lead to alterations in onset of sexual maturation and reduced fertility. These findings underscore the importance of considering sensitive markers of human fecundity in relation to lead exposure and should be confirmed in studies that can address the methodologic limitations of previous research.

IMPACT OF LEAD EXPOSURE ON MATERNAL HYPERTENSION DURING PREGNANCY

There is some evidence that maternal physiologic parameters in pregnancy can be modulated by low levels of

lead exposure (Tabacova et al. 1994; Takser et al. 2005; Tellez-Rojo et al. 2004). However, the definitive relationship between lead exposure and maternal health outcomes in pregnancy is unclear. Lead is an established risk factor for hypertension in adults (Hertz-Picciotto and Croft 1993; Kosnett et al. 2007). Hypertension is one of the most common complications of pregnancy. There is substantial evidence that lead damages the vascular endothelium (Vaziri and Sica 2004) and that endothelial dysfunction is an important mediator of hypertension and preeclampsia in pregnancy (Karumanchi et al. 2005).

The most widely used classification of high blood pressure in pregnancy is that of the National High Blood Pressure Education Program Working Group (2000). This classification distinguishes between new hypertension arising during the pregnancy after 20 weeks (gestational hypertension) and preexisting hypertension (chronic hypertension).

It is important to differentiate between non-proteinuric hypertension and hypertension plus proteinuria (preeclampsia), as adverse clinical outcomes are more closely related to the latter. Severe hypertension usually defined as a systolic blood pressure of ≥180 mm Hg or diastolic blood pressure of ≥110 mm Hg, even in the absence of proteinuria, has been associated with adverse maternal and perinatal outcomes.

Gestational Hypertension

Hypertension in pregnancy is defined as a systolic blood pressure of 140 mm Hg or higher or diastolic pressure of 90 mm Hg or higher that occurs after 20 weeks gestation in a woman with previously normal blood pressure. Increasing levels of lead in blood have been associated with gestational hypertension. Among 3,851 women delivering at a Boston hospital from 1979-1981, incidence of pregnancy hypertension and elevated blood pressure at delivery increased significantly as blood lead increased (mean blood lead 6.9 ± 3.3 µg/dL). During delivery, lead levels correlated with both systolic (Pearson $r = 0.081$, $p = 0.0001$) and diastolic ($r = 0.051$, $p = 0.002$) blood pressure. Using a reference level of 0.7 µg/dL, the relative risk doubled when blood lead level approached 15. There was no association, however, between blood lead level and risk for preeclampsia in this study (Rabinowitz et al. 1987).

Rothenberg et al. (1999a) found that blood lead was a statistically significant predictor of maternal blood pressure among 1,627 women immigrants (mean blood lead 2.3 µg/dL) but not among nonimmigrants (mean blood lead 1.9 µg/dL).

In a cross-sectional analysis of third trimester primigravid women in Malta (N = 143), investigators compared normotensive women to those with gestational hypertension (Magri et al. 2003). Those with hypertension (mean blood lead 9.6 ± 6 µg/dL, N = 30) had significantly higher blood lead levels compared to normotensive controls (mean blood lead 5.8 ± 3 µg/dL, N = 93). A study of women with gestational age ranging from 30-41 weeks in Tehran, Iran, was conducted to assess the relationship between blood lead levels and gestational hypertension (Vigeh et al. 2004). Postpartum blood lead levels were significantly higher among 55 cases with hypertension (mean 5.7 ± 2.0 µg/dL) in comparison to 55 age-matched normotensive controls (mean 4.8 ±1.9 µg/dL).

The prevalence of gestational hypertension has been shown to be increased even at blood lead levels less than 5 µg/dL. Sowers et al. (2002) studied a cohort of 705 women aged 12-34 years who presented for prenatal care at one of three clinics in New Jersey with with mean (standard error) blood lead level equal to 1.2 ± 0.03 µg/dL and found maternal blood lead significantly associated with gestational hypertension.

Associations have also been found between gestational hypertension and bone lead. Rothenberg et al. (2002) reported on a prospective cohort study of 1,006 women aged 16-44 years enrolled during their third trimester in south central Los Angeles. This study included postpartum measures of tibia and calcaneus bone lead in addition to maternal blood lead levels. They found that each 10 µg/g increase in calcaneus bone lead (range -30.6 to 49.9 µg/g) was associated with an almost two-fold increased risk for third-trimester hypertension, a

0.70-mm Hg increase in third-trimester systolic blood pressure, and a 0.54-mm Hg increase in third-trimester diastolic blood pressure.

Preeclampsia

Preeclampsia, a pregnancy-specific disorder associated with increased maternal and perinatal morbidity and mortality, is defined as a) systolic blood pressure ≥140 mm Hg and/or diastolic blood pressure ≥90 mm Hg beginning after the 20th week of gestation and b) proteinuria ≥300 mg per 24 hours. Preeclampsia is usually associated with edema, hyperuricemia, and a fall in glomerular filtration rate. Blood lead levels have been associated with the risk for preeclampsia, although the evidence is less clear than for gestational hypertension. Dawson et al. (2000) observed significant differences between normotensive (N = 20) and hypertensive or preeclamptic (N = 19) pregnancies with respect to red blood cell lead content. They found maternal blood pressure to be directly proportional to RBC lead content; however, the selection criteria and study population in this small group at increased risk are not well-defined, so selection bias and confounding cannot be ruled out.

In the 2004 study by Vigeh et al. noted above, there were no significant differences in blood lead concentrations among hypertensive subjects with proteinuria (N = 30) and those without proteinuria (N = 25). In another study by Vigeh et al. (2006), among 396 postpartum women in Tehran, 31 with preeclampsia had significantly higher blood lead levels (mean 5.09 ± 2.01 µg/dL) compared to 365 normotensive controls (mean 4.82 ± 2.22 µg/dL) and significantly higher umbilical cord blood lead levels (mean 4.30 ± 2.49 µg/dL compared to 3.5 ± 2.09 µg/dL) (Vigeh et al. 2006). A 13-fold increased risk for preeclampsia compared to normotensive controls (mean blood lead 3.52 ± 2.09 µg/dL) was observed for every log-unit increase (~3 µg/dL) in blood lead. The 1987 study by Rabinowitz et al. of 3,851 women delivering in Boston found no association between blood lead level and risk for preeclampia (Rabinowitz et al. 1987).

Summary of the Evidence: Effects on Maternal Hypertension

Gestational hypertension and preeclampsia have been associated with adverse maternal and perinatal outcomes. Lead exposure has been associated with increased risk for gestational hypertension but the magnitude of the effect, the exposure level at which risk begins to increase, and whether risk is most associated with acute or cumulative exposure, remain uncertain. It is unclear whether lead-induced increases in blood pressure during pregnancy lead to severe hypertension or preeclampsia. However, even mild gestational hypertension can be expected to lead to increased maternal and fetal monitoring, medical interventions, and additional health care costs. Also, causality is unclear since preexisting hypertension reduces renal function, which in turn could result in the retention of lead.

IMPACT OF LEAD EXPOSURE ON PREGNANCY OUTCOMES

Spontaneous Abortion

There is consistent evidence that the risk for spontaneous abortion is increased by maternal exposure to high levels of lead. In her review of studies on the association between elevated blood lead levels and spontaneous abortion, Hertz-Picciotto (2000) includes a detailed summary of studies involving high blood lead levels, which come primarily from the literature on industrial exposures in Europe during the 19th century. Yet few studies have addressed the risk for spontaneous abortion at lower levels of exposure. Of those studies that have addressed this issue, most reports provide limited evidence to support an association between maternal blood lead levels of 0 to 30 µg/dL and increased risk for spontaneous abortion (Laudanski et al. 1991; Lindbohm et al. 1992; McMichael et al. 1986; Murphy et al. 1990; Tabacova and Balabaeva 1993). However, the lack of evidence for an association at these low-to-moderate blood lead levels may be due to methodologic deficiencies in these studies, such as small sample sizes, lack of control for confounding, problems in case ascertainment, and/or limitations in exposure assessment (Hertz-Piccioto 2000).

The strongest evidence to date is a prospective study of pregnant women in Mexico City, which addressed most of the deficiencies of the prior studies and demonstrated a statistically significant dose-response relationship between maternal blood lead levels (average 11.0 µg/dL) and risk for spontaneous abortion (Borja-Aburto et al. 1999). Odds ratios for spontaneous abortion for the blood lead groups 5-9, 10-14, and >15 µg/dL were 2.3, 5.4, and 12.2, respectively, in comparison to the reference group (<5 µg/dL) (p for trend = 0.03) with an estimated increased odds for spontaneous abortion of 1.8 (95% CI = 1.1–3.1) for every 5 µg/dL increase in blood lead. In another study of pregnant women (N = 207) from Mexico City (mean BLL 6.2 µg/dL), a 0.1% increment in the maternal plasma-to-blood lead ratio was associated with a 12% greater incidence of reported history of spontaneous abortion (p = 0.02) (Lamadrid-Figueroa et al. 2007). On average, women with no spontaneous abortions had higher blood lead levels than women with one or more reported spontaneous abortions (6.5 vs. 5.8 µg/dL); however, with each additional abortion experienced, women had an 18% greater plasma-to-blood lead ratio on average (p < 0.01). Women with a larger plasma-to-whole blood lead ratio may be at higher risk for miscarriage due to a greater availability of lead in plasma, which more readily crosses the placental barrier.

Preterm Delivery, Low Birth Weight, Length, and Head Circumference

Andrews et al. (1994) reviewed the epidemiologic literature through the early 1990s on prenatal lead exposure in relation to gestational age and birth weight. These studies are somewhat contradictory, most likely due to methodologic differences in study design, sample size, and/or degree of control for confounding. The more recent and well-designed studies suggest that maternal lead exposure during pregnancy is inversely related to fetal growth, as reflected by duration of pregnancy and infant size. Irgens et al. (1998), using a registry-based approach, found that women occupationally exposed to lead were more likely to deliver a low birth weight infant than women not exposed to lead (odds ratio [OR] = 1.1, 95% CI = 0.98–1.29). A case-control study in Mexico City found cord blood lead to be higher in preterm infants (mean 9.8 µg/dL) compared to term infants (mean 8.4 µg/dL) (Torres-Sanchez et al. 1999). A birth cohort study, also conducted in Mexico City, found maternal bone lead burden to be inversely related to birth weight (Gonzalez-Cossio et al. 1997) and birth length and head circumference at birth (Hernandez-Avila et al. 2002). A study by Rothenberg et al. (1999) among Mexican-Americans found that over the 1–35 µg/dL range of maternal blood lead at 36 weeks of pregnancy, the estimated reduction in 6-month infant head circumference was 1.9 cm (95% CI = 0.9–3.0 cm).

Congenital Anomalies

Very few studies have examined maternal lead exposure and risk for congenital malformations and, with one exception, none included biologic measures of lead exposure. Needleman et al. (1984) conducted a record review and reported an association between cord blood lead and minor congenital anomalies, but major anomalies did not show a similar association. In a case-control study, Bound et al. (1997) found an increased risk between living in an area with water lead levels greater than 10 µg/L (ppb) and delivering a child with a neural tube defect. Irgens et al. (1998) found, in a registry-based study, women occupationally exposed to lead were more likely to deliver an infant with a neural tube defect than women not exposed to lead (OR = 2.87, 95% CI = 1.1–6.4). In a case-control study conducted within the Baltimore-Washington Infant Study (Jackson et al. 2004), an association was observed between maternal occupational lead exposure and total anomalous pulmonary venous return although this relationship was not statistically significant (OR = 1.57, 95% CI = 0.64–3.47).

Summary of the Evidence: Pregnancy Outcomes

Overall, increased risk for spontaneous abortion appears to be associated with blood lead levels ≥30 µg/dL. Limited evidence suggests that maternal blood lead levels less than 30 µg/dL could also increase the risk for spontaneous abortion, although these findings remain to be confirmed in further research. Maternal lead exposure may increase the risk for preterm delivery and low birth weight, although data are limited and a blood lead level at which the risks begin to increase has not been determined. The available data are inadequate to establish the presence or absence of an association between maternal lead exposure and major congenital anomalies in the fetus.

IMPACT OF LEAD EXPOSURE ON INFANT GROWTH AND NEURODEVELOPMENT

Infant Growth

Few studies have investigated the effects of prenatal lead exposure on infant growth. Two studies suggest an association between maternal lead exposure and decreased growth. In one study, maternal bone lead levels were negatively associated with infant weight at one month of age and with postnatal weight gain between birth and 1 month (Sanin et al. 2001). In another study, postnatal linear growth rate was negatively related to prenatal blood lead level, although only when infants' postnatal lead exposure was elevated (Shukla et al. 1989). Infants born to a mother with prenatal blood lead concentration greater than 7.7 µg/dL (the median level in the cohort) and whose blood lead increased 10 µg/dL between 3 and 15 months of age were about 2 cm shorter at 15 months of age ($p = 0.01$). Greene and Ernhart (1991) also reported negative associations between prenatal lead level and birth weight, birth length, and head circumference, although none were statistically significant. Data on the association between prenatal lead exposure and infant growth is limted and thus inconclusive.

Lead and Neurodevelopment

Neurotoxic effects of lead are observed during episodes of acute lead poisoning in both children and adults. It remains unclear, however, whether prenatal or postnatal lead exposure is more detrimental to neurodevelopment. A number of chemicals, including lead, have been shown, in experimental animal models as well as in humans, to cause morphological changes in the developing nervous system (Costa et al. 2004). Given the incomplete blood-brain barrier in the developing nervous system, children might be more susceptible to insults during the prenatal and early postnatal periods (Bearer 1995; Rodier 1995; Weiss and Landrigan 2000).

Animal research indicates that the central nervous system is the organ system most vulnerable to developmental chemical injury (Rodier 2004), with vulnerabilities that pertain to processes critical to neurodevelopment, such as the establishment of neuron numbers; migration of neurons; establishment of synaptic connections, neurotransmitter activity, receptor numbers; and deposition of myelin. Neurons begin forming even before the neural tube closes. Most cerebral neurons form during the second trimester of gestation and migrate to their adult location well before birth (Goldstein 1990). Neuronal connections, however, are sparse at birth compared to adulthood. During the first 24 months of life, synaptic density and cerebral metabolic rate increase dramatically and by age 3 years are two-fold greater than those in the adult. The proliferation of synapses (synaptogenesis) is critical for the formation of basic circuitry of the nervous system (Rodier 1995). Synaptic "pruning" during early childhood establishes the final number of neurons.

Lead is known to interfere with synaptogenesis and, perhaps, with pruning (Goldstein 1992). It interferes with stimulated neurotransmitter release at synapses in the cholinergic, dopaminergic, noradrenergic, and GABergic systems (Cory-Slechta 1997; Guilarte et al. 1994). It substitutes for calcium and zinc as a second messenger in ion-dependent events. These disturbances in neurotransmitter release would thus be expected to disrupt the normal organization of synaptic connections (Bressler and Goldstein 1991).

The brain is protected from large molecular compounds in the blood by the blood-brain barrier, created by tight junctions between endothelial cells in cerebral blood vessels (Goldstein 1990). The development of this barrier function begins *in utero* and continues through the first year of life (Goldstein 1990). The brain is one of the target organs for lead and lead exposure *in utero* and the first year of life may dirupt the development of the blood-brain barrier.

These lead-induced biochemical disturbances in the brain are accompanied by impaired performance on a wide variety of tests of learning and memory in a variety of animal models and no threshold for these impairments has been identified (White et al. 2007).

Epidemiologic Evidence for Neurodevelopmental Effects of Lead

A large number of studies provide convincing evidence that prenatal lead exposure impairs children's neurodevelopment (Table 2-1). In most of the early prospective studies, many children had prenatal exposures exceeding 10 µg/dL. Several studies reported significant inverse associations with neurobehavior (Bellinger et al. 1987; Dietrich et al. 1987a,b; Ernhart et al. 1987; Shen et al. 1998; Wasserman et al. 2000). One study found that the early developmental delays were largely overcome if postnatal lead exposures were low in the preschool years, but appeared to be more persistent among children whose postnatal blood lead levels were also greater than 10 µg/dL (Bellinger et al. 1990). Other studies found that the effects of prenatal exposure were independent of changes in postnatal blood lead levels (e.g., Wasserman et al. 2000). These inverse associations persisted into adolescence and beyond, as maternal blood lead levels during pregnancy predicted teenage attention and visuoconstruction abilities (Ris et al. 2004), teenage self-reported delinquent behaviors (Dietrich et al. 2001), and increased arrest rates between the ages of 19 and 24 (Wright et al. 2008). A relationship between prenatal blood lead levels and the onset of schizophrenia between the late teens and early 20s is also seen (Opler et al. 2004, 2008). Some studies, however, did not find evidence of prenatal lead effects (e.g., Baghurst et al. 1992; Bellinger et al. 1992; Cooney et al. 1989a, 1989b; Dietrich et al. 1990, 1993; Ernhart et al. 1989; McMichael et al. 1988).

More-recent prospective studies have included children with lower prenatal exposures, and continue to detect inverse associations with neurodevelopment. Wasserman et al. (2000) found independent adverse effects of both prenatal and postnatal blood lead on IQ among Yugoslavian children age 3-7 years. Prenatal lead exposure was associated with a deficit of 1.8 IQ points for every doubling of prenatal maternal blood lead after controlling for postnatal exposure and other covariates. In a study conducted in Mexico City, Gomaa et al. (2002) found that umbilical cord blood lead and maternal bone lead levels were independently associated with covariate-adjusted scores at 2 years of age on the Mental Development Index score of the Bayley Scales of Infant Development with no evidence of a threshold. Maternal blood lead level early in the second trimester and in the third trimester was a significant predictor for some measures of mental and psychomotor development at age 2 years (Wigg et al. 1988). In another study in Mexico City, maternal plasma lead level in the first trimester was a particularly strong predictor of neurodevelopment at age 2 years (Hu et al. 2006). When this cohort was assessed at 24 months, inclusion of umbilical cord blood lead level in the model indicated that it was a significant predictor of psychomotor development even when analyses were restricted to children whose lead levels never exceeded 10 µg/dL (Tellez-Rojo et al. 2006). Schnaas et al. (2006) found that prenatal lead exposure around 28-36 weeks gestation (third trimester) was a stronger predictor of reduced intellectual development at ages 6–10 years than second trimester (12-20 weeks) exposure, but that study did not measure prenatal exposure in the first trimester of pregnancy. Jedrychowski et al. (2008) found a higher risk of scoring in the high-risk group on the Fagan Test of Infant Intelligence at age 6 months when umbilical cord blood was higher. Low-level umbilical cord blood lead levels can also negatively impact responses to acute stress (Gump et al. 2008).

In another study conducted in Mexico City, third trimester increases in maternal blood lead levels were associated with decreased ability of newborns to self-quiet and be consoled during the first 30 days of life (Rothenberg et al. 1989). In addition, greater prenatal and perinatal lead exposure was associated with altered brainstem auditory evoked responses (Rothenberg et al. 1994, 2000).

Threshold Levels and Persistence of Effects

No threshold has been found for the adverse effects of lead on neurodevelopment (Centers for Disease Control and Prevention 2004). Recent evidence, in fact, suggests that the dose-effect relationship might be supralinear, with steeper dose responses at levels below 10 µg/dL than above 10 µg/dL (Bellinger and Needleman 2003; Canfield et al. 2003; Jusko et al. 2008; Kordas et al. 2006; Lanphear et al. 2000; Tellez-Rojo et al. 2006). In the largest study of this issue, Lanphear et al. (2005) pooled data on 1,333 children who participated in seven

international population-based longitudinal cohort studies and were followed from birth or infancy until 5-10 years of age. Among children with a maximal blood lead level <7.5 µg/dL, the decline in full-scale IQ for a given increase in blood lead was significantly greater than the decline observed among children with a maximal level ≥7.5 µg/dL. Nonlinear relationships were also detected in the Yugoslavia (Wasserman et al. 2000) and Mexico City (Schnaas et al. 2006) studies which suggest that the effects of prenatal exposure may also be more pronounced at blood lead levels less than 10 µg/dL.

Evidence from several of the prospective studies suggests that the adverse effects of early childhood lead exposure on neurodevelopment persist into the second decade of life (Bellinger et al. 1992; Fergusson et al. 1997; Ris et al. 2004; Tong et al. 1996; Wasserman et al. 2000) and are unrelated to changes in later blood lead level (Burns et al. 1999; Tong et al. 1998;). Administration of the chelating agent succimer to children with blood lead levels of 20-44 µg/dL did not prevent or reverse neurodevelopmental toxicity (Dietrich et al. 2004; Rogan et al. 2001).

Summary of the Evidence: Infant Growth and Neurodevelopment

Data on the association between prenatal lead exposure and infant growth are limted and thus inconclusive. The findings of recent cohort studies offer suggest that prenatal lead exposure at maternal blood lead levels below 10 µg/dL is inversely related to neurobehavioral development independent from the effects of postnatal exposure. While the lead-associated differences in test score are small when viewed as a potential change in an individual child's score, they acquire substantially greater importance when viewed as a shift in the mean score within a population (Bellinger 2004). The mechanism(s) by which low-level lead exposure, whether incurred prenatally or postnatally, might adversely affect neurobehavioral development remains uncertain, although experimental data support the involvement of many pathways.

Because there is no apparent threshold below which adverse effects of lead do not occur, CDC has not identified an allowable exposure level, level of concern, or any other bright line intended to connote a safe or unsafe level of exposure for either mother or fetus. Instead, CDC is applying public health principles of prevention to intervene when prudent. Specific recommendations are presented throughout the rest of these guidelines.

Table 2-1. Summary of Studies Estimating Association of Prenatal Lead Exposure with Neurodevelopmental Effects

Year	Study	Study Site	Study Type	N	Estimate of Prenatal Exposure Measured	Lead Levels (in µg/dL)	Outcome Measure(s)	Age at Outcome	Results
2008	Low-level prenatal and postnatal blood lead exposure and adrenocortical responses to acute stress in children (Gump et al. 2008)	Oswego, NY	Cohort study	154	Umbilical cord blood lead level (BLL)	Range: <1.0-6.3	Cortisol response to acute stress (the glucocorticoid product of hypothalamic–pituitary–adrenal (HPA) activation)	9.5 years	Relatively low prenatal blood lead levels, e.g., BLL <10 µg/dL, can alter adrenocortical response to acute stress.
2008	Prenatal low-level lead exposure and developmental delay of infants at age 6 months (Krakow inner city study) (Jedrychowski et al. 2008)	Krakow, Poland	Cohort study	452	Umbilical cord BLL	Mean cord BLL 1.42, 95% CI = 1.35–1.48	Fagan Test of Infant Intelligence (FTII)	6 months	Estimated risk for scoring in high-risk group of developmental delay (FTII classification 3) due to higher lead blood levels was two-fold greater (odds ratio [OR] = 2.33, 95% confidence interval [CI] = 1.32–4.11) than for lower lead blood levels after adjusting for potential confounders (gestational age, gender of the child, and maternal education).
2008	Prenatal exposure to lead, delta-aminolevulinic acid, and schizophrenia: further evidence (Opler et al. 2008)	Oakland, CA, Providence, RI, and Boston, MA	Pooled case control	200 (119 from Oakland, 81 from New England)	Maternal delta-ALA from second trimester frozen blood samples	Dichotomized to estimated (from delta-aminolevulinic acid [ALA]) maternal BLLs in 2nd trimester of ≥15 or <15	Schizophrenia (includes schizophrenia, schizoaffective disorder schizophrenia, schizotypal personality disorder, delusional disorder, and nonaffective psychoses not otherwise specified)	15-22 years (not included in this report, but from Opler et al. [2004])	OR for schizophrenia associated with exposure, corresponding to 15 µg/dL of blood lead was 1.92 (95% CI = 1.05-3.87, p = 0.03).

Year	Study	Study Site	Study Type	N	Estimate of Prenatal Exposure Measured	Lead Levels (in µg/dL)	Outcome Measure(s)	Age at Outcome	Results
2008	Association of prenatal and childhood blood lead concentrations with criminal arrests in early adulthood (Wright et al. 2008)	Cincinnati, OH	Cohort study	250	Maternal prenatal BLL at 1st or early 2nd trimester	Mean (standard deviation [SD]) BLL = 8.3 (3.8); Median 7.8 (5th to 95th percentile 2.9–16).	Number of criminal arrests since turning 18 years of age	19-24 years	Increased arrest rates associated with prenatal BLL, relative risk (RR) = 1.40 (95% CI = 1.07 – 1.85).
2006	Fetal lead exposure at each stage of pregnancy as a predictor of infant mental development (Hu et al. 2006)	Mexico City, Mexico	Cohort study	146	Maternal prenatal plasma lead	Plasma lead mean (SD): 1st trimester 0.016 (0.014), N = 119; 2nd trimester 0.014 (0.011), N = 136; 3rd trimester 0.016 (0.024), N = 132	Bayley Mental Development Index (MDI)	24 months	Single-trimester models of MDI scores suggested a negative relationship between prenatal lead and MDI at 24 months adjusting for covariates. Maternal plasma lead in 1st trimester most strongly associated with MDI (β = −4.13, p = 0.03)
2006	Fetal lead exposure at each stage of pregnancy as a predictor of infant mental development (Hu et al. 2006)	Mexico City, Mexico	Cohort study	146	Maternal prenatal BLL	BLL mean (SD): 1st trimester 7.1 (5.1), N = 119; 2nd trimester 6.1 (3.2), N = 136; 3rd trimester 6.9 (4.2), N = 132; delivery 7.3 (4.3), N = 111	Bayley MDI	24 months	Single-trimester models of MDI scores suggested a negative relationship between prenatal lead and MDI at 24 months adjusting for covariates. Maternal blood lead in 1st trimester most strongly associated with MDI (β = −3.77, p = 0.03).
2006	Fetal lead exposure at each stage of pregnancy as a predictor of infant mental development (Hu et al. 2006)	Mexico City, Mexico	Cohort study	146	Umbilical cord BLL	Umbilical cord lead (mean 6.2 SD 3.9) (for N = 83 only)	Bayley MDI	24 months	Umbilical cord blood lead was not statistically significantly associated with MDI (β = −0.35, p = 0.88), but this exposure measure was only available on a subset of subjects.

Year	Study	Study Site	Study Type	N	Estimate of Prenatal Exposure Measured	Lead Levels (in µg/dL)	Outcome Measure(s)	Age at Outcome	Results
2006	Reduced intellectual development in children with prenatal lead exposure (Schnaas et al. 2006)	Mexico City, Mexico	Cohort study	150	Maternal BLL (12-20 weeks)	Geometric mean 8.2; 3.0–20.7, 5th-95th percentile	Full-scale IQ (FSIQ) as assessed using the Wechsler Intelligence Scale for Children–Revised (WISC-R; Spanish version) under standardized conditions	6-10 years	Multivariate regression analysis showed IQ reduction associated with BLL increase (β = -1.45, 95% CI = -4.75 to 2.00), but was not statistically significant (p = 0.42).
2006	Reduced intellectual development in children with prenatal lead exposure (Schnaas et al. 2006)	Mexico City, Mexico	Cohort study	150	Maternal BLL (28-36 weeks)	Geometric mean 7.8; 2.5–24.6, 5th-95th percentile	FSIQ as assessed using WISC-R; Spanish version under standardized conditions	6-10 years	Multivariate regression analysis showed IQ reduction associated with BLL increase (β = -4.00, 95% CI = -6.37 to -1.65) and was statistically significant (p = 0.001).
2006	Reduced intellectual development in children with prenatal lead exposure (Schnaas et al. 2006)	Mexico City, Mexico	Cohort study	112	Maternal BLL (at delivery)	Not reported	FSIQ as assessed using WISC-R; Spanish version under standardized conditions	6-10 years	Multivariate regression analysis showed IQ reduction associated with BLL increase (β = -1.29, 95% CI = -4.41 to 1.83) but was not statistically significant (p = 0.41).
2006	Reduced intellectual development in children with prenatal lead exposure (Schnaas et al. 2006)	Mexico City, Mexico	Cohort study	109	Umbilical cord BLL	Not reported	FSIQ as assessed using WISC-R; Spanish version under standardized conditions	6-10 years	Multivariate regression analysis showed IQ reduction associated with BLL increase (β = -0.95, 95% CI = -3.65 to 1.75) but was not statistically significant (p = 0.49).

Year	Study	Study Site	Study Type	N	Estimate of Prenatal Exposure Measured	Lead Levels (in µg/dL)	Outcome Measure(s)	Age at Outcome	Results
2004	Prenatal lead exposure, delta-aminolevulinic acid, and schizophrenia (Opler et al. 2004)	Oakland, CA	Nested case control	119	Maternal delta-ALA from 2nd trimester frozen blood samples	Dichotomized to estimated (from delta-ALA) maternal BLLs in 2nd trimester of ≥15 and <15	Schizophrenia (includes schizophrenia, schizoaffective disorder schizophrenia, schizotypal personality disorder, delusional disorder, and nonaffective psychoses not otherwise specified)	15-22 years	OR for schizophrenia associated with exposure, corresponding to 15 µg/dL of blood lead was 2.43 (95% CI = 0.99-5.96; p = 0.051).
2004	Early exposure to lead and neuropsychological outcome in adolescence (Ris et al. 2004)	Cincinnati, OH	Prospective cohort study	195	Prenatal maternal BLL	Mean BLL 4-35	Neuropsychological measures: memory, learning/ IQ, attention, visuoconstruction, and fine-motor	15-17 years	Prenatal BLL associated with decreased neuropsychological measures in the attention and visuoconstructional domains at mid-adolescence.
2002	Maternal bone lead as an independent risk factor of fetal neurotoxicity: a prospective study (Gomaa et al. 2002)	Mexico City, Mexico	Prospective cohort study	197	Maternal tibia bone lead 1 month after delivery (cortical bone)	Mean 11.5, SD 11.0, range <1-85.9	MDI and Psychomotor Development Index (PDI) scores as assessed using the Bayley Scales of Infant Development II (BSID-II; Spanish version)	24 months	Higher tibia lead levels were associated with lower MDI scores, but this association was not statistically significant.
2002	Maternal bone lead as an independent risk factor of fetal neurotoxicity: a prospective study (Gomaa et al. 2002)	Mexico City, Mexico	Prospective cohort study	197	Maternal patella bone lead 1 month after delivery (trabecular bone)	Mean 17.9, SD 5.2, range <1-76.6	MDI and PDI scores as assessed using BSID-II; Spanish version	24 months	In relation to the lowest quartile of trabecular bone lead, the 2nd, 3rd, and 4th quartiles were associated with 5.4 (p = 0.05), 7.2 (p = 0.01) and 6.5 (p = 0.02) point decrements in adjusted MDI scores, respectively.

Year	Study	Study Site	Study Type	N	Estimate of Prenatal Exposure Measured	Lead Levels (in µg/dL)	Outcome Measure(s)	Age at Outcome	Results
2002	Maternal bone lead as an independent risk factor of fetal neurotoxicity: a prospective study (Gomaa et al. 2002)	Mexico City, Mexico	Prospective cohort study	197	Umbilical cord BLL	Mean 6.7, SD 3.4, range 1.2 to 21.6	MDI and PDI scores as assessed using BSID-II; Spanish version	24 months	A 2-fold increase in cord blood lead level was associated with a 3.1-point decrement in MDI score
2001	Early exposure to lead and juvenile delinquency (Dietrich et al. 2001)	Cincinnati, OH	Prospective cohort study	157	Prenatal BLL (end of 1st trimester)	Mean 8.9, SD 3.9, range was not reported	Delinquency	15-17 years	Prenatal exposure to lead was significantly associated with a covariate adjusted increase in the frequency of parent-reported delinquent and antisocial behaviors (β = 0.194, SE = 0.089, Partial r2 = 0.045, p = 0.032), and with a covariate-adjusted increase in frequency of self-reported delinquent and antisocial behaviors. Partial r2 = (β = 0.192, SE = 0.076, 0.049, p = 0.002).
2000	Brainstem auditory evoked response at five years and prenatal and postnatal blood lead (Rothenberg et al. 2000)	Mexico City, Mexico	Prospective cohort study	100	Maternal BLL (20 weeks)	Abstract: geometric mean 7.7, range 1–30.5. Table, with BAER Geometric mean 8.1 SD +8.1/-4.0	Brainstem auditory evoked response (BAER) interval	BAER: 5 years	Using multiple linear regression, both conduction intervals I-V and III-V had significant or marginally significant relationships with 20-week maternal blood lead level. The nonlinear model showed I-V and III-V interpeak intervals decreased as 20-week blood lead rose from 1 to 8 µg/dL, and then increased as blood lead rose from 8 to 30.5 µg/dL.

Year	Study	Study Site	Study Type	N	Estimate of Prenatal Exposure Measured	Lead Levels (in µg/dL)	Outcome Measure(s)	Age at Outcome	Results
2000	The Yugoslavia prospective lead study: contributions of prenatal and postnatal lead exposure to early intelligence (Wasserman et al. 2000)	Mitrovica and Pristina, Yugoslavia	Prospective cohort study	390	Maternal BLL (mid-pregnancy)	Means: exposed 18.2; controls 5.25	Early intelligence as assessed by McCarthy GCI (ages 3 and 4); Wechsler Preschool and Primary Scale of Intelligence-Revised (WPPSI-R IQ) (age 5); Wechsler Intelligence Scale for Children-version III (WISC-III IQ) (age 7)	3-5, 7 years	With adjustment for covariates, a significant decrement was detected: 6.05 points in IQ for each log unit increase in prenatal BLL (SE 1.35, $p < 0.001$). A 50% rise in prenatal BLL was associated with a 1.07 point decrement in IQ (95% CI = 0.60, 1.53). The association between prenatal BLL and IQ is not linear; the strongest postnatal effects are noted at the lower levels of prenatal exposure.
2000	The Yugoslavia prospective lead study: contributions of prenatal and postnatal lead exposure to early intelligence (Wasserman et al. 2000)	Mitrovica and Pristina, Yugoslavia	Prospective cohort study	390	Prenatal (average of mother's log10 BLL at mid-pregnancy and at delivery)	Means: exposed 19.5; controls 5.13	Early intelligence as assessed by McCarthy GCI (ages 3 and 4); WPPSI-R IQ (age 5); WISC-III IQ (age 7)	3-5, 7 years	With adjustment for covariates, a significant decrement was detected: 6.05 points in IQ for each log unit increase in prenatal BLL (SE 1.35, $p < 0.001$). A 50% rise in prenatal BLL was associated with a 1.07 point decrement in IQ (95% CI: 0.60, 1.53). The association between prenatal BLL and IQ is not linear; the strongest postnatal effects are noted at the lower levels of prenatal exposure.
2000	The Yugoslavia prospective lead study: contributions of prenatal and postnatal lead exposure to early intelligence (Wasserman et al. 2000)	Mitrovica and Pristina, Yugoslavia	Prospective cohort study	390	Umbilical cord BLL	Means: exposed 20.4; controls 5.01	Early intelligence as assessed by McCarthy GCI (ages 3 and 4); WPPSI-R IQ (age 5); WISC-III IQ (age 7)	3-5, 7 years	With adjustment for covariates, a significant decrement was detected: 6.05 points in IQ for each log unit increase in prenatal BLL (SE 1.35, $p < 0.001$). A 50% rise in prenatal BLL was associated with a 1.07 point decrement in IQ (95% CI: 0.60, 1.53). The association between prenatal BLL and IQ is not linear; the strongest postnatal effects are noted at the lower levels of prenatal exposure.

Year	Study	Study Site	Study Type	N	Estimate of Prenatal Exposure Measured	Lead Levels (in µg/dL)	Outcome Measure(s)	Age at Outcome	Results
1998	Low-level prenatal lead exposure and neurobehavioral development of children in the first year of life: a prospective study in Shanghai (Shen et al. 1998)	Shanghai, China	Prospective cohort study	133	Umbilical cord BLL	Geometric mean: 9.2, range 1.6 to 17.5, 95% CI = 8.86 to 9.54. High lead group mean 13.4, SD 2.0; Low lead group mean 5.3, SD 1.4	Child development as assessed by the MDI and PDI of the Bayley Scales of Infant Development	3, 6, and 12 months	At all three ages, after controlling for confounders, the MDI scores were inversely related to the infants' cord blood lead levels (at 3, 6, 12 months, p = 0.0187, 0.0315, and 0.0279, respectively); however, no significant association between cord blood lead levels and the PDI scores was detected.
1994	Prenatal and perinatal low level lead exposure alters brainstem auditory evoked responses in infants (Rothenberg et al. 1994)	Mexico City, Mexico	Prospective cohort study	25-29	Maternal BLL (12, 20, 28, 36 weeks)	Not reported	Infant BAER	Median: 9 days (range 2-39 days); 3 months	For neonates, the I-V interpeak interval is increased with increasing maternal BLL at 12 weeks. Latencies of peaks I and III are decreased with increasing maternal BLL at 20 weeks, and the III-V interpeak interval is increased with increasing maternal BLL at 20 weeks. The III-V interpeak interval is increased with increasing maternal BLL at 28 and 36 weeks. At 3 months, maternal BLL at 20 and 36 weeks were associated with increased III-IV interpeak intervals. These findings are statistically significant ($p < 0.1$). Infant spatial localization of sound may be compromised by mid-pregnancy lead exposure.

Year	Study	Study Site	Study Type	N	Estimate of Prenatal Exposure Measured	Lead Levels (in µg/dL)	Outcome Measure(s)	Age at Outcome	Results
1994	Prenatal and perinatal low level lead exposure alters brainstem auditory evoked responses in infants (Rothenberg et al. 1994)	Mexico City, Mexico	Prospective cohort study	25	Maternal BLL (at delivery)	Not reported	Infant BAER	Median: 9 days (range 2-39 days)	The III-V interpeak interval is increased with increasing maternal BLL at delivery. This finding is statistically significant ($p < 0.1$). Infant spatial localization of sound may be compromised by prenatal mid-pregnancy lead exposure.
1994	Prenatal and perinatal low level lead exposure alters brainstem auditory evoked responses in infants (Rothenberg et al. 1994)	Mexico City, Mexico	Prospective cohort study	27	Umbilical cord BLL	Not reported	Infant BAER	Median: 9 days (range 2-39 days); 3 months	For neonates, the III-V interpeak interval is increased with increasing cord BLL. At 3 months, cord BLL was associated with increased III-IV interpeak intervals. These findings are statistically significant ($p < 0.1$). Infant spatial localization of sound may be compromised by prenatal midpregnancy lead exposure.
1993	The developmental consequences of low to moderate prenatal and postnatal lead exposure: Intellectual attainment in the Cincinnati lead study cohort following school entry (Dietrich et al. 1993)	Cincinnati, OH	Prospective cohort study	217	Maternal BLL (end of 1st trimester)	Mean 8.3, SD 3.7	Full Scale IQ (FSIQ), Performance IQ (PIQ), and Verbal IQ (VIQ) as assessed by WISC-R	6.5 years	Covariate-adjusted regression coefficients for BPb indices and the Wechsler scales demonstrated that PreBPb was unrelated to intellectual attainment at 6.5 years (FSIQ: $\beta = 0.15$, SE 0.21; PIQ $\beta = 0.06$, SE 0.23; VIQ: $\beta = 0.16$, SE 0.21; all $p > 0.1$).
1992	Environmental exposure to lead and children's intelligence at the age of seven years: the Port Pirie study (Baghurst et al. 1992)	Port Pirie, Australia	Prospective cohort study	494	Maternal BLL (average antenatal)	Geometric mean concentrations by quartile: I 6.2 (low); II 8.7; III 10.6; IV 14.3 (high)	IQ as measured by WISC-R	7 years (median age: 186 days after 7th birthday)	Inverse relationship between full-scale IQ at age 7 years and antenatal BLLs (unadjusted), but not statistically significant after adjustment for multiple covariates ($\beta = -1.4$, SE 2.0, $p = 0.48$).

Year	Study	Study Site	Study Type	N	Estimate of Prenatal Exposure Measured	Lead Levels (in µg/dL)	Outcome Measure(s)	Age at Outcome	Results
1992	Environmental exposure to lead and children's intelligence at the age of seven years: the Port Pirie study (Baghurst et al. 1992)	Port Pirie, Australia	Prospective cohort study	494	Umbilical cord BLL	Geometric mean concentrations by quartile: I 4.3 (low); II 7.4; III 9.9; IV 15.0 (high); overall mean 8.9	IQ as measured by WISC-R	7 years (median age: 186 days after 7th birthday)	Inverse relationship between full-scale IQ at age 7 years and cord BLLs (unadjusted), but not statistically significant after adjustment for multiple covariates ($\beta = 0.6$, SE 1.4, $p = 0.68$).
1992	Low level lead exposure, intelligence and academic achievement: a long-term follow-up study (Bellinger et al. 1992)	Boston, MA	Prospective cohort study	148	Umbilical cord BLL	Categorized into: low <3; medium 6-7; high ≥10; no mean, SD, range given	WISC-R and the Kaufman Test of Educational Achievement (K-TEA)	10 years	Cord BLL was inversely associated with crude full-scale IQ (low: $\beta = -1.29$, SD 3.03; medium $\beta = -1.52$, SD 3.01 (high: $\beta = 1.0$); $p = 0.86$); and with adjusted full-scale IQ (low: $\beta = -0.48$, SD 2.65; medium -2.55 $\beta = 2.56$, SD (high: $\beta = 1.0$); $p = 0.57$), but the association failed to meet statistical significance.
1990	Antecedents and correlates of improved cognitive performance in children exposed *in utero* to low levels of lead (Bellinger et al. 1990)	Boston, MA	Prospective cohort study	170	Umbilical cord BLL	Categorized into: low <3; medium 6-7; high ≥10; no mean, SD, range given	Cognitive function as assessed by MDI scores from the Bayley Scales of Infant Development at age 2 and by GCI score from the McCarthy Scales of Children's Abilities at 57 months	24 months; 57.8 months (median age)	Elevated prenatal lead is associated with lower MDI scores at 2 years old. Recovery from 2 to 5 years of age is modified by sociodemographic factors and BLL at 2 years.
1990	Lead exposure and neurobehavioral development in later infancy (Dietrich et al. 1990)	Cincinnati, OH	Prospective cohort study	237	Maternal BLL (50% first trimester, 49% 2nd trimester, 1% 3rd trimester)	Mean 8.0, SD 3.7, Range 1-27	Behavioral development as assessed by Bayley MDI	24 months	No statistically significant relationships between prenatal blood lead variables and Bayley MDI were found.

Year	Study	Study Site	Study Type	N	Estimate of Prenatal Exposure Measured	Lead Levels (in µg/dL)	Outcome Measure(s)	Age at Outcome	Results
1989	Low level exposure to lead: the Sydney lead study (Cooney et al. 1989a)	Sydney, Australia	Prospective cohort study	207	Maternal BLL (at delivery)	Geometric mean 9.1, SD 1.3	GCI score from the McCarthy Scales of Children's Abilities and motor subscale	48 months	Prenatal BLL was not significantly associated with developmental indices at 48 months of age with limited control for potential confounding variables.
1989	Low level exposure to lead: the Sydney lead study (Cooney et al. 1989a)	Sydney, Australia	Prospective cohort study	207	Umbilical cord BLL	Geometric mean 8.1, SD 1.4	GCI score from the McCarthy Scales of Children's Abilities and motor subscale	48 months	Umbilical cord BLL was not significantly associated with developmental indices at 48 months of age with limited control for potential confounding variables.
1989	Neurobehavioral consequences of prenatal low level exposure to lead (Cooney et al. 1989b)	Sydney, Australia	Prospective cohort study	215-274	Maternal BLL (at delivery)	Geometric mean, 9.1; range 0-29 (70% ≤10)	Development assessed by the MDI and PDI scores of the Bayley Scales of Infant Development at 6, 12, and 24 months, and GCI score from the McCarthy Scales of Children's Abilities and motor subscale at 36 months	6, 12, 24, and 36 months	Analyses do not support a relationship between maternal BLL in this range and developmental deficits to the age of 3 years.
1989	Neurobehavioral consequences of prenatal low level exposure to lead (Cooney et al. 1989b)	Sydney, Australia	Prospective cohort study	215-274	Umbilical cord BLL	Geometric mean, 8.1; range 0-29 (80% ≤10)	Development assessed by the MDI and PDI scores of the Bayley Scales of Infant Development at 6, 12, and 24 months, and GCI score from the McCarthy Scales of Children's Abilities and motor subscale at 36 months	6, 12, 24, and 36 months	Analyses do not support a relationship between cord BLL in this range and developmental deficits to the age of 3 years.

Year	Study	Study Site	Study Type	N	Estimate of Prenatal Exposure Measured	Lead Levels (in µg/dL)	Outcome Measure(s)	Age at Outcome	Results
1989	Low level lead exposure in the prenatal and early preschool periods: intelligence prior to school entry (Ernhart et al. 1989)	Cleveland, OH	Prospective cohort study	135	Maternal BLL (at delivery)	Mean 6.5, SD 1.8, range 2.7-11.8	Cognitive development as assessed by the Wechsler Preschool and Primary Scale of Intelligence (WPPSI)	4 years 10 months	Maternal BLL was significantly correlated with the WPPSI full scale and subscale IQ scores when unadjusted (r values -0.23 to -0.25, p<0.01), but not statistically significant when adjusted for covariates.
1989	Low level lead exposure in the prenatal and early preschool periods: intelligence prior to school entry (Ernhart et al. 1989)	Cleveland, OH	Prospective cohort study	118	Umbilical cord BLL	Mean 5.89, SD 2.10, range 2.8 - 14.7	Cognitive development as assessed by WPPSI	4 years 10 months	Cord BLL is significantly correlated with the WPPSI full scale and subscale IQ scores when unadjusted (r values -0.20 to -0.22, p<0.05), but not statistically significant when adjusted for covariates.
1989	Neurobehavioral deficits after low level lead exposure in neonates: the Mexico City pilot study (Rothenberg et al. 1989)	Mexico City, Mexico	Prospective cohort study	42	Maternal BLL (36 weeks)	Mean (SD) range (µg/dL): 15.0 (6.4) 5.5-42	Brazelton Neonatal Behavioral Assessment Scale (NBAS)	48 hours; 15 and 30 days	Change in maternal BLL between 36 weeks and birth predicted NBAS regulation of state as identified by the neonatal behavioral assessment scale at 15 days (partial r2 = 0.068, p = 0.049), regulation of state at 30 days (partial r2 = 0.061, p = 0.055), and autonomic regulation at 30 days (partial r2 = 0.048, p = 0.073).
1989	Neurobehavioral deficits after low level lead exposure in neonates: the Mexico City pilot study (Rothenberg et al. 1989)	Mexico City, Mexico	Prospective cohort study	42	Maternal BLL and umbilical cord lead (at delivery)	Mean (SD) range (µg/dL): maternal BLL 15.5 (5.7) 6.0-33.5; umbilical cord 13.1 (6.0) 3.0-33.5	Brazelton NBAS	48 hours; 15 and 30 days	Difference in maternal and umbilical cord lead at delivery predicted NBAS regulation of state as identified by the neonatal behavioral assessment scale at 30 days (partial r2 = 0.071, p = 0.042).

Year	Study	Study Site	Study Type	N	Estimate of Prenatal Exposure Measured	Lead Levels (in µg/dL)	Outcome Measure(s)	Age at Outcome	Results
1988	Port Pirie cohort study: childhood blood lead and neuropsychological development at age two years (Wigg et al. 1988)	Port Pirie, Australia	Prospective cohort study	509-586	Maternal BLL (14-20 weeks; 3rd trimester)	Not reported	Development as assessed by the MDI and PDI scores of the Bayley Scales of Infant Development	24 months	Maternal BLL was negatively correlated with mental and psychomotor development, with some measures achieving statistical significance: 14-20 weeks gestation: MDI -0.06, PDI -0.05; after 20 weeks gestation: MDI -0.08 ($p < 0.05$), PDI 0.02; average prepartum MDI -0.11 ($p < 0.05$), PDI -0.06 (Pearson correlation coefficients, unadjusted for covariates).
1988	Port Pirie cohort study: childhood blood lead and neuropsychological development at age two years (Wigg et al. 1988)	Port Pirie, Australia	Prospective cohort study	524	Maternal BLL (at delivery)	Not reported	Development as assessed by the MDI and PDI scores of the Bayley Scales of Infant Development	24 months	Maternal BLL at delivery was negatively correlated with mental and psychomotor development, but was not statistically significant: MDI -0.03, PDI -0.02 (Pearson correlation coefficients, unadjusted for covariates).
1988	Port Pirie cohort study: childhood blood lead and neuropsychological development at age two years (Wigg et al. 1988)	Port Pirie, Australia	Prospective cohort study	520	Umbilical cord BLL	Geometric mean 8.3, 95% CI = 8.0-8.6	Development as assessed by the MDI and PDI scores of the Bayley Scales of Infant Development	24 months	Cord BLL was negatively correlated with mental and psychomotor development; but was not statistically significant: MDI -0.04, PDI -0.04 (Pearson correlation coefficients, unadjusted for covariates).

Year	Study	Study Site	Study Type	N	Estimate of Prenatal Exposure Measured	Lead Levels (in µg/dL)	Outcome Measure(s)	Age at Outcome	Results
1987	Longitudinal analyses of prenatal and postnatal lead exposure and early cognitive development (Bellinger et al. 1987)	Boston, MA	Prospective cohort study	182-201	Umbilical cord BLL	Mean 6.6, SD 3.2, range 0-37. Categorized into: low, <3; medium, 6-7; high, > = 10	Development as assessed by the MDI of the Bayley Scales of Infant Development	6, 12, 18, 24 months	At all ages, infants who had higher cord BLLs had lower crude MDI scores than infants in the other two groups; this relationship was stronger when adjusted for covariates. Estimated difference between low exposure and high exposure group was 4.8 points (95% CI = 2.3, 7.3); between medium exposure and high exposure group was 3.8 (95% CI = 1.3, 6.3).
1987	Low-level fetal lead exposure effect on neurobehavioral development in early infancy (Dietrich et al. 1987)	Cincinnati, OH	Prospective cohort study	266	Maternal BLL (50% first trimester, 49% 2nd trimester, 1% 3rd trimester)	Mean 8.0, SD 3.7, range 1-27	Development as assessed by the MDI and PDI scores of the Bayley Scales of Infant Development	3 and 6 months	In multiple regression analysis, at 3 months, MDI decreased by 0.34 for each increase of 1 µg/dL of prenatal lead (SE = 0.17, p = 0.05); at 6 months, MDI decreased by 0.76 for each increase of 1 µg/dL of prenatal lead (SE = 0.34, p = 0.02). No significant effects of prenatal lead exposure on PDI were found after adjustment for covariates.
1987	Low-level fetal lead exposure effect on neurobehavioral development in early infancy (Dietrich et al. 1987)	Cincinnati, OH	Prospective cohort study	96	Umbilical cord BLL	Mean 6.4, SD 4.5, range 1-28	Development as assessed by the MDI and PDI scores of the Bayley Scales of Infant Development	3 and 6 months	In multiple regression analysis, at 3 months, MDI decreased by 0.6 for each increase of 1 µg/dL of umbilical cord lead (SE = 0.26, p = 0.02); at 6 months, MDI decreased by 0.66 for each increase of 1 µg/dL of umbilical cord lead, but was not statistically significant at the 0.05 level (SE = 0.37, p = 0.08). No significant effects of prenatal lead exposure on PDI were found after adjustment for covariates.

Year	Study	Study Site	Study Type	N	Estimate of Prenatal Exposure Measured	Lead Levels (in µg/dL)	Outcome Measure(s)	Age at Outcome	Results
1987	Low-level lead exposure in the prenatal and early preschool periods: early preschool development (Ernhart et al. 1987)	Cleveland, OH	Prospective cohort study	119-145	Maternal BLL (at delivery)	Mean 6.5, SD 1.8, range 2.7-11.8	Bayley MDI and PDI and modified Kent Infant Development (KID) scale at 6 months; Bayley MDI at 1 year and 2 years; Stanford-Binet Intelligence scale at 3 years	6 months; 1, 2, and 3 years	Maternal BLL was statistically significantly associated with 6 month MDI, PDI, and KID in unadjusted analyses, but these associations were not significant after control for covariates.
1987	Low-level lead exposure in the prenatal and early preschool periods: early preschool development (Ernhart et al. 1987)	Cleveland, OH	Prospective cohort study	109-127	Umbilical cord BLL	Mean 5.99, SD 2.11, range 2.8-14.7	Bayley MDI and PDI and modified KID scale at 6 months; Bayley MDI at 1 year and 2 years; Stanford-Binet Intelligence scale at 3 years	6 months; 1, 2, and 3 years	Umbilical cord BLL was not statistically significantly associated with 6 month or later MDI, PDI, and KID.

Abbreviations: 95% CI: 95% confidence interval; BAER: brainstem auditory evoked response; BLL: blood lead level; BSID-II: Bayley Scales of Infant Development; delta-ALA: delta-aminolevulinic acid; FSIQ: full-scale IQ; FTII: Fagan Test of Infant Intelligence; GCI: general cognitive index; HPA: hypothalamic-pituitary-adrenal; KID: Kent Infant Development; K-TEA: Kaufman Test of Educational Achievement; MDI: mental development index; NBAS: Neonatal Behavioral Assessment Scale; OR: odds ratio; PDI: psychomotor development index; PIQ: performance IQ; RR: relative risk; SD: standard deviation; VIQ: verbal IQ; WISC-III IQ: Wechsler Intelligence Scale for Children-version III; WISC-R: Wechsler Intelligence Scale for Children-Revised; WPPSI: Wechsler Preschool and Primary Scale of Intelligence; WPPSI-R IQ: Wechsler Preschool and Primary Scale of Intelligence-Revised.

Key Points

- No single test is available to establish total body lead burden; biological markers (biomarkers) must be used to estimate maternal lead body burden and to assess lead dose to the fetus or infant during pregnancy or breastfeeding.
- Blood lead is the most well-validated and widely available measure of lead exposure. However, a single blood lead test may not reflect cumulative lead exposure and may not be sufficient to establish the full nature of the developmental risk to the fetus/infant. Repeat testing may be necessary.
- Bone is a potential endogenous source of lead exposure and studies have demonstrated that some of the previously acquired maternal bone lead stores are mobilized during pregnancy and lactation. However, bone lead measurement is almost exclusively a research tool.
- Lead readily crosses the placenta by passive diffusion and has been measured in the fetal brain as early as the end of the first trimester, so primary prevention of exposure is particularly important to reduce risk.
- Lead has been detected in the breast milk of women in population-based studies; however, the availability of high-quality data to assess the risk for toxicity to the breastfeeding infant is limited.
- Given the difficulty of accurately and precisely measuring trace amounts of lead in human breast milk, routine measurement of breast milk lead is not warranted for routine clinical application at this time.

INTRODUCTION

The purpose of this chapter is to discuss biological markers (biomarkers) that have been proposed to assess lead body burden and to summarize our present understanding of the biokinetics of lead during pregnancy and lactation. There is no single test available to establish total body lead burden, since lead may be in all body fluids and tissues including bone. Biomarkers must be used to estimate lead body burden and to assess lead dose to the fetus during pregnancy and to the infant during lactation. Figure 3-1 shows the major lead exposure pathways from mother to infant.

BIOLOGICAL MARKERS OF LEAD EXPOSURE

Certain biomarkers of lead dose to the fetus during pregnancy have been validated as measures of exposure. These include measurement of lead collected from maternal venous blood during pregnancy and umbilical cord blood at delivery, and measurement of lead in maternal bone using the noninvasive technique of K-x-ray fluorescence (Hu and Hernandez-Avila 2002). Each of these biomarkers provides an independent level of information regarding fetal lead exposure; together, they are critical to understanding whether lead toxicity varies based on timing of exposure, cumulative versus acute dose, and partitioning of lead between red cells and plasma (Hu and Hernandez-Avila 2002; Tellez-Rojo et al. 2004).

Variability in individual blood lead levels and limitations in the accuracy of measurement techniques including limits of detection, rounding, analytical methods, and regression to the mean pose challenges to reliable

assessment of blood lead levels, particularly when blood lead levels are low. Laboratory instruments introduce measurement error, as do certain blood lead sampling methods (e.g., capillary samples may be prone to contamination due to lead dust on the skin surface). Venous blood lead tests produce the most reliable results. Capillary samples have a high level of sensitivity but lower specificity and may produce a higher number of false positives.

Other biomarkers have been used or proposed, usually because of the relative ease and noninvasiveness of collection procedures. These include hair, nails, teeth, saliva, urine, feces, meconium, placenta, and sperm. However, the utility of these alternatives as biomarkers for internal dose has not been demonstrated. In addition to the absence of consistent, validated analytic methods and standard reference materials for these biomarkers, they would also have to overcome the challenge of external contamination (Barbosa et al. 2005).

Whole Blood Lead

Blood lead has been the most commonly used and readily available biomarker of exposure to date with standard units of measurement in micrograms per deciliter (1 μg/dL = 0.0484 μmol/L). Following removal of the subject from environmental exposure, the decline in blood lead concentration occurs relatively rapidly at first; the initial half-life of lead in blood is about 35 days (Rabinowitz et al. 1976). This initial rapid drop is followed by a slow continuing decline over several months to years. In addition to lead from exogenous sources, blood lead represents the contribution of past environmental exposure being mobilized from endogenous bone stores. It is this reservoir of lead that determines the slow decline in blood lead after the first few weeks following removal from exposure.

Umbilical cord whole blood lead collected at delivery has been widely used as a measure of fetal exposure (Harville et al. 2005; Satin et al. 1991; Scanlon 1971; Rothenberg et al. 1996;). Lead readily crosses the placenta by passive diffusion (Goyer 1990; Silbergeld 1986) and fetal blood lead concentration is highly correlated with maternal blood lead concentration (Goyer 1990).

However, a single blood lead test may not reflect cumulative lead exposure and may not be sufficient to establish the full nature of the developmental risk to the fetus/infant. Physiologic changes, such as decreasing hematocrit, saturation of red cell lead-binding capacity, and increased bone resorption or intestinal absorption of lead, may influence the interpretation of blood lead levels during pregnancy. In addition, it is well known from the experimental literature that the vulnerability of developing organ systems, including the brain, to environmental toxicants can vary widely over the course of pregnancy (Mendola 2002). Thus, it is plausible that lead exposure may be particularly neurotoxic during a specific trimester (Hu et al. 2006; Schnaas et al. 2006).

Plasma Lead

The overwhelming majority of lead in blood is bound to erythrocytes (DeSilva 1981), but plasma is the blood compartment from which lead is available to cross cell membranes (Cavalleri et al. 1978). An understanding of how plasma lead concentration is related to whole blood lead concentration is important. Plasma lead concentrations in the range of 0.1%-5.0% of whole blood lead concentration have been reported (DeSilva 1981; Manton and Cook 1984; Ong et al. 1986). Although whole blood lead levels are highly correlated with plasma lead levels, lead levels in bone and other tissues (particularly trabecular bone) exert an additional independent influence on plasma lead levels (Hernandez-Avila et al. 1998). Recent data suggest that the plasma-to-whole blood lead ratio may vary quite widely among and within individuals (Hu 1998; Lamadrid-Figueroa et al. 2006), raising questions about the use of maternal whole blood lead as a proxy for plasma lead and fetal exposure (Chuang et al. 2001; Goyer 1990; Hu et al. 2006).

However, the measurement of maternal plasma lead is not likely to become a clinically useful tool. The methods required to measure plasma lead accurately are laborious and require specialized equipment and ultraclean techniques (Smith et al. 1998). Moreover, recent data suggest that the gain in using measurements of plasma lead during pregnancy to predict fetal/infant outcomes is only modest (Hu et al. 2006). Consequently,

this biomarker may be a useful research tool in efforts to understand and detect the health impacts of environmental lead exposure, but cannot be recommended at this time as a clinical tool.

Bone Lead

Bone is a dynamic reservoir for lead, in constant exchange with blood and soft tissue elements (Rabinowitz 1991; Tsaih et al. 1999). Lead is incorporated into the hydroxyapatite crystalline structure of bone, much like calcium, and may also transfer into bone matrix exclusive of incorporation into hydroxyapatite (Marcus 1985). Because over 90% of lead in the adult human body is stored in bone (Barry 1975; Barry and Mossman 1970), there is the possibility of redistribution of cumulative lead stores from bone into blood during periods of heightened bone turnover, such as pregnancy and lactation (Roberts and Silbergeld 1995). Lead in bone has a half-life of years to decades and therefore reflects cumulative lead exposure (Hu et al. 1998). Measurement of lead in bone using a noninvasive, in vivo X-ray fluorescence (XRF) technique makes epidemiologic evaluation of the impact of retained body burden of lead possible (Hu 1998).

The amount of lead in bone depends on the individual's lead exposure history. Smith et al. (1996) determined that bone contributed 40%-70% of the lead in blood of environmentally exposed subjects who were undergoing total hip or knee joint replacement, indicating that the skeleton can be an important endogenous source of lead exposure. By examining the lead isotopic ratio in a small number of pregnant women who were recent immigrants to Australia (and pregnant Australian controls), Gulson and his colleagues (1997) were able to show that the skeletal contribution to maternal blood lead increased during pregnancy and lactation. Lead in maternal diet and bone lead were the main contributors to circulating maternal blood lead levels (Gulson 1998a). The relative contribution of bone lead to blood lead will vary depending on the exposure history of the individuals.

The measurement of bone lead requires special equipment and trained operators and is used mainly in research settings. Therefore, it is unlikely that this method will have widespread clinical application. However, this biomarker is a useful tool in research efforts to understand and detect the health impacts of cumulative lead exposure.

Breast Milk Lead

Detectable levels of lead in breast milk have been documented in population studies of community-dwelling women with no known source of occupational or elevated environmental lead exposure (Abadin et al. 1997; Anderson and Wolff 2000). Given the correlation of breast milk lead levels with maternal and infant blood lead levels (Ettinger et al. 2004a, 2004b), milk lead can be used as an indicator of both maternal and neonatal exposures (Hallén et al. 1995). In studies of lead in human breast milk, concentrations have been observed ranging over three levels of magnitude, from <1 to greater than 100 µg/L (ppb) (Chatranon et al. 1978; Ettinger et al. 2004a; Gulson et al. 1997; Larsson et al. 1981; Murthy and Rhea 1971; Namihira et al. 1993). These differences are partially attributable to true differences in population exposures across time and geographic location (Solomon and Weiss 2002). However, it is also likely that a variety of methodological factors affect the analytic variability and validity of the reported results. Breast milk lead levels from published studies with extremely high values should be reviewed with caution due to the high potential for environmental contamination during sample collection, storage, and analysis. Documented sources of breast milk contamination include the use of lead acetate ointment (Knowles 1974), lead in nipple shields (Knowles 1974; Newman 1997), foil from alcohol wipes used in sample collection (Hu et al. 1996), and latex laboratory gloves (Friel et al. 1996). Pretreatment of biological materials is also subject to unintentional addition of contaminants from chemical reagents, digestion devices, and atmospheric particles (Coni et al. 1990; Stacchini et al. 1989).

Inaccuracies of the laboratory analytic methods, particularly poor analytic sensitivity at low concentrations, also affect measurement of trace lead in human milk. Measurement of lead in breast milk is complicated by the fat content of human milk, which changes during feeding and over the course of lactation (Sim and McNeil 1992). Any partitioning of lead into the fat layer of milk must be accounted for in the analysis, which leads to

the problem of either further contamination or loss during the intensive dry ashing procedure frequently used to prepare milk samples for analysis. Precise and accurate analysis is challenging due to difficulty in identifying a method that will digest samples with 100% efficiency (Ettinger et al. 2004a, 2004b). Gulson et al. (1998b) reviewed and compared the results of a number of studies of the relationship of breast milk lead to maternal blood lead published over the past 15 years, and concluded that the line of best fit through the data "that are considered to represent the realistic relationships between lead in maternal blood and breast milk" defines an array of slope of less than 3%. The implication is that those studies yielding ratios greater than 3% suffered from significant contamination.

Given the difficulty of accurately and precisely measuring trace lead in human breast milk, routine measurement of breast milk lead is not warranted for clinical application. It will only be practical in research settings or in certain extenuating circumstances, assuming that a qualified laboratory can be identified.

BIOKINETICS OF LEAD DURING PREGNANCY

Changes in Maternal Blood Lead Levels During Pregnancy

There are several case reports of elevated blood lead measurements in pregnancy (Mayer-Popken et al. 1986; Rothenberg et al. 1992; Ryu et al. 1978; Shannon 2003). Most cross-sectional studies investigating blood lead levels during pregnancy have shown a tendency for blood lead levels to decrease at least through the first half of pregnancy (Alexander and Delves 1981; Bonithon-Kopp et al. 1986; Gershanik et al. 1974). Baghurst (1987) found no difference in BLLs between different stages of pregnancy (weeks 14-20, weeks 30-36, and delivery). However, Farias et al. (1996) found BLLs were associated with gestational week of measurement, with levels declining after week 12.

Rothenberg et al. (1994), attempting to model kinetics over the course of pregnancy, showed a significant drop in blood lead levels from weeks 12 to 20. However, from 20 weeks to delivery, an analysis for linear trend confirmed a significant increase in blood lead levels in the later part of pregnancy. Schell et al. (2000) also reported changes in hematocrit-corrected blood lead levels over the course of pregnancy. Blood lead levels declined between the first and second trimesters and increased over the remaining course of pregnancy through delivery. Hertz-Picciotto et al. (2000) followed 195 women over the course of pregnancy and also found a U-shaped pattern of maternal blood lead concentration across pregnancy. The late pregnancy increases were steeper among women with low dietary calcium intake in both the younger and older age groups. Most recently, Lamadrid-Figueroa and colleagues (2006) found increased plasma lead levels for a given whole-blood lead value as pregnancy progresses for whole-blood lead levels greater than approximately 11.0 µg/dL, but not for those less than 10.0 µg/dL.

Transfer of Lead to the Fetus

That lead reaches human fetal tissues has been known for many years (Barltrop 1969; Kehoe et al. 1933; Thompsett and Anderson 1935). Barltrop (1969) collected serial fetal blood lead measurements from each trimester throughout pregnancy and found no recognizable pattern but was able to show that maternal blood lead concentration was highly correlated with umbilical cord lead, suggesting transplacental movement of lead to the fetus. In fact, lead readily crosses the placenta by passive diffusion (Goyer 1990; Silbergeld 1986) and lead has been measured in the fetal brain as early as the end of the first trimester (13 weeks) (Goyer 1990).

Bone Lead as an Endogenous Source of Exposure

Two early studies implicated bone lead as an endogenous source of exposure during pregnancy. Thompson et al. (1985) documented a case of increased maternal and infant blood lead in a woman with a history of childhood lead poisoning, but no exposure during pregnancy or for 30 years prior. Manton (1985) reported a rise in his wife's blood lead levels over the course of her pregnancy along with changes in the specific lead-isotopic ratios, indicating that contributions to her blood lead during pregnancy did not correspond to an external source.

Recent studies have documented that bone lead stores are mobilized during pregnancy and lactation (Gulson et al. 1997; Hernandez-Avila et al. 1996; Hu et al. 1996; Rothenberg et al. 2000). By examining the lead isotopic ratio in a small number of pregnant women who were recent immigrants to Australia (and pregnant Australian controls), Gulson and colleagues (1997) were able to show that the skeletal contribution to blood lead increased over pregnancy. Rothenberg et al. (2000) followed over 300 Hispanic-American women with serial blood lead levels over the course of pregnancy and found that whole blood lead concentrations were significantly influenced by bone lead. Markowitz and Shen (2001) reported a case of declining bone lead concentration in conjunction with an increase in blood lead levels over the course of pregnancy and the early postpartum period. Riess and Halm (2007) described a case report suggesting that bone sources at high levels can lead to an increase in BLL.

Animal studies support the human data. Using stable lead isotopes in monkeys, researchers found that a 29%-56% decrease in bone lead mobilization in the first trimester was followed by an increase in the second and third trimesters (Franklin et al. 1997). The increases were up to 44% over baseline levels. Further analysis of maternal bone and fetal bone and tissues revealed that from 7%-39% of lead in the fetal skeleton originated from maternal bone.

BIOKINETICS OF LEAD DURING LACTATION

Maternal bone turnover increases during lactation (Sowers et al. 2002), which has raised the concern that maternal blood lead concentrations might increase significantly during lactation. It has been estimated that up to 5% or more of bone mass is mobilized during lactation (Hayslip et al. 1989; Sowers 1996); therefore, the possibility exists for redistribution of cumulative lead stores from bone into plasma, thus returning lead to the maternal circulation.

Gulson et al. (1998a) found that mobilization of lead from bone continued after pregnancy into the postpartum period for up to 6 months during lactation and occurred at levels higher than during pregnancy. They concluded that the major sources of lead in breast milk were maternal bone and diet. Manton et al. (2003) observed sustained elevations of from 1 to 4 µg/dL in maternal blood lead concentration during the first 6 to 8 months of lactation, after the expected normal postpartum reduction in plasma volume, in 6 nursing mothers with prepregnancy blood lead concentrations of less than 2 µg/dL. These elevations were followed by gradual declines over the next year in the two women who continued to breastfeed to 18 months postpartum. Isotope ratio analysis suggested that the additional lead originated from maternal bone.

Osterloh and Kelly (1999) found no relationship between decreasing vertebral or femoral neck bone densites and the changes in maternal blood lead concentration at intervals over 6 months of lactation in 58 mainly poor Hispanic mothers with low mean blood lead concentrations of 2.35 µg/dL at enrollment in the study (32 to 38 weeks of gestation). However, at higher blood concentrations, Téllez-Rojo et al. (2002) observed an incremental increase of 1.4 µg/dL in blood lead concentration in women who were breastfeeding exclusively relative to women who had stopped lactation. These women had blood lead concentrations up to 23.4 µg/dL at delivery and were followed through 7 months postpartum. Bonithon-Kopp et al. (1986) found that women over 30 had significantly higher levels of breast milk lead than women between 20 and 30 years of age. Since bone accumulates lead with age, it is possible that the higher breast milk lead levels in the older women were associated with higher bone lead levels. Maternal bone lead levels have since been shown to be positively associated with breast milk lead concentrations (Ettinger et al. 2004a, 2006).

PREDICTORS OF UMBILICAL CORD BLOOD LEAD LEVELS

Umbilical cord blood lead has been widely used as a measure of fetal exposure (Rabinowitz et al. 1984; Rothenberg et al. 1996; Scanlon 1971). Numerous studies suggest that maternal blood lead and umbilical cord lead levels, measured concurrently at delivery, are highly correlated (Baghurst et al. 1991; Graziano et al. 1990;

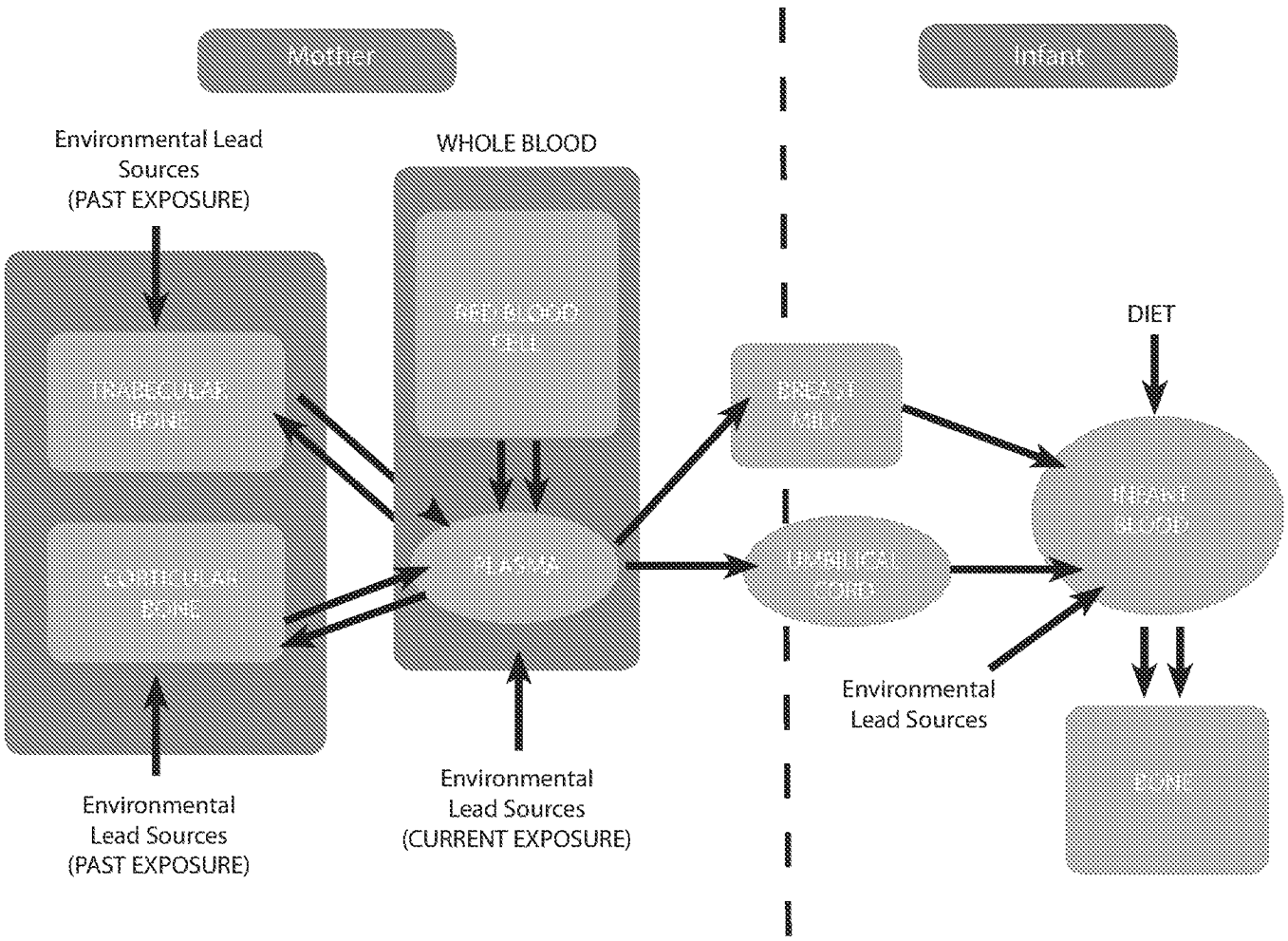
Harville et al. 2005; Rothenberg et al. 1996), suggesting a near-perfect linear relationship. Most data indicate that umbilical cord lead is approximately 0.85 of maternal blood lead at parturition (Carbonne et al. 1998; Goyer 1990; Graziano et al. 1990). Thus, fetal-infant lead level, as measured in umbilical cord blood, is often lower than the maternal blood lead at delivery. However, some studies have shown umbilical cord lead to be higher than maternal blood lead levels at delivery and investigated the determinants for such differences (Harville et al. 2005; Rothenberg et al. 1996).

Rothenberg et al. (1996) studied Mexican women of low-to-middle socioeconomic status from 12 weeks of pregnancy to delivery to determine factors that explain the relationship between cord and maternal blood lead. They found from 245 paired maternal-cord blood lead samples that mothers with occasional alcohol use during pregnancy, high milk intake, and more spontaneous abortions delivered babies with lower cord blood lead and that maternal age, use of lead-glazed pottery, and canned foods was associated with increased cord blood lead. They found cord blood lead levels were higher than maternal blood lead levels at delivery in 33% of the cases, predominantly influenced by older maternal age and lower milk consumption. The authors suggested that the measurable influence of maternal blood lead on delivery cord blood lead is limited to the four to eight weeks prior to delivery. Also, many factors suspected of influencing bone lead also influenced cord blood lead, some of them independently of their effect on maternal delivery blood lead.

Harville et al. (2005) studied factors influencing the difference between maternal and cord blood lead levels to determine why some infants receive higher exposures relative to their mother's body burden than do others. They found that higher maternal blood pressure and alcohol consumption were associated with higher cord lead relative to the lead of the mother. Higher maternal hemoglobin and presence of the sickle cell trait were associated with lower cord blood lead in comparison to mother's blood lead, suggesting that iron status may be an important factor in the maternal-fetal transfer of lead across the placenta.

Chuang et al. (2001) modeled the interrelations of lead levels in bone, venous blood, and umbilical cord blood with exogenous lead exposure through maternal plasma lead in peripartum women. An interquartile range increase in either patella (trabecular) or tibia (cortical) bone lead was associated with an increase in cord blood lead by about 1 µg/dL. An increase of 0.1 µg/m3 in air lead was associated with an increase in the mean level of fetal cord blood lead by 0.67 µg/dL. With 1 additional day of lead-glazed ceramic use per week in the peripartum period, the mean cord blood lead level increased by 0.27 µg/dL. The models suggested that the contributions from endogenous (bone) and exogenous (environmental) sources were relatively equal, and that maternal plasma lead varies independently from maternal whole blood lead.

Figure 3-1. Major Lead Exposure Pathways from Mother to Infant



CHAPTER 4. DISTRIBUTION OF BLLS, RISK FACTORS FOR AND SOURCES OF LEAD EXPOSURE IN PREGNANT AND LACTATING WOMEN

KEY POINTS

- Risk factors for lead exposure in pregnant women differ from those described for young children.
- Common risk factors for pregnant women include recent immigration status, practicing pica, occupational exposure, use of alternative remedies or cosmetics, use of traditional lead glazed pottery, and nutritional status.
- Pica during pregnancy appears to occur more frequently in sections of the South and in immigrant communities where this behavior is a culturally acceptable practice.
- Lead-based paint is less likely to be an important exposure source for pregnant women than it is for children, except during renovation or remodeling of homes built before 1978.
- Sources of lead exposure in the United States vary by population subgroup and geography; therefore, public health agencies should be consulted for community-specific risk data.
- Fetal exposure to lead through maternal bone lead mobilization is possible for women with significant prior lead exposure; however, most women with blood lead levels typical in the United States are unlikely to contribute substantial burdens to their infants.

INTRODUCTION

This chapter discusses the distribution of blood lead levels in women of childbearing age, risk factors relevant to this population, and sources of lead exposure. Information on the distribution of blood lead levels in pregnant women in the United States is derived from cross-sectional surveys, case reports, and epidemiological studies. From the direct, albeit limited, information on the distribution of blood lead levels in pregnant women, along with the available complementary information on blood lead levels in women of childbearing age and in occupational settings, it is evident that the risk factors for lead exposure in pregnant women differ from those described in young children. Health care providers and public health departments need to understand the risk factors specific to pregnant women in order to identify sources of lead in pregnant women, provide patient education and counseling, and intervene to prevent or reduce exposures.

For pregnant women, recent immigration and practicing pica are major risk factors for blood lead levels ≥5 µg/dL. Occupational lead exposure and nutritional status are also important risk factors warranting assessment. Certain culturally specific practices, such as the use of alternative remedies or imported cosmetics and the use of traditional lead glazed pottery for cooking and storing food, are important risk factors for lead exposure in pregnant women (Centers for Disease Control and Prevention 2004; Saper et al. 2004, 2008). Some population groups, such as immigrants, are more likely to be at risk for exposure from these sources. Shannon (2003) identified seven severely lead poisoned women who were exposed to sources of lead including ingestion of soil, pottery, or paint chips; household renovations; and use of herbal remedies. Lead-based paint is less likely to be an important exposure source for pregnant women than it is for children, except during renovation or remodeling in homes built before 1978.

Additionally, recent evidence has shown that bone resorption increases during pregnancy in all women (see Chapter 3). Although not an issue for most women with blood lead levels typical in the United States, fetal exposure to lead through maternal bone lead mobilization may be a concern for women with significant lead exposure earlier in life, either in the United States or in their countries of origin.

EPIDEMIOLOGY OF BLOOD LEAD LEVELS IN U.S. WOMEN

Distribution of Blood Lead Levels Among U.S. Women of Childbearing Age

Lee et al. (2005) studied determinants of blood lead in U.S. women of childbearing age using data from NHANES III (1988-1994). The geometric mean blood lead level among women aged 20-49 years (N = 4,393) was 1.78 µg/dL (range 0.7-31.1). Approximately 30%, 6%, and <1% of the women had blood lead levels ≥2.5 µg/dL, ≥5 µg/dL, and ≥10 µg/dL, respectively. A number of factors were associated with higher blood lead levels including higher maternal age, Black or Hispanic race/ethnicity, living in the Northeast region or in urban areas, lower educational level, poverty, lower hematocrit, alcohol use, cigarette smoking, and higher serum protoporphyrin level. Number of live births, breastfeeding history, year house was built, and type of drinking water were not significantly associated with differences in blood lead. Subjects in the first phase of the survey (1988-1991) had significantly higher weighted mean blood lead levels (2.0 µg/dL) than those in the second phase 1991-1994 (1.6 µg/dL), suggesting a decreasing trend in population average blood lead levels over time ($p<0.01$).

NHANES data from 1999-2002 showed an even lower geometric mean blood lead level of 1.2 µg/dL among women age 20-59 (Centers for Disease Control and Prevention 2005). Mean blood lead levels were significantly higher in Blacks (1.4 µg/dL) and intermediate in Mexican Americans (1.3 µg/dL). The percentage of women 15-49 years old with blood lead levels ≥10 µg/dL is 0.3% and ≥5 µg/dL is 0.9% (Centers for Disease Control and Prevention 2008, unpublished data).

McKelvey et al. (2007) studied blood lead among New York City adults using data from the 2004 New York City Health and Nutrition Examination Survey (NYC HANES). Further analyses performed by the authors (unpublished) specific to women 20-49 years of age (N = 755) found that the geometric mean blood lead level was 1.30 µg/dL (range 0.33-27.3). Approximately 10.5%, 1.4%, and 0.2% of the women had blood lead levels ≥2.5 µg/dL, ≥5 µg/dL, and ≥10 µg/dL, respectively. Blood lead was positively associated with: age; non-Hispanic Black, White, or Asian race/ethnicity, compared to Hispanic; foreign birth; and former and current smoking. Blood lead was inversely proportional to educational level. After multivariable adjustment, Asian race/ethnicity was the strongest predictor of blood lead level. In a separate study focused solely on immigrant mothers who gave birth in New York City in 2003, Graber et al. (2006) found that mean blood lead levels decreased with age by 0.032 µg/dL per year (see Case Study 4-1).

Reported Occupational Exposures Among U.S. Women of Childbearing Age

CDC's state-based Adult Blood Lead Epidemiology and Surveillance (ABLES) program tracks laboratory-reported BLLs in adults (age 16 years and older) from 37 states who have been tested through workplace monitoring programs or on the basis of clinical suspicion of lead exposure above background levels. The lowest reportable BLL varies by state and some states only report elevated results, not all test results. In the 10 states that reported BLLs of any level in 2004, information was reported on 10,527 women of childbearing age (16-44 years). Among these women, 13% (1,370) had BLLs ≥5 µg/dL; 4.5% (476) had BLLs ≥10 µg/dL, and fewer than 1% (86) had BLLs ≥25 µg/dL. Of the women with BLLs ≥5 µg/dL, 32.3% reported occupational exposures; of those employed, the majority were in the manufacturing sector. Because testing practices vary by employer and clinician, reporting practices vary by state, and all lead exposed women may not be tested, these data should not be used to estimate population-based rates of specific blood lead levels in the general population of women (Centers for Disease Control and Prevention 2007).

RISK FACTORS FOR LEAD EXPOSURE IN U.S. WOMEN OF CHILDBEARING AGE

Recent immigration to the United States and pica behavior are risk factors that have been shown to be associated with lead exposure above background levels in pregnant women, although they are actually behaviors that serve as proxies for other sources of lead. Women with a friend or relative identified with lead exposure above background levels are also more likely to have increased blood lead levels (Handley et al. 2007). In addition, the unique physiology of pregnancy and lactation has been shown to result in increased bone turnover and, thus, higher maternal BLLs. Nutrition may play a role in the extent to which lead is absorbed and the extent of bone turnover. An understanding of these factors is useful in assessing the sources of lead exposures in pregnant women and in developing interventions to prevent and/or interrupt lead exposure. Figure 4-1 presents common risk factors for lead exposure by pregnant women in the United States.

Recent Immigration to the United States

A number of studies have identified immigrant status as a primary risk factor for lead poisoning in women and young children in the United States (Klitzman et al. 2002; Tehranifar et al. 2008). Immigrant status is a risk factor for blood lead levels much higher than concurrent blood lead levels in U.S. women of childbearing age in at least three ways. First, women from countries where relatively high lead exposure is endemic may carry high cumulative body burdens of lead. (Appendices III and V provide information about lead sources and culturally specific products associated with specific countries or regions.) Brown et al. (2000) investigated determinants of bone and blood lead concentrations in women in Mexico City during the early postpartum period and found that maternal age and time spent living in Mexico City, an area with high ambient lead contamination, were strong predictors of bone lead levels. Second, immigrants may transport lead-containing products, cultural practices, and behaviors with them from their countries of origin. Third, some recent immigrants may live in poor conditions that increase their risk for exposure to lead-based paint and other lead hazards from renovation and repair. In addition, since immigrant women may face cultural, linguistic, economic, and legal barriers to early prenatal care, these risk factors may be compounded by delays in identification and management of lead poisoning.

Data on 75 pregnant women identified with blood lead levels ≥15 µg/dL were provided in the Annual Report 2006 for Preventing Lead Poisoning in New York City. Of these 75 women, 99% were foreign born (68% were from Mexico) and 73% reported using imported products during pregnancy, including foods, spices, herbal medicines, pottery, and cosmetics. None of the women were exposed to lead at work.

Klitzman et al. (2002) reported on thirty-three pregnant women in New York City with blood lead levels of 20 µg/dL or higher identified from 1996-1999 by the New York City Department of Health and Mental Hygiene blood lead surveillance program. Ninety percent of individuals were foreign born, the majority being from Mexico (57%), with a median time in the United States of 6 years (range 1 month to 20 years). Two-thirds of the women had levels between 20 and 29 µg/dL and possible sources of exposure were identified in 97% of these cases. Overall, thirteen (39%) reported pica behavior; 7 (21%) reported using imported pottery for cooking; and 8 (24%) reported consuming imported spices, tea, and/or food. Other sources identified included vitamins and supplements, lead-based paint hazards, and previous history of exposure to lead.

Graber et al. (2006) conducted a retrospective record review of pregnant women seeking prenatal care from January 2003 to June 2005 at an inner-city women's health center serving a largely immigrant population in Elmhurst Hospital, Queens, New York City. Of the 4,814 women seeking care, 91% were foreign born and 9% were U.S. born. These data from an inner-city medical clinic suggest that prenatal lead exposure disproportionately occurs during the pregnancies of immigrant women from certain countries and occurs at a prevalence high enough to warrant universal blood lead testing (see Case Study 4-1).

Handley et al. (2007) studied 214 women in 2002-2003 who were enrolled in health department clinics in Monterey, California, for their prenatal care. The study population was 95% Latina and 87% were born in Mexico. Sixty-six of the women were born in Oaxaca, Mexico. The prevalence of blood lead levels ≥10 µg/dL

in the study population was 12%, much higher than concurrent blood lead levels in the U.S. population in general. Women with blood lead levels ≥10 µg/dL were more likely to be born in Oaxaca (96%), more likely to eat foods imported from Mexico (84%), and more likely to report having a friend or relative with "lead in their blood" (28%). This study identified home-prepared grasshoppers (chapulines) sent from Oaxaca as a source of lead exposure.

Case Study 4-1. Prenatal Lead Exposure in New York City Immigrant Communities: The Elmhurst Queens Experience

Of the 124,345 babies born in New York City in 2003, 52% were to mothers who were born outside of the United States (New York Vital Statistics). Since many of the sources of lead for pregnant women are related to cultural practices, past exposures, and certain occupations, the prevalence of elevated blood lead levels among pregnant women in New York City is likely to be higher than U.S. averages. A retrospective record review of pregnant women seeking prenatal care at an inner-city women's health center was conducted in order to describe the epidemiology of blood lead levels among pregnant women in an inner-city, primarily immigrant population. Computerized registration and laboratory data for pregnant women seeking prenatal care from January 2003 to June 2005 at the Women's Health Center at Elmhurst Hospital, Queens, New York, were reviewed.

Distribution of Age and Blood Lead Levels (BLLs) for U.S.- and Foreign-Born Pregnant Women in Elmhurst, Queens, NY (January 2003-June 2005)

	U.S. Born	Foreign Born	All Women
N (%)	446 (9.3)	4,368 (90.7)	4,814
Age (years)	23.7	28.3	27.8
Age Range	14-43	13-52	13-52
Mean BLL (µg/dL)	1.2	2.4	2.3
BLL Range	0-17	0–31	0-31
% with BLL ≥10 µg/dL	0.2	1.2	1.1
% with BLL ≥5 µg/dL	1.6	11.5	10.6

Note: All difference between the two groups were statistically significant ($p<0.001$)

One hundred countries of origin were represented in the sample. Pregnant women who were born outside of the United States were 8.2 times (95% CI = 3.8 to 17.3) more likely to have a BLL ≥5 µg/dL. Those women with the highest mean BLLs and percent with BLLs ≥5 µg/dL were from Bangladesh (4.39 µg/dL, 36.6%), Mexico (3.23 µg/dL, 20.9%) and Pakistan (2.86 µg/dL, 17.6%).

Women from countries where leaded gasoline is still in use had higher mean BLLs (3.42 µg/dL) and percent of women with BLLs ≥5 µg/dL (24.6%) in comparison to women from countries where leaded gasoline is no longer in use (1.42 µg/dL, 1.9%). Mean BLL decreased with age by 0.032 µg/dL per year ($p< 0.001$). Mean BLL increased by 0.14 µg/dL ($p<0.05$) from 2003 to 2005 as did the percent of women with BLLs ≥10 µg/dL. BLLs did not vary by time of year.

From Graber N, Gabinskaya T, Forman J, Gertner M. 2006. Prenatal lead exposure in New York City Immigrant communities [poster]. In: Pediatric Academic Societies (PAS) 2006 Annual Meeting, April 29-May 3, 2006, San Francisco.

Pica

Although formal pica definitions vary, the behavior common to all definitions of pica is a pattern of deliberate ingestion of nonfood items. Some definitions focus solely on the eating behavior (e.g., Medline defines pica as "a pattern of eating non-food materials (such as dirt or paper)" (Medline Plus 2009). Western medicine has viewed pica as aberrant and unhealthy behavior, an eating disorder, or a psychiatric diagnosis. For example, the American Psychiatric Association defines pica as the "compulsive eating or appetite for nonnutritive substances, either non-food items (e.g., clay, soil) or some food ingredients (e.g., starch, ice), which persists for more than one month" (American Psychiatric Association 1994). However, respected non-Western community institutions have historically accepted pica as a way to improve health. Pica has been practiced by people worldwide for medicinal, religious, and cultural reasons since antiquity (Abrahams and Parsons 1996; Hunter and de Kleine 1984). The Greeks and Romans used clay to treat various medical conditions. Certain Catholic sects in Central America have sold clay tablets inscribed with Christian scenes for centuries. These clay tablets, known as tierra santa, which are blessed before sale and believed to have health-giving properties, are available throughout Mexico and Central America. Clay tablets are also produced and sold throughout many parts of Africa and are eaten—generally not for religious or health-related purposes, but for their taste and texture.

While pica appears to be relatively rare in the United States, it is a common practice in many parts of the world, particularly in Africa, Asia, and Central America. Prevalence rates have been reported to be as high as 50% to 74% in parts of Africa (Nchito et al. 2004; Sule and Madugu 2001), and 23% to 44% in Latin America (Lopez et al. 2004). In the United States, pica appears to occur more frequently in sections of the South and in immigrant communities where this behavior is a culturally acceptable practice. Prevalence studies of pica in U.S. subpopulations have found 34% in Mexican-born women living in California (Simpson et al. 2000), and 14% (Smulian et al. 1995) to 38% (Corbett et al. 2003) in low-income rural African-American women.

In some studies, women felt that not giving in to pica cravings could harm their fetus and lead to miscarriage, illness, or an unhappy baby (Simpson et al. 2000). Since pica is viewed negatively by the Western medical community (American Psychiatric Association 1994), individuals who engage in pica may be reluctant to disclose that they consume nonfood items if asked directly about the practice. A review of 13 studies published between 1950 and 1987 (Horner et al. 1991) estimated that the risk for pica increases if pica is practiced by other family members and is increased six-fold if the woman had a prepregnancy history of pica. Other factors that may influence whether women are comfortable disclosing pica use include being able to converse in their native language, being able to discuss the practice in private, and being questioned about the practice in an accepting manner by someone from their own community (Simpson et al. 2000).

Materials ingested as pica can be benign or potentially harmful and include ice, paper, dirt, clay, starch, ashes, and small stones as well as substances contaminated with lead or other toxic substances. Pica behavior has been associated with anemia and other nutritional deficiencies in cross-sectional studies, although pica has not been confirmed to be caused by nutritional deficiencies; pica has been associated rarely with more serious side effects, such as gastrointestinal blockages (Edwards et al. 1994; Geissler et al. 1998). Cases of lead poisoning have also been reported if the substances consumed are contaminated with lead. Most commonly these substances have been reported to be lead-contaminated soil and pottery [see Appendix III for a description of commonly ingested substances with pica].

In a case study of one Hispanic pregnant woman in California, Hamilton et al. (2001) found blood lead levels of 119.4 µg/dL in the woman and 113.6 µg/dL in the cord blood at delivery. The woman practiced a form of pica in which she broke a lead-glazed clay pot from Mexico into small pieces and ate several pieces daily. The researchers found that this practice was apparently not uncommon in Mexican women. Shannon (2003) reviewed seven cases of severely lead-poisoned women (BLLs ≥45 µg/dL) over a 3-year period and identified an additional eight cases from the medical literature. He found that severe lead poisoning in these mainly Hispanic women occurred most often because of ingestion of lead-contaminated clay, soil, and pottery. Presenting features were mostly subtle, consisting of only malaise and anemia.

Mobilization of Endogenous Bone Lead in Pregnancy

Although, the majority of U.S. women of childbearing age are unlikely to have bone lead stores large enough to result in large elevations in maternal blood lead concentrations, at least one recent case report suggested that bone sources at high levels can lead to an increase in BLL (Riess and Halm 2007). There also is evidence that with closely spaced multiple pregnancies, maternal blood lead levels in subsequent pregnancies are lower and the increases in maternal blood lead occurring during late pregnancy and lactation are lower relative to those in the first pregnancy (Manton et al. 2003; Rothenberg et al. 1994). This observation is consonant with observations from the lead industry in the nineteenth and early twentieth century (Legge 1901; Legge and Goadby 1912; Paul 1860), which held that if a lead-poisoned woman had a child, her symptoms would be assuaged. This limited evidence suggests that the greatest concern about lead exposure may be during the first pregnancy, although this observation is probably meaningful only at very high lead levels.

Dietary and Lifestyle Factors

Nutritional status may make women more susceptible to lead exposures. Adequate dietary intake of certain key nutrients (calcium; iron; zinc; vitamins C, D, and E) is known to decrease lead absorption (Mahaffey 1990). Iron deficiency anemia is associated with elevated blood lead levels and may increase lead absorption and also has an additional independent negative impact on fetal development. Calcium deficiency may increase bone turnover since maternal bone is a major source of calcium for the developing fetus and nursing infant. Chapter 7 provides a fuller discussion of nutritional issues. Both alcohol use and cigarette smoking have also been associated with higher lead levels and should be avoided during pregnancy and lactation.

SOURCES OF LEAD EXPOSURE

While various sources of lead exposure in pregnant women in the United States have been identified, these sources vary according to population subgroup and geography. Thus, assessment and reduction of sources must be specific to the community. The sources discussed below are those that have been identified in previous research and should be used as a guide for clinical and public health interventions. Figure 4-2 summarizes general advice for pregnant women to avoid lead exposure, although additional advice may be warranted due to specific local risk factors.

Occupational Sources

Lead is used in more than 100 industries [see Appendix IV for a list of major lead-using industries]. Occupations in which workers may be directly exposed to lead at significant levels include construction; smelting; auto repair; work on firing ranges; painting; manufacturing of ceramics, electrical components, batteries, wire and cable, plastics, pottery, and stained glass; battery and scrap metal recycling; mining; and all types of ferrous and nonferrous metals production. In addition, women and children may be exposed to lead through the inadvertent carriage of lead dust from the workplace on workers' clothing, shoes, or bodies, also known as take-home exposure. Lead dust carried from work settles on surfaces in the vehicle and home, where it can be ingested or inhaled by young children with normal mouthing behavior and by household members handling workers' clothing (Hipkins et al. 2004). The National Institute for Occupational Safety and Health documented cases of take-home lead exposure in a 1995 Report to Congress in response to the Workers' Family Protection Act (National Institute for Occupational Safety and Health 1995).

While BLLs in occupationally exposed individuals have fallen dramatically since lead industry standards were revised in 1978 (Anderson and Islam 2006), occupational exposures are still a source of lead exposure in women (Centers for Disease Control and Prevention 2007). According to reports from the ABLES Program, a total of 442 (32.3%) of the 1,370 females with BLLs >5 µg/dL had occupational exposures (Centers for Disease Control and Prevention 2007). ABLES data from the New York State Department of Health indicate that 46% (62 of 135) of women of childbearing age with moderate BLLs (10-25 µg/dL) reported occupational exposure as the primary source of lead exposure (Fletcher et al. 1999). Automobile battery manufacturing and lead battery re-

covery industries pose the highest risks although workers in the construction trades can also have significant exposures to lead (Centers for Disease Control and Prevention 2007; Fletcher et al. 1999). Laborers and painters have been found to have higher BLLs than other construction trade groups such as plumbers and electricians (Reynold et al. 1999). Construction work that is associated with higher BLLs includes bridge renovation; residential remodeling; and activities such as welding, cutting, and rivet busting (Reynold et al. 1999).

The Occupational Safety and Health Administration (OSHA) has lead standards for general industry (29 CFR 1910.1025) (Occupational Safety and Health Administration 1984) and construction (29 CFR 1926.62) (Occupational Safety and Health Administration 1993). Currently, under the OSHA standards, a worker must be included in a lead medical surveillance program if he/she is exposed to airborne lead levels of 30 µg/m3 or higher (8-hour time-weighted average) for more than 30 days per year. Partly to diminish the risk that a lead worker takes lead home on his clothing or body (take-home exposure), the lead standards contain provisions requiring access to showers, work clothes, and changing rooms at the workplace. Some workers potentially exposed to high levels of lead may not receive adequate medical surveillance because their work does not result in air lead levels that trigger the required surveillance. Additionally, certain occupations are exempt from the workplace protections established by OSHA. Exempted workers include some public employees and the self-employed. Self employed workers might include those in cottage industries such as battery reclamation, automobile/radiator repair, pottery and ceramics, and stained glass. These job categories may not be monitored for lead exposures. In some cases, the home itself may function as a cottage industry workplace, increasing the potential for lead exposure to all family members. Undocumented immigrant workers are a particularly vulnerable group in that their access to lead exposure monitoring and protective measures may be limited.

Occupational exposure to lead also remains a problem in developing countries where industries are less likely to be regulated and little environmental monitoring is done. Studies have documented the impact of cottage industries on lead exposure in international settings, including: backyard battery repair and recycling of batteries (Matte et al. 1989) and radiators (Dykeman et al. 2002) and the production of low-temperature fired lead-glazed ceramics (Fernandez et al. 1997; Hibbert et al. 1999) and tiles (Vahter et al. 1997).

Lead-glazed Ceramic Pottery

Of all the culturally specific practices and products that may put pregnant women at risk for lead exposure, the use of traditional lead-glazed ceramic pottery for cooking and storing food is perhaps the most well-documented in the literature (Hernandez-Avila et al. 1991, 1996; Romieu et al. 1994). Lead-glazed ceramics production is a mostly home-based or cottage industry in Mexico where lead monoxide (greta; 93% lead by weight) is used to make a glaze that is often set in low-temperature (<1,000 degrees), wood-fired kilns. Pottery produced in this manner can leach large amounts of lead into food and beverages being cooked, served, or stored. This traditional pottery is used throughout the country across all levels of socioeconomic status. Acute high-dose exposures from foods and beverage contaminated by traditional Mexican pottery have been reported (Matte et al. 1994) and long-term use of lead-glazed ceramics may result in chronic low-to-moderate lead poisoning and elevated body burden of lead (Hernandez-Avila et al. 1991). Cases of lead poisoning have been reported after the consumption of crushed lead-glazed pottery, mainly among Hispanic women (Shannon 2003).

Herbal and Alternative Remedies

Lead has been found in some alternative medicines and therapeutic herbs traditionally used by East Indian, Indian, Middle Eastern, West Asian, and Hispanic cultures (Garvey et al. 2001; Saper et al. 2004, 2008). These alternative medicines can contain herbs, minerals, metals, or animal products. Lead and other heavy metals are put into certain folk medicines intentionally because these metals are thought to be useful in treating some ailments. They have also been reported to be added to increase the weight of the product for substances sold by weight. Sometimes lead unintentionally gets into the folk medicine during grinding, coloring, or other methods of preparation. Lead has been found in powders and tablets given for arthritis, infertility, upset stomach, menstrual cramps, colic, and other illnesses. Case Study 4-2 describes lead poisoning associated with ayurvedic medicines.

Most of the published literature relating herbal therapies and alternative medicines to elevated BLLs has been in case reports of children or adults (Ernst 2002; Lynch and Braithwaite 2005), not specifically in women of childbearing age or pregnant or lactating women. Many of the alternative therapies used were self-administered, rather than recommended by a traditional healer or health care provider. In a case study of one 45-year old Korean man who drank Chinese herbal tea for medicinal purposes, Markowitz et al. (1994) found a blood lead level of 76 µg/dL. The lead exposure was found to be hai ge fen (clamshell powder), one of 36 ingredients in the tea, which had become contaminated with lead. In another report, Cheng et al. (1998) described that six of eight children found to be taking herbal medicines had BLLs >10 µg/dL. Use of greta was described in a 2-year-old boy identified with a blood lead level of 83 µg/dL in a CDC report (1993). A review of 1991-1992 California data yielded 40 cases with BLLs >20 µg/dL where children had received ethnic remedies. Over 80% of these children had Hispanic surnames (Centers for Disease Control and Prevention 1993). Tait et al. (2002) reported on a 24 year-old woman from India who immigrated to Australia and delivered a child there with a neonatal BLL that was the highest recorded for a surviving infant in the country (cord BLL was 158.3 µg/dL). An exposure assessment revealed the mother's long-term ingestion of lead-contaminated herbal tablets as the source.

Use of herbal and alternative remedies is not confined to immigrant communities and reported use is substantial among the general population, as documented in several studies. Eisenberg found in a 1990 national U.S. survey that 34% of English-speaking adults >18 years of age reported use of at least one unconventional therapy (Eisenberg et al. 1993). Only 10% reported receiving these alternative therapies from a traditional healer or health care provider and 72% did not tell their medical doctor that they used unconventional therapy. Highest use was in non-Black individuals between the ages of 25 to 49 with relatively higher education and income. A follow-up survey conducted in 1997 found that use had increased to 42% (Eisenberg et al. 1998). More than 60% did not tell their medical doctors that they used alternative therapies. A 2001 New York City study found that 47% of women used medicinal therapies (Factor-Litvak et al. 2001). In a questionnaire survey of herbal medicine use among 734 women who had recently or were about to give birth in Massachusetts, Hepner et al. (2002) found that 7.1% reported the use of herbal remedies mostly on the advice of their health care provider. Although the rates of reported use of herbal and alternative remedies vary, symptomatic cases of lead poisoning have been reported from these sources.

Case Study 4-2. Lead Poisoning Associated with Ayurvedic Medications, California (2003)

Lead poisoning can occur from use of alternative or folk remedies. Ayurveda is a traditional form of medicine practiced in India and other South Asian countries. Ayurvedic medications can contain herbs, minerals, metals, or animal products and are made in standardized and nonstandardized formulations.

A woman aged 31 years visited an emergency department with nausea, vomiting, and lower abdominal pain 2 weeks after a spontaneous abortion. One week later, she was hospitalized for severe, persistent microcytic anemia with prominent basophilic stippling that was not improving with iron supplementation. A heavy metals screen revealed a BLL of 112 µg/dL; a repeat BLL 10 days later was 71 µg/dL, before initiation of oral chelation therapy. A zinc protoporphyrin measurement performed at that time was >400 µg/dL. Her husband's BLL was 6 µg/dL. No residential or occupational lead sources were identified, but the woman reported taking nine different ayurvedic medications prescribed by a practitioner in India for fertility during a 2-month period, including one pill four times daily. She discontinued the medications after an abnormal fetal ultrasound 1 month before her initial BLL. Analysis of her medications revealed 73,900 ppm lead in the pill taken four times daily and 21, 65, and 285 ppm lead in three other remedies. Her BLL was 22 µg/dL when she was tested 9.5 months after the initial BLL testing.

From Centers for Disease Control and Prevention. 2004. Lead poisoning associated with ayurvedic medications—five states, 2000-2003. MMWR Morb Mortal Wkly Rep 53;582-4.

Imported Cosmetics

Kohl, also known as 'al kohl' or 'surma', is a gray or black eye cosmetic applied to the conjunctival margins of the eyes that can contain up to 83% lead. It is used in the Middle East, India, Pakistan, and some parts of Africa for medicinal and cosmetic reasons (Parry and Eaton 1991). It is believed to strengthen and protect the eyes against disease. These cosmetics have been associated with elevated lead levels in children (Mojdehi and Gurtner 1996; Sprinkle 1995) and may also be used by women of childbearing age (Moghraby et al. 1989), especially those who are recent immigrants to the United States. [See Appendix V For a detailed list of alternative medicines, herbs, and cosmetics that may contain lead.]

Foods and Other Consumer Products

Lead can enter the food chain from contaminated soil or water, deposition from the air, or contact with food containers and processing. In the United States, dietary intakes of lead have been reduced due to: the removal of lead from gasoline; the elimination of lead-soldered cans and lead-based printing ink on candy wrappers and bread bags; and changes to agricultural practices, such as banning of lead-arsenate pesticides (Bolger et al. 1991, 1996). The U.S. Food and Drug Administration (FDA) maximum total tolerable daily intake (TTDI) of lead is 6 µg/day for children under 6 years of age, 25 µg/day for pregnant women, and 75 µg/day for other adults (Bolger et al. 1996; Carrington et al. 1996; U.S. Food and Drug Administration 1993). These values were established when dietary intake levels were higher than current estimates. Several scientists have suggested that this standard be revised and made more rigorous, which would lower the TTDI for children to 1 µg/day (Carrington et al. 1996; Ross, et al. 2000). Nonetheless, results from the Total Diet Study (sometimes called the market basket study)—an ongoing assessment by FDA that determines levels of various contaminants and nutrients in foods—indicate that current levels of lead in the U.S. food supply are quite low (available at http://www.cfsan.fda.gov/~comm/tds-toc.html). The estimated daily dietary intake in the United States is currently estimated to be in the range of 2 to 10 µg.

On occasion, imported foods and food products brought to the United States have been identified with elevated levels of lead. For instance, Lozeena is an orange powder used to color rice and meat that contains 7.8%-8.9% lead (U.S. Centers for Disease Control and Prevention 1998). FDA has issued warnings about tamarind candy lollipops (labeled Dulmex brand "Bolirindo") imported from Mexico due to high levels of lead that may be associated with the product, especially in the wrapper (U.S. Food and Drug Administration 1993, 2001). Analysis of these wrappers, which children may chew on or lick, showed between 21,000 to 22,000 parts per million (ppm) of lead while the lollipop sticks contained more than 400 ppm of lead, and the candy itself contained approximately 0.2 ppm of lead. Recently, the FDA revised the recommended maximum lead level for lead in candy to 0.1 ppm (U.S. Food and Drug Administration 2006). Traditional food products that are contaminated with lead may be brought into the U.S. through unregulated routes (Handley et al. 2007). Chapulines (grasshoppers) from Mexico, for example, have been found to contain high levels of lead and have been the subject of a health alert by the California Department of Health Services (California Department of Health Services 2003). "Natural" calcium supplements derived from animal bone may contain lead (Ross et al. 2000; Scelfo and Flegal 2000). Waterfowl may ingest lead shot, become contaminated, and possibly be consumed by unsuspecting hunters and their families (Levesque et al. 2003). In addition, regular ingestion of game meat harvested with lead ammunition may be be a source of lead exposure (Kosnett 2009).

Lead in Drinking Water

Control measures taken during the last two decades, including actions taken under the requirements of the 1986 and 1996 amendments to the Safe Drinking Water Act and the Environmental Protection Agency's (EPA) Lead and Copper Rule (U.S. Environmental Protection Agency 1991, 1997a), have greatly reduced exposures to lead in tap water. Even so, lead still can be found in some metal water taps, interior water pipes, or pipes connecting a house to the main water pipe in the street (Centers for Disease Control and Prevention 2004b). Lead found in tap water usually comes from the corrosion of older fixtures or from the solder that connects pipes. When water sits in leaded pipes for several hours, lead can leach into the water supply. Most studies show that consumption of lead-contaminated water alone would not be likely to elevate blood lead levels in most adults to a level that is toxicologically significant, even exposure to water with a lead content close to the EPA action level for lead of 15 parts per billion (ppb) (U.S. Environmental Protection Agency 1991). Risk will vary, however, depending upon the individual, the circumstances, and the amount of water consumed. For example, infants who drink formula prepared with lead-contaminated water may be at higher risk because of the large volume of water they consume relative to their body size and the higher percentage of lead they absorb (Baum and Shannon 1997). [See related discussion on lead in reconstituted infant formula, Chapter 9.] Officials in communities that are considering changes in water additives or that have implemented such changes in water disinfection should assess whether these changes might result in increased lead in residential tap water (Centers for Disease Control and Prevention 2004b; Miranda 2007). EPA has asked all state health and environmental officials to monitor lead in drinking water at schools and day care centers.

Lead Paint: Home Repair, Renovation, and Remodeling Activities

Lead-based paint was commonly used in homes built before 1950, and was not banned from sale for residential use in the United States until 1978. Recent studies estimate that more than 38 million U.S. homes still contain some lead-based paint, with two-thirds of the houses built before 1960 containing lead-based paint hazards (Jacobs et al. 2002). Lead-based paint hazards were concentrated in homes with incomes less than $30,000 (35% vs. 19% in homes with incomes >$30,000) and in the Northeast and Midwest where the prevalence was twice as high as in the South and West.

Lead in paint and house dust are the most common sources of exposure in U.S. children (Lanphear et al. 1998). Among adults, however, exposure to lead-based paint and construction-related lead hazards occurs mainly during home repair, renovation, and remodeling activities conducted by the residents themselves or due to improper work practices of tradesmen and contractors (Centers for Disease Control and Prevention 2009;

Feldman 1978; Fischbein et al. 1981; Jacobs 1998; Jacobs et al. 2003; Marino et al. 1990; Reisman et al. 2002; U.S. Department of Housing and Urban Development 1995).

Two basic circumstances increase the risk for an adult's exposure to lead-based paint: if paint has deteriorated, and when paint has been disturbed during remodeling or renovation. Paint deterioration can be caused by moisture problems, poor maintenance, or other problems. The paint on moveable building components (friction and impact surfaces such as windows and doors) pose higher risks because routine opening/closing can damage the paint on their surfaces over time and lead-based paint was used on these components historically. Property owners should take precautions when repainting surfaces with deteriorated paint or performing any remodeling or renovation work that disturbs painted surfaces (such as scraping off paint or tearing out walls) (U.S. Environmental Protection Agency 1997b).

The U.S. government defines lead-based paint hazards as not only encompassing lead-based paint, but also dangerous levels of lead in settled dust and bare soil. Testing for lead-based paint hazards can be done either by obtaining dust wipe samples from the floor and window sills or by using a portable x-ray fluorescence analyzer (XRF) to document the presence of lead in paint. EPA's 2001 hazard standard (40 CFR 745) set the benchmark for floor dust lead level at 40 µg/ft2 and 250 µg/ft2 for interior window sills.

Lead-contaminated Soil

Soil may contain lead from deteriorating, exterior lead-based paint or other sources such as deposition from years of leaded gasoline use or industrial emissions. Lead-contaminated soil can be tracked into the home and mixed with household dust, which may also contain lead from interior paint sources. In the United States, lead-contaminated soil is defined as a hazard if there is 400 ppm of lead in bare soil in children's play areas or an average of 1,200 ppm for bare soil in the rest of the yard (U.S. EPA 2001). Poisoning from lead-contaminated soil is most common among young children who play on the floor and commonly mouth objects, but has also been reported to occur in women who consume lead-contaminated soil. For example, cases of lead poisoning have been reported after the consumption of lead-contaminated soil (Case Study 4-3). Exposure to lead from food grown in lead contaminated soil in urban gardens has also been noted (Finster et al. 2004).

Case Study 4-3. A Case of Lead Poisoning from Soil Ingestion During Pregnancy

S.N. is a 33-year-old woman who was pregnant four times with three living children. She was born in Jamaica, West Indies, and immigrated to the United States during her most recent pregnancy. Her obstetric history included three prior uncomplicated full-term vaginal deliveries. She registered for prenatal care at 19 weeks' gestation with no significant historical problems. On questioning, she revealed a history of pica, eating soil from near her house. Her initial tests included a blood lead level of 26 µg/dL, free erythrocyte protoporphyrin 48 (normal < 35 µg/dL), Hgb 9.5 g/dL, and Ferritin 4.9 ng/dL. She was counseled to stop the pica behavior and referred for genetic and nutritional counseling and to a special lead clinic. Her repeat blood lead level at 23 weeks' gestation was 13 µg/dL. Environmental lead tests of the water were negative. Soil tests were negative, except for areas around the garage door of her house. The patient had no knowledge of lead levels or lead testing during her other pregnancies in Jamaica. She was admitted for induction of labor at 38 weeks' gestation due to preeclampsia. She had a normal spontaneous vaginal delivery of a girl, 3,395 grams. Apgar scores were 9 at 1 minute and 9 at 5 minutes. She was discharged on day 3 and followed postpartum as her blood pressure gradually decreased to normal levels. Her postpartum blood lead level was 13 µg/dL and free erythrocyte protoporphyrin 60. S.N. decided to breastfeed and bottle-feed. At 6 weeks, the baby was noted to have a blood lead level of 20 µg/dL.

From: Hackley B, Katz-Jacobson A. 2003. Lead poisoning in pregnancy: a case study with implications for midwives. J Midwifery Womens Health 48(1):30-8.

Point Sources of Lead

Point sources of lead exposure include active mining and smelting operations, lead contamination at former mining and smelting sites, and industrial emissions, such as those from battery-manufacturing and recycling activities, particularly in international settings where environmental regulations and monitoring programs may not be in place. Studies have documented the impact of lead mining and smelting activities, both in the United States and elsewhere (Baghurst et al. 1987; Benin et al. 1999; Graziano et al. 1990), and women who live near active or former lead mines and smelters may be exposed to high levels of lead contamination.

Leaded Gasoline

Recognition of the toxic effects of lead has prompted interventions that have resulted in reductions in lead exposure in many countries. In the United States, standards to phase out leaded gasoline use were first implemented in 1973 (U.S. Environmental Protection Agency 1973). In 1995, leaded fuel accounted for only 0.6 % of total gasoline sales in the United States and, in 1996, the Clean Air Act banned the sale of leaded fuel for use in on-road vehicles (U.S. Environmental Protection Agency 1996). A worldwide initiative to phase-out lead in gasoline has already stimulated important reductions in ambient air lead levels and population blood lead levels in some countries (Cortez-Lugo et al. 2003; Romieu et al. 1992). A complete phase-out of leaded gasoline was completed throughout the Latin American and Caribbean region by 2005 (Burke 2004; Walsh 2007). However, in some parts of Africa, Asia, and the Middle East, leaded gasoline is still common (Partnership for Clean Fuels and Vehicles 2007). The impact of leaded fuel is more important in urban settings, given their higher vehicular density.

Hobbies and Recreational Activities

Hobbies and recreational activities that may cause exposure to lead include, but are not limited to creating stained glass; enameling copper; casting bronze; making pottery with certain leaded glazes and paints; casting ammunition, fishing weights, or lead figurines; jewelry making and electronics (with lead solder); glassblowing with leaded glass; print-making; refinishing old furniture; distilling liquor; hunting; and target shooting.

Table 4-1. Risk Factors for Lead Exposure in Pregnant and Lactating Women

- **Recent immigration from or residency in areas where ambient lead contamination is high.** Women from countries where leaded gasoline is still being used (or was recently phased out) or where industrial emissions are not well controlled.
- **Living near a point source of lead**, such as lead mines, smelters, or battery recycling plants (even if the establishment is closed).
- **Working with lead or living with someone who does.** Women who work in or who have family members who work in lead-industry (take-home exposures).
- **Using lead-glazed ceramic pottery.** Women who cook, store, or serve food in lead-glazed ceramic pottery made in a traditional process and usually imported by individuals outside the normal commercial channels.
- **Eating nonfood substances (pica).** Women who eat or mouth nonfood items that may be contaminated with lead (such as soil or lead-glazed ceramic pottery).
- **Using alternative or complementary medicines, herbs, or therapies.** Women who use imported home remedies or certain traditional herbs that may be contaminated with lead.
- **Using imported cosmetics or certain food products.** Women who use imported cosmetics, such as kohl or surma, or certain imported foods or spices that may be contaminated with lead.
- **Engaging in certain high-risk hobbies or recreational activities.** Women who engage in high-risk activities or have family members who do.
- **Renovating or remodeling older homes without lead hazard controls in place.** Women who have been disturbing lead paint and/or creating lead dust or spending time in such a home environment.
- **Consumption of lead-contaminated drinking water.** Women whose homes have leaded pipes or source lines with lead.
- **Having a history of previous lead exposure or evidence of elevated body burden of lead.** Women who may have high body burdens of lead from past exposures, particularly those who are deficient in certain key nutrients (calcium, iron).
- **Living with someone identified with an elevated lead level.** Women who may have exposures in common with a child, close friend, or other relative living in same environment.

Table 4-2. Key Recommendations to Prevent or Reduce Lead Exposure in Pregnant and Lactating Women

- Never eat or mouth nonfood items, such as clay, soil, pottery, or paint chips, because they may be contaminated with lead (see Appendix III).
- Avoid jobs or hobbies that may involve lead exposure, and take precautions to avoid take-home lead dust if a household member works with lead. Such work includes construction or home renovation/repair in pre-1978 homes, and lead battery manufacturing or recycling. [See Appendix IV]
- Avoid using imported lead-glazed ceramic pottery produced in cottage industries (described elsewhere in this chapter) and pewter or brass containers or utensils to cook, serve, or store food.
- Avoid using leaded crystal to serve or store beverages.
- Do not use dishes that are chipped or cracked.
- Stay away from repair, repainting, renovation, and remodeling work being done in homes built before 1978 in order to avoid possible exposure to lead-conaiminated dust from old lead-based paint. Avoid exposure to deteriorated lead-based paint in older homes.
- Avoid alternative cosmetics, food additives, and medicines imported from overseas that may contain lead, such as azarcon, kohl, kajal, surma, and many others listed in Appendix V.
- Use caution when consuming candies, spices, and other foods that have been brought into the country by travelers from abroad, especially if they appear to be noncommercial products of unknown safety.
- Eat a balanced diet with adequate intakes of iron and calcium, and avoid the use of cigarettes and alcohol.

Key Recommendations for Initial Blood Lead Testing

- Blood lead testing of all pregnant women in the United States is not recommended.
- State or local public health departments should identify populations at increased risk for lead exposure and provide guidance about community-specific risk factors to assist clinicians in determining the need for blood lead testing for identified populations or for individuals at risk.
- Routine blood lead testing of pregnant women is recommended in clinical settings that serve populations with identified risk factors for lead exposure.
- In clinical settings where routine blood lead testing of pregnant women is not indicated on the basis of community-specific risk factors, health care providers should consider the possibility of lead exposure in individual pregnant women by evaluating risk factors for exposure as part of a comprehensive occupational, environmental, and lifestyle health risk assessment of the pregnant woman [see Table 4-1]. Blood lead testing should be performed if a single risk factor is identified at any point during pregnancy.
- When indicated, blood lead testing should take place at the earliest contact with the patient, ideally pre-conceptionally or at the first prenatal visit, and be conducted using venous blood lead tests only.
- Both maternal and infant blood lead level test results, along with relevant environmental findings, should be incorporated into both the mother's and the infant's medical records in a timely fashion. Even though such records are likely to be maintained separately, these data are necessary for proper medical management of mother and infant.

Key Recommendations for Follow-up Blood Lead Testing

- A toxicological threshold for adverse health effects has not been identified. Thus, follow-up blood lead testing is recommended for pregnant women with BLL ≥5 µg/dL and their newborn infants to inform environmental and clinical decision-making.
- Pregnant women with confirmed BLLs ≥45 µg/dL should be considered as high-risk pregnancies and managed in consultation with experts in lead poisoning and high-risk pregnancy.

INTRODUCTION

This chapter describes considerations for initial and follow-up blood lead testing during pregnancy and early infancy. It provides information for providers, public health agencies, and communities to guide the approach to the testing and follow up of blood lead levels where lead exposure above background levels is either known or thought to be a concern or where there is no information on the epidemiology of blood lead levels among the target groups (pregnant women and infants less than 6 months of age). The tables outlining frequency of follow-up blood lead testing of newborns [Table 5-1] and infants [Table 5-2] exposed *in utero* fill a gap left by the CDC recommendation for the follow-up testing of lead-exposed children, which begins at age 6 months (Centers for Disease Control and Prevention 1991, 2002).

The strategy described in this chapter for secondary prevention of lead toxicity through testing and identification of lead-exposed pregnant women is focused on the individual. However, a primary prevention strategy of community-focused reduction of lead sources is crucial to prevent the adverse consequences of lead exposure. Secondary prevention strategies, such as testing and follow up of lead exposure above background levels in individual women, do not adequately prevent exposure or the resultant adverse health outcomes. An understanding of the community characteristics, ethnicity, cultural practices, local industry and common occupations, and alternative medicine use practices will assist in identifying groups of women at risk for lead exposure. This strategy may be successful in primary prevention of exposure to the developing fetus and infant if it guides health education and outreach activities in high-risk communities.

IDENTIFICATION OF PREGNANT WOMEN WITH ELEVATED BLOOD LEAD LEVELS

Screening for Elevated Blood Lead Levels

The purpose of screening pregnant women is to identify women exposed to lead who can reasonably be expected to benefit from the knowledge of their lead exposures above background levels and subsequent actions to prevent additional lead exposure or adverse effects to themselves or their fetuses. In this report, screening refers to a laboratory test that is performed on a blood sample from an asymptomatic person to determine if that person has evidence of lead exposure above background levels. One goal of identifying pregnant women at risk is to prevent the potential adverse health outcomes for mother and infant associated with lead exposure during pregnancy. As described in Chapter 2, evidence suggests that no threshold exists for the impacts of lead on maternal health or on the birth, growth, and neurodevelopmental outcomes of the offspring. NHANES data on the blood lead levels of U.S. women of childbearing age indicate that a BLL ≥5 µg/dL is higher than the 98th percentile (or 3 standard deviations) for this population (Centers for Disease Control and Prevention 2009, unpublished data). Thus, a BLL ≥5 µg/dL indicates that a pregnant woman has been exposed to lead well above the U.S. average exposure.

The U.S. Preventive Services Task Force (USPSTF) recently completed a review of the evidence for lead screening in pregnancy. USPSTF found no studies examining the effectiveness of screening or interventions on improving health outcomes in asymptomatic pregnant women, and a lack of availability of evidence for interventions to reduce blood lead levels in this population. The potential harms of screening cited include false-positive test results, anxiety, inconvenience, work or school absenteeism, and financial costs associated with repeated testing (Rischitelli et al. 2006; U.S. Preventive Services Task Force 2006). However, the USPSTF review did not assess the health impact on subpopulations exposed to lead prenatally or during breastfeeding or the benefits of screening only such subgroups.

CDC has determined that there is evidence for health effects in asymptomatic pregnant women at the population level and that a threshold for these effects has not been established. However, there is currently a lack of evidence of improved outcomes from interventions provided to pregnant women with a BLL ≥5 µg/dL since no studies on this point exist. Therefore, the traditional model for medical decision-making of a case definition linked directly to a proven clinical treatment is not useful in this context. Until such research data are available, and given the convincing evidence of neurodevelopmental effects of lead in the prenatal period, CDC recommends a precautionary approach, noting that a BLL ≥5 µg/dL in a pregnant woman indicates that she has or has recently had exposure to lead well above that for most women of child bearing age in the U.S. population. Since there are still many potential lead sources that a pregnant woman can encounter, a blood lead test is a simple and inexpensive way to identify pregnant women with lead exposures above background levels, so that lead sources can be identified and further exposure can be prevented in the best interests of the mother and child. In addition, source identification and remediation activities may benefit other household and community members, depending upon the source in question, as well as the mother and fetus/infant in subsequent pregnancies. Finally, in contrast to abstract and generalized anticipatory guidance, blood lead test results above background levels are also concrete and actionable data points that may help focus attention by an expectant woman on the challenge of identifying and reducing lead exposure.

Blood Lead Testing in the General Population and High-risk Subgroups

Universal blood lead testing of all pregnant women in the United States is not warranted (Rischitelli et al. 2006; U.S. Preventive Services Task Force 2006) considering the current estimated prevalence of elevated blood lead levels is less than 1% of women of childbearing age (Centers for Disease Control and Prevention 2009, unpublished data). However, routine blood lead testing may be warranted in specific U.S. subpopulations at increased risk for lead exposure due to local, community-specific factors, such as environmental sources of lead or the demographics of the population. In addition, individual characteristics and behaviors put certain populations of women of childbearing age at increased risk for lead exposure relative to that of the general population.

The presence of risk factors in a subpopulation of pregnant women, for example in a particular clinic population, is an indication for routine blood lead testing among all pregnant women in this subpopulation. [See Case Studies 4-1 and 4-2 for examples from Elmhurst, New York, and California, respectively.] State or local public health departments should provide clinicians with information on community-specific risk factors appropriate for use in determining the need for routine blood lead testing, including data describing the distribution of blood lead levels in the community and local knowledge of immigration patterns and ethnicity, common occupations, alternative medicine use, cultural practices, local industries, and idiosyncratic sources. Routine testing should continue in subpopulations known to be at increased risk until the specific risk factors within that population are better understood and more targeted methods for identifying women at increased risk can be employed.

The presence of a large industry in a community, such as a battery recycling plant or a lead smelter, is also indication for blood lead testing of the local pregnant population. A list of occupations with the potential for lead exposure can be found in Appendix IV. When the prevalence of lead exposure above background levels is known to be high in certain communities, it may benefit the providers to develop a centralized blood lead testing program at a local hospital, clinic, or community center.

Individual Risk Factor Assessments

Blood lead testing of individual pregnant women based on individual risk factors may be warranted even when blood lead testing of population subgroups is not warranted. Identification of women who may be at increased risk for lead exposure consists of a comprehensive occupational, environmental, and lifestyle history to assess individual risk. However, validated risk factor questionnaires do not currently exist to predict who would benefit from blood lead testing. Local variation in lead exposure patterns makes national development of such a tool impractical. Instead, development (or adaptation) and validation of a risk factor questionnaire should occur at the local level, under the leadership of local public health authorities, after local risk factors for lead poisoning in pregnancy have been ascertained.

In general, when risk factor questionnaires are used, a positive answer to any question should prompt the measurement of the patient's blood lead level. The New York City Department of Health and Mental Hygiene developed a short tool consisting of five questions (New York City Department of Health and Mental Hygiene 2006) [see Figure 5-1]. The Minnesota Department of Health recommends a seven-question tool (Minnesota Department of Health 2007) [see Figure 5-2]. At the time of publication of this document, these risk factor questionnaires have not yet been validated. Nevertheless, such questionnaires do have an inherent educational value, as they stimulate dialogue between the health-care provider and patient and create an opportunity to educate families about lead hazards.

Assessments of other risk factor questionnaires primarily for children have been conducted, including one that was adapted for use with pregnant women. Stefanak et al. (1996) assessed the accuracy of the CDC childhood lead poisoning risk questionnaire (Centers for Disease Control and Prevention 1991) for administration as a screening tool to 314 pregnant women. In this study, which included both rural and urban areas, questions

associated with elevated blood lead in pregnant women included the following: home built before 1960 with chipping or peeling paint, current smoker, and consumption of more than nine servings of canned food per week. Women who answered "yes" to any one of those questions were five times more likely to have an elevated blood lead level (BLL ≥10 µg/dL) ($p<0.001$). The authors calculated the sensitivity and negative predictive value of the CDC questionnaire to be 75.7% and 93.1%, respectively, in this population, suggesting a high confidence that a negative response would classify a respondent correctly. However, the positive predictive value was only 46%, suggesting less confidence in a positive response to correctly classify individuals. When a full 19-question survey was administered, the sensitivity and negative predictive value increased to 89.2% and 96.4%, respectively. The performance difference between the questionnaires is most likely because the CDC childhood lead poisoning risk factor questionnaire developed for children does not target the major sources of lead exposure in pregnant women.

Clinical Indicators for Blood Lead Testing

Clinical indications for measuring a blood lead level include the presence of a risk factor for exposure, physical signs or symptoms, or the presence of a household member with known lead exposure above background levels. Most individuals with measurable lead exposure above background levels are asymptomatic. When symptoms or physical findings of lead poisoning are present, they are often difficult to differentiate as they are generally nonspecific and quite common. These include constipation, abdominal pain, anemia, headache, fatigue, myalgias and arthralgias, anorexia, sleep disturbance, difficulty concentrating, and hypertension, among others. Blood lead levels should be measured when these symptoms are present and the suspicion of a source of lead exists. Blood lead levels should also be measured in the work-up of acutely ill pregnant women presenting with severe abdominal colic, seizure, or coma, and considered in the differential diagnosis of consistent constitutional symptoms (e.g., persistent headache, myalgias, fatigue, etc.) and anemia.

Timing of Blood Lead Testing During Pregnancy

Identifying maternal lead exposure prior to conception or early in the pregnancy potentially offers the most benefit to the developing fetus. Unfortunately, lead poisoning is frequently identified late in pregnancy. Klitzman et al. (2002) reports that the median gestational age at diagnosis was 25.4 weeks (range 6 to 39), while Shannon (2003) reports that lead poisoning was discovered in the third trimester in 12 of 15 (86%) subjects after the women presented with subtle but characteristic findings of severe lead poisoning, including malaise, anemia, or basophilic stippling on blood smear. Early blood lead testing may not always identify lead poisoned women sooner in cases where the exposure is first occurring during pregnancy, such as pregnancy-related pica behavior. In these cases, the measurement of a BLL preconception or early in the first trimester may precede the patient's exposure. Earlier testing, however, does have the benefit of early identification in pregnant women with chronic, ongoing, or historical cumulative exposures (Hu 1991; Hu and Hernandez-Avila 2002; Hu et al. 1996). Therefore, it is recommended that blood lead testing of women at increased risk take place at the earliest contact with the patient, ideally preconceptionally or at the first prenatal visit.

Methods to Collect Blood Samples for Testing

Although blood lead levels can be measured from both capillary and venous samples, the preferred method for adults is a venous blood sample in a vacuum tube. Venous samples are more reliable than capillary blood lead levels, which can be inaccurate due to environmental contamination or dilution of the specimen from finger squeezing. Capillary samples can be used if strict protocols are employed to reduce the risk for contamination; however, even if obtained under these conditions, a capillary BLL ≥5 µg/dL requires confirmation with a venous blood lead test.

Methods to Analyze Lead Levels in Blood

Blood lead levels from venous samples should be analyzed by a certified laboratory using one of the approved methods such as: inductively coupled plasma mass spectroscopy (ICP-MS), graphite-furnace atomic

absorption spectrophotometry (GFAAS), or anodic-stripping voltammetry (ASV). Specimen tubes for collection should be lead-free and laboratories should be consulted about the preferred specimen tube and collection procedures. For details about laboratory analytic procedures see *Analytical Procedures for the Determination of Lead in Blood and Urine, Approved Guideline* (Parsons et al. 2001); available at http://www.clsi.org/source/orders/free/c40-a.pdf 22.

Using a centralized laboratory ensures the accuracy of testing and enables better compliance with local reporting requirements. Clinical Laboratory Improvement Act (CLIA) certification of laboratories and participation in national proficiency testing programs helps assure that the methods employed for blood lead testing are accurate and precise to within a specified range of BLLs. Regardless of the method employed, CLIA-mandated proficiency testing programs require accuracy to within the range of +/- 4 µg/dL (or +/- 10%). The limits of detection, accuracy, and precision of BLL determination will vary with the type of method used and among laboratories using the same method. Of the three commonly used methods, ICP-MS and GFAAS have limits of detection of about 0.3-1.0 µg/dL with values reported to two significant figures. ASV has a detection limit of 1-3 µg/dL and is less precise usually reporting values as whole numbers, but is adequate for BLL testing above the limit of detection. For medical interpretation and decisions on management, BLLs can be rounded to a whole number.

Measurement of the BLL of patients at risk for lead exposure can also be done at the point-of-care using a portable blood lead analyzer (Pineau et al. 2002; Shannon and Rifai 1997). Although this method offers the benefit of an immediate result and intervention, point-of-care measurements for pregnant women should be limited to situations where sending specimens to a centralized, certified laboratory is not feasible due to logistics, lack of refrigeration, or cost limitations. Any blood lead measurement ≥5 µg/dL obtained by this method should be confirmed by a certified laboratory with a venous blood lead test (as noted in the point-of-care's instrument use guidance).

Interpretation of Blood Lead Test Results

Analytical variability must be considered when interpreting blood lead results. Changes in successive blood lead measurements on an individual can be considered significant only if the net difference of results exceeds the analytic variance of the method. The degree of analytical variability between laboratories that employ different analytic methods usually exceeds that within a single laboratory. Therefore, a single laboratory using one analytical method should be used to best compare multiple blood lead results from an individual or a population (Centers for Disease Control and Prevention 2005). As a practical matter, ACCLPP therefore recommends that trends in blood lead levels for an individual should not be considered clinically significant until the magnitude of the change is ≥5 µg/dL (Binns et al. 2007).

As described above, a BLL ≥5 µg/dL indicates that a pregnant woman has been exposed to lead well above the average U.S. exposure. Separate scientific studies indicate that adverse effects at BLLs ≥5 µg/dL are likely in pregnant women and likely to increase with increasing blood lead levels. Therefore, additional actions on the part of health care providers and public health are indicated for pregnant women with BLLs ≥5 µg/dL and their infants (see Table 6-1).

As described in Chapter 6, occupationally exposed women should be referred to an occupational physician or center treating occupationally exposed adults. Steps to minimize lead exposure should be undertaken if the BLL is ≥5 µg/dL, and medical removal from workplace exposure should be undertaken if the BLL is ≥10 µg/dL.

Transmission of Blood Lead Test Results

Health care providers have two important responsibilities with respect to sharing laboratory reports of blood lead levels. First, blood lead levels of both mother and child should be transmitted and entered into both the mother's and the infant's medical records in a timely fashion. For instance, the infant's initial and sequential

BLLs should be in the mother's chart, and vice versa, as these data should inform decisions about additional blood lead testing, breastfeeding, and environmental interventions, among other actions. In addition, information about identified lead exposure sources can be clinically useful and should be shared.

In jurisdictions where reporting of BLLs is not done by laboratories, health care providers should also notify the Lead Poisoning Prevention Program of the local or state health department of confirmed BLLs ≥10 µg/dL in a pregnant woman to ensure that health department data are complete and that women receive appropriate services from public health. The report should include complete demographic information on the patient, the health care provider's name and phone number, and the method of sample collection (venous or capillary).

FOLLOW-UP TESTING IN THE PREGNANT WOMAN

Once a blood lead level ≥5 µg/dL has been identified, an important component in the management of lead-exposed individuals is follow-up blood lead testing to assess trends. After the source of exposure has been identified and removed, it is expected that the BLL will decline. However, there is no clear formula to estimate the expected rate of decline of BLLs in exposed women or their offspring. Several factors play a role, including duration of the exposure, presence of physiological stressors affecting bone turnover rates, nutritional status, and medical and environmental interventions.

Follow-up blood lead testing is indicated for pregnant women with a BLL ≥5 µg/dL according to the schedules in Table 5-3. At higher BLLs, a follow-up confirmatory BLL might be indicated earlier than on the schedule provided. Even a single BLL ≥5 µg/dL should prompt the asking of certain risk related questions as soon as possible. Depending on the answers, it may be important to take immediate action. For example, if a pregnant woman from India has a BLL of 10 µg/dL and is taking ayurvedic supplements, she should be advised to immediately stop taking the supplements instead of waiting weeks for another BLL.

When the patient's BLL does not fall after several months, the various factors that may impact the rate of decline (i.e., duration of exposure, psychological stressors, nutritional status, and medical and environmental interventions) should be reconsidered. In some cases, further environmental investigation may be needed. A continuing increase in the measured venous BLL during the follow-up period may indicate continuing or possibly increased exposure to lead and indicates a need for further environmental investigation. Potential causes of rising BLLs in pregnant women include the failure to address the source of the lead or inappropriate management of the lead source; continued use of lead-contaminated products such as spices, foods, cosmetic, folk remedies or lead-glazed ceramics that were not revealed during the initial investigation; and increases in mobilization of bone lead stores from past, high-dose exposures. Additionally, prevention of exposure to lead from occupational sources may not be adequate to maintain a BLL below the level of concern. (See Chapter 6 for medical management guidelines for occupationally exposed women.) Measurement of follow-up BLLs is the main method for determining how urgently additional intervention is needed and whether blood lead levels are declining once interventions, such as removal from the source of exposure, have taken place.

As described in Chapter 3, blood lead levels in pregnancy generally follow a U-shaped curve over the course of pregnancy, with peak blood lead level appearing to be at or near delivery. Assuming unchanging lead intake, the combination of hemodilution, increased weight of organs, and enhanced metabolic activity may account for much of the observed decrease in whole blood lead between 12 and 20 weeks gestation. Accelerated absorption of dietary lead, decreased elimination of lead from the body, and release of bone lead, perhaps following the calcium conservation strategies of late pregnancy, may all operate to yield the observed pattern of lead during pregnancy. Bone resorption dynamics change throughout pregnancy, and the implications for follow-up testing are two-fold. Pregnant women who have an initial blood lead level that is ≥5 µg/dL in the first trimester may have a lower BLL on repeat testing during the second trimester, regardless of interventions. This blood lead level may increase prior to delivery and may, in fact, be higher than the initial level. Addition-

ally, the measured BLL of pregnant women in the second and late first trimesters may be an underestimation of the actual body lead burden. However, the magnitude of this change is uncertain and it is unclear whether the change is clinically significant for determining whether a follow-up BLL <5 µg/dL measured in the first or second trimester should be repeated again at or near delivery. In addition, a single blood lead level cannot be used to establish a woman's risk during her entire pregnancy.

FOLLOW-UP TESTING IN THE NEWBORNS AND INFANTS <6 MONTHS OF AGE

Maternal and umbilical cord lead levels at delivery are, in most cases, highly correlated. However, in a woman with a known BLL ≥5 µg/dL during pregnancy, umbilical cord or neonatal lead levels should be measured to establish a baseline for clinical management. Follow-up blood lead testing is indicated for neonates and infants with a BLL ≥5 µg/dL according to the schedules in Tables 5-1 and 5-2. After the child is 6 months of age, recommendations from *Managing Elevated Blood Lead Levels Among Young Children: Recommendations from the Advisory Committee on Childhood Lead Poisoning Prevention* (Centers for Disease Control and Prevention 2002) should be followed.

Potential causes of rising BLLs in newborns and infants under the age of 6 months include environmental sources of lead exposure, such as environmental contamination from lead dust and lead in the diet. Not enough is known about the kinetics of lead in the prenatally exposed newborn to make reliable projections about the rate of change of infant BLLs after birth.

FOLLOW-UP TESTING IN THE LACTATING MOTHER AND NURSING INFANT

Postpartum maternal blood lead levels are expected to increase during the first month after delivery (Osterloh and Kelly 1999; Rothenberg et al. 2000). This increase is thought to be due partially to postpartum hemoconcentration due to fluid loss and is also greater in lactating women than in women who bottle-feed their infants, suggesting that lactation stimulates the release of lead from bone (Tellez-Rojo et al., 2002) and that bone lead mobilization may actually be higher during lactation than in pregnancy (Gulson et al., 1998). These findings illustrate the importance of understanding that an increase in maternal blood lead level after delivery may not necessarily be associated with a new source of exogenous exposure and may, in fact, result from endogenous release of cumulative bone lead stores. However, it is difficult to draw a conclusion from the scientific literature about the magnitude of the change warranting concern. [See Chapter 9 for information on breastfeeding and Table 9-1 for information on follow-up of blood lead levels during lactation.]

Table 5-1. Follow-up of Initial Blood Lead Testing of the Neonate (<1 Month of Age)

Initial Venous Blood Lead Level[a] (BLL; µg/dL)	Perform follow-up test(s)[b]
<5	According to local lead screening guidelines for children.
5-24	Within 1 month (at first newborn visit).[c]
25-44	Within 2 weeks. Consultation with a clinician experienced in the management of children with BLLs in this range is strongly advised.[d]
≥45	Within 24 hours and then at frequent intervals depending on clinical interventions and trend in BLLs. Prompt consultation with a clinician experienced in the management of children with BLLs in this range is strongly advised.[d]

[a]The initial blood lead level may be either from an umbilical cord sample at the time of delivery or an infant venous BLL. A venous blood sample is preferred over a capillary sample. Decisions to initiate or stop breastfeeding or initiate chelation therapy should be based on venous blood lead test results only.

[b]If infants are breastfeeding, also follow recommendations in Chapter 9.

[c]According to pediatric health supervision guidelines (well-baby visit schedule) or as clinically indicated based on trends in blood lead levels.

[d]The higher the BLL on the initial test, the more urgent the need for confirmatory testing.

Table 5-2. Schedule for Follow-up Blood Lead Testing in Infants <6 Months of Age[a,b]

Venous blood lead level (BLL, µg/dL)	Early follow up (first 2-4 tests after identification or until BLL begins to decline)	Later follow up (after BLL begins to decline)
<10	According to local lead screening guidelines for children	According to local lead screening guidelines for children
10-14	3 months[c]	Within 6-9 months
15-19	1-3 months[c]	Within 3-6 months
20-24	1-3 months[c]	Within 1-3 months
25-44	2 weeks-1 month[c]	Within 1 month
≥45	Within 24 hours[d]	As directed by clinician managing chelation treatment

Adapted from Centers for Disease Control and Prevention. 2002. Managing elevated blood lead levels among young children: recommendations from the Advisory Committee on Childhood Lead Poisoning Prevention. Atlanta: U.S. Department of Health and Human Services.

[a]After 6 months of age, recommendations from Managing Elevated Blood Lead Levels Among Young Children: Recommendations from the Advisory Committee on Childhood Lead Poisoning Prevention (Centers for Disease Control and Prevention 2002) should be followed.

[b]If infants are breastfeeding, also follow recommendations in Chapter 9.

[c]Some case managers or primary care providers may choose to repeat blood lead tests on all new patients within a month to ensure that their BLL levels are not rising more quickly than anticipated. Seasonal variation of BLLs exists and may be more apparent in colder climate areas. Greater exposure in the summer months may necessitate more frequent follow ups.

[d]Consultation with a clinician experienced in the management of children with BLLs in this range is strongly advised.

Table 5-3. Frequency of Maternal Blood Lead Follow-up Testing During Pregnancy

Venous[a] Blood Lead Level (BLL; µg/dL)	Perform follow-up test(s)[b]
<5	None (no follow-up testing is indicated).
5-14	Within 1 month. Obtain a maternal BLL[c] or cord BLL at delivery.
15-24	Within 1 month and then every 2-3 months. Obtain a maternal BLL[c] or cord BLL at delivery. More-frequent testing may be indicated based on risk factor history.
25-44	Within 1-4 weeks and then every month. Obtain a maternal BLL[c] or cord BLL at delivery.
≥45	Within 24 hours and then at frequent intervals depending on clinical interventions and trend in BLLs. Consultation with a clinician experienced in the management of pregnant women with BLLs in this range is strongly advised. Obtain a maternal BLL or cord BLL at delivery.

[a]Venous blood sample is recommended for maternal blood lead testing.

[b]The higher the BLL on the screening test, the more urgent the need for confirmatory testing.

[c]If possible, obtain a maternal BLL prior to delivery since BLLs tend to rise over the course of pregnancy.

Figure 5-1. New York City Department of Health and Mental Hygiene: Recommended Lead Risk Assessment Questions for Pregnant Women

Health-care providers should use a blood lead test to screen pregnant women if they answer "yes" to any of the following questions:

1. Were you born, or have you spent any time, outside of the United States?
   In NYC, approximately 95% of identified lead-poisoned pregnant women are foreign born. Countries of birth in descending order of frequency include Mexico, India, Bangladesh, Russia, Pakistan, Ecuador, Haiti, Jamaica, Morocco, Dominican Republic, Guatemala, Guyana, El Salvador, Gambia, Ghana, Honduras, Israel, Ivory Coast, Korea, Nepal, Sierra Leone, and Trinidad.
2. During the past 12 months, did you use any imported health remedies, spices, foods, ceramics, or cosmetics?
3. At any time during your pregnancy, did you eat, chew on, or mouth nonfood items such as clay, crushed pottery, soil, or paint chips?
4. In the last 12 months, has there been any renovation or repair work in your home or apartment building?
5. Have you ever had a job or hobby that involved possible lead exposure, such as home renovation or working with glass, ceramics, or jewelry?

Figure 5-2. Minnesota Department of Health: Recommended Lead Risk Assessment Questions for Pregnant Women

Health-care providers should use a blood lead test to screen pregnant women if they answer "yes" or "don't know" to any of the following questions, or if they have moved to Minnesota from a major metropolitan area or another country within the last 12 months:

1. Do you or others in your household have an occupation that involves lead exposure?
2. Sometimes pregnant women have the urge to eat things that are not food, such as clay, soil, plaster, or paint chips. Do you ever eat any of these things—even accidentally?
3. Do you live in a house built before 1978 with ongoing renovations that generate a lot of dust (for example, sanding and scraping)?
4. To your knowledge, has your home been tested for lead in the water and if so, were you told that the level was high?
5. Do you use any traditional folk remedies or cosmetics that are not sold in a regular drug store or are homemade?
6. Do you or others in your household have any hobbies or activities likely to cause lead exposure?
7. Do you use non-commercially prepared pottery or leaded crystal?

Key Recommendations for Health Care Providers for the Management of Pregnant and Lactating Women with Blood Lead Levels ≥5 µg/dL

For women with prenatal **blood lead levels ≥5 µg/dL**,

- Attempt to determine source(s) of lead exposure and counsel patients on avoiding further exposure, including identification and assessment of pica behavior (see Chapter 4).
- Assess nutritional adequacy and counsel on eating a balanced diet with adequate intakes of iron and calcium (see Chapter 7).
- Perform confirmatory and follow-up blood lead testing according to the recommended schedules (see Chapter 5 [and Chapter 9 if breastfeeding]).
- For occupationally exposed women, review the proper use of personal protective equipment and consider contacting the employer to encourage reducing exposure.
- Encourage breastfeeding consistent with the provisos in Chapter 9.

For women with prenatal **blood lead levels of 10-14 µg/dL**, ALL OF THE ABOVE, PLUS:

- Notify Lead Poisoning Prevention Program of local health department if BLLs ≥10 µg/dL are not reported by laboratory.
- Refer occupationally exposed women to occupational medicine specialists and remove from workplace lead exposure.

For women with prenatal **blood lead levels of 15-44 µg/dL**, ALL OF THE ABOVE, PLUS:

- Support environmental risk assessment by the corresponding local or state health department with subsequent source reduction and case management.

For women with prenatal **blood lead levels ≥45 µg/dL**, ALL OF THE ABOVE, PLUS:

- Treat as high-risk pregnancy and consult with an expert in lead poisoning on chelation and other treatment decisions (see Chapter 8).

Note: Women of childbearing age with BLLs ≥5 µg/dL who are not currently pregnant or breastfeeding should be followed according to the OSHA medical surveillance guidelines in Appendix C.

INTRODUCTION

This chapter summarizes actions to be undertaken by health care providers, in coordination with local and state health departments, in providing clinical and environmental services to pregnant and lactating women with BLLs ≥5 µg/dL. Both the health department and health care provider have roles to play in keeping pregnant and lactating women and their offspring safe from further lead exposure. The chapter also describes how public health case management can work to coordinate actions between health departments and health care providers to optimize the health of and prevent lead exposure for both the affected mother and fetus or infant.

This report recommends follow-up activities and interventions beginning at BLLs ≥5 µg/dL in pregnant women; Table 6-1 presents specific CDC recommendations for medical and public health actions according to blood lead levels of the pregnant/lactating woman receiving intervention. Because the prevalence of BLLs ≥5 µg/dL, and especially ≥15 µg/dL, is low in the United States, the frequency of follow-up testing recommended herein should not be an undue burden on the health care system. Although the BLL at which particular elements of case management will be initiated is variable by jurisdiction, education and follow-up BLL monitoring should be available for any pregnant woman who has a confirmed BLL ≥5 µg/dL. More intense management, including home environmental and source investigation, should be available to any pregnant woman with a BLL ≥15 µg/dL.

Unlike the blood lead level of concern of 10 µg/dL for children, which is a communitywide action level, a BLL of 5 µg/dL in pregnant women serves a different purpose: it flags the occurrence of prior (or ongoing) lead exposure above background levels, which may not otherwise be recognized. Given the vulnerability of a developing fetus to adverse effects and the possibility of preventing additional exposures, and despite the lack of proven interventions linked to improved outcomes, CDC feels it is prudent to initiate prevention and screening activities for pregnant women showing any evidence of lead exposure above background levels. And, as noted earlier, in contrast to abstract and generalized anticipatory guidance, blood lead test results above background levels are also concrete and actionable data points that may help focus attention by an expectant woman on the challenge of identifying and reducing lead exposure.

This chapter describes the role of clinicians in medical management of pregnant and lactating women with BLLs ≥5 µg/dL, including both **clinical interventions**, with reference to detailed chapters, and **environmental counseling to reduce lead exposures**. This chapter also reviews the role of public health agencies in providing **environmental investigations** and **case management**. These essential activities complement those provided by health care providers to ensure that pregnant women receive the full spectrum of appropriate services to identify and reduce exposures to lead.

MEDICAL MANAGEMENT: ROLE OF THE HEALTH CARE PROVIDER

Medical management of pregnant women with BLL ≥5 µg/dL consists of two parallel tracks: environmental management and clinical services. The mainstay of management for pregnant women with blood lead levels ≥5 µg/dL is removal of the source, disruption of the route of exposure, or avoidance of the lead containing substance or activity. Recommendations for reducing lead exposure are presented below.

Recommended clinical care is described throughout this report in the chapters presenting the research base on blood lead testing, nutrition, chelation, breastfeeding, and other issues. For the convenience of readers, a brief overview of important aspects of clinical care to accompany environmental risk reduction is provided in Box 6-1. Each topic presented is discussed in detail in separate chapters, as noted.

Reducing lead exposure can be a complex challenge, which does not always lend itself to straightforward interventions. Lead exposure can occur in the home, community, or workplace, so identifying specific sources of lead and exposure pathway(s) for an individual is essential to reducing exposure for a particular woman. Any or all of the following strategies may need to be applied depending on a woman's residence, lifestyle, or occupation. This section describes the essential actions recommended for health care providers to assess lead exposure and counsel on its reduction.

Source identification beyond obtaining a thorough environmental and occupational history should be conducted in collaboration with the local health department when BLLs are ≥15 µg/dL. During this process, local or state health departments will visit the home to conduct in-person interviews and collect samples that allow for more-thorough understanding of the risk factors and lead sources and pathways of exposure. In some jurisdictions, an investigation of the workplace may take place as well. This information should be shared with the health care providers for both the mother and infant. Health care providers can assist in the investigation

by providing information to health departments on suspected sources that are identified during the care of the patient. In identifying the source or risk factors, testing of all family and household members of the patient for blood lead levels will reveal whether the source is common to everyone or unique to the patient.

Evaluate Occupational Exposure and Make Appropriate Notifications

While blood lead levels in occupationally exposed individuals have fallen dramatically since lead industry standards were revised in 1978 (Anderson and Islam 2006), occupational exposures are still a source of lead exposure in women (Centers for Disease Control and Prevention 2007; Fletcher et al. 1999). Public health departments and health care providers should evaluate occupation as a possible source of lead exposure in pregnant or lactating women with BLLs ≥5 µg/dL and, if occupational exposure exists, refer these women to an occupational physician or occupational medicine center that treats occupationally exposed adults. Appendix IV lists major lead-using industries.

Under current OSHA standards, workplace protections to reduce lead exposure include medical surveillance, periodic air monitoring, and provision of change and shower facilities to reduce take-home exposure. Medical removal is required by OSHA only when blood lead concentrations exceed 50 µg/dL (for construction) or 60 µg/dL (for general industry). BLLs of 40 µg/dL trigger a medical evaluation. However, the OSHA standards are out of date and are inadequate for protecting the health of lead-exposed workers, especially pregnant women and their offspring. Adverse health effects have been associated with much lower blood lead levels currently set as benchmarks for OSHA enforcement.

New evidence has emerged over the last 20 years showing that both cumulative as well as acute lead exposures pose significant health risks (Kosnett et al. 2007). As discussed in Chapter 2 of this document, lead exposure during pregnancy has been associated with an increased risk for spontaneous abortion and adverse effects on fetal growth and neurodevelopment. In response to current research findings, recent recommendations by Kosnett et al. (2007) and by the Association of Occupational and Environmental Clinics (2007) call for setting the general lead industry blood lead level of concern to 10 µg/dL; for occupationally exposed women who are or may become pregnant, the goal is to maintain a BLL <5 µg/dL.

From a clinical perspective, it is important to note that the OSHA Medical Surveillance Guidelines included as Appendix C to the 1977 Lead Standard (www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10033) explicitly states:

> "Recommendations [regarding medical removal protection] may be more stringent than the specific provisions of the standard. The examining physician, therefore, is given broad flexibility to tailor special protective procedures to the needs of individual employees. This flexibility extends to the evaluation and management of pregnant workers and male and female workers who are planning to raise children. Based on the history, physical examination, and laboratory studies, the physician might recommend special protective measures or medical removal for an employee who is pregnant or who is planning to conceive a child when, in the physician's judgment, continued exposure to lead at the current job would pose a significant risk."

The appendix goes on to state: "The adverse effects of lead on reproduction are being actively researched and OSHA encourages the physician to remain abreast of recent developments in the area to best advise pregnant workers or workers planning to conceive children."

Since substantial research developments have occurred since the 1970s when the OSHA standards were developed, occupationally exposed women who are or may become pregnant should be removed from lead exposure if their blood lead level is ≥10 µg/dL. If the blood lead level is in the range of 5 to 9 µg/dL, the health care provider should ask about potential sources of lead exposure on the job and review appropriate use of personal protective equipment in an effort to reduce exposure. Workplace hygiene should be emphasized in

order to keep exposure as low as possible and to prevent take-home exposures for other household members. Specifically, patients should be advised to

- Wear a respirator and keep it clean.
- Use wet cleaning methods and HEPA vacuums to clean work areas. Never dry sweep or use compressed air.
- Wash hands and face before eating and drinking. Never eat or drink in the work area.
- Normal handwashing and cleaning of eating surfaces may not remove all surface lead, 'lead visualization' wipes are available can help determine if lead has been removed to an adequate degree.
- When possible, wash or shower and change clothes and shoes before leaving work. Keep all work items away from family areas in the home, and wash and dry work clothes separately from other laundry.

Where feasible, the occupational medicine provider should consider contacting the woman's employer with recommended best practices to monitor and reduce lead exposure in their workplace. An example of such a letter is provided in Appendix XIV. Appendix XV contains the California Department of Public Health Workplace Hazard Alert. Prior to issuing such a letter, the healthcare provider should discuss the contents with the affected employee, and obtain her authorization. Although the letter in Appendix XIV refers to the medical removal protection provisions of the OSHA lead standards, the provider and the employee should be aware that some patients (e.g., employees of government agencies, mines, railroads and airlines) may work for a business that does not necessarily fall under OSHA jurisdiction. For these employees, the reference to the OSHA standard should be omitted and the employee should give explicit consent for release of medical information to her employer.

Identify and Discourage Pica Behavior

As discussed in Chapter 4, the behavior common to all definitions of pica is a pattern of deliberate ingestion of nonfood items, which can cause lead exposure if the substances consumed are contaminated with lead. All pregnant women, but especially those with blood lead levels ≥5 µg/dL, should be counseled to never eat nonfood items that may contain lead, such as clay, soil, pottery, or paint chips. Appendix III lists commonly reported pica substances.

Once pica is identified, the specific behavior must be characterized in order to determine how best to intervene. Clinicians are encouraged to follow a standardized history outline to obtain a more complete picture of pica behavior for an individual woman. Table 6-2 provides suggested factors to assess and characterize pica behavior, including such issues as the reason(s) for the behavior (if known) and the substance(s) being consumed. Only a few studies are available that evaluate the effectiveness of interventions designed to reduce or eliminate pica behavior. Most of these studies evaluated the impact of interventions on pica behavior in developmentally delayed individuals or those with obsessive-compulsive disorders (Goh et al., 1999; McAdam, et al. 2004; Piazza et al. 1998). Other studies have attempted to reduce pica behavior by providing vitamin supplements and improving the quality of the diet. While this approach appears to be effective in some case reports (Bugle and Rubin 1993; Pace and Toyer 2000), a randomized, double blind, placebo-controlled, two-by-two factorial study found that micronutrient supplementation did not affect geophagy (eating earth) in 220 school-aged children in Zambia (Nchito et al. 2004). They concluded that the results supported the premise that geophagy is a learned activity and that nutritional deficiencies associated with geophagy are more likely to be a result, not a cause, of this practice. No intervention studies were found that included pregnant women.

Therefore, until further research is available that can guide clinical practice, interventions should promote alternative, healthier strategies in response to the patient's apparent reasons for pica. The approach depends

upon eliciting accurate information from the patient about the behavior. In the clinical setting, it may be useful to ask women specifically about the discomforts of pregnancy and the techniques being used to minimize them. Pica has been commonly reported to be used in pregnancy to help relieve abdominal pain, diarrhea, and nausea; to assuage cravings and to improve appetite; and to impart a sense of well-being. Obstetrical providers also should inquire about cravings. Ice pica is particularly common and is often accompanied by pica associated with less benign substances. Inquiring first about general cravings in pregnancy, then about specific cravings for ice, and finally cravings for other less-commonly ingested nonfood items may be more likely to uncover pica behavior. Follow-up questions inquiring about the ingestion of other substances commonly used by members of a woman's community may also help elicit a history of pica.

If the substance is consumed due to cravings, then substitution with a similar, but uncontaminated, substance could be suggested. If a woman is experiencing stomach upset, nausea, or lack of appetite, more appropriate interventions should be followed. Current recommendations of the American College of Obstetricians and Gynecologists (ACOG) for the effective management of nausea and vomiting in pregnancy include vitamin B6 supplementation, use of antiemetic medications, and nonpharmacological approaches such as use of "sea-bands" which use pressure points on the wrist to suppress nausea. These interventions can reduce the discomfort associated with nausea and vomiting of pregnancy by 70% (American College of Obstetricians and Gynecologists 2004). When associated with a psychiatric disorder, appropriate referrals for counseling and behavior modification are warranted.

Descriptive studies have found associations between nutritional deficiencies and pica. Several studies reported lower serum ferritin levels (Edwards et al. 1994; Geissler et al. 1998), lower hemoglobin or hematocrit levels (Corbett et al. 2003; Edwards et al. 1994; Geissler et al. 1998; Rainville 1998), or higher rates of anemia (Kettaneh et al. 2005) in those who engage in pica, while others have found no health effects associated with pica (Smulian et al. 1995). Therefore, women who engage in pica behavior, regardless of the substance consumed, require nutritional counseling.

Counsel Women About Avoiding Sources of Lead Exposure

Avoid alternative products that may contain lead and stay informed of new risks

As discussed in Chapter 4, certain products have been found to be contaminated with lead. Some products have been associated clearly with lead poisoning cases and women should be counseled to avoid these products. These include alternative cosmetics, food additives, and medicines imported from overseas that may contain lead, such as azarcon, kohl, kajal, surma, and many others listed in Appendix V. Pregnant women should be informed that herbal medicines and alternative remedies imported personally or ordered from other countries by mail or online are not subject to FDA premarket approval and therefore their safety cannot be assured, even if the product is professionally packaged and labeled. Pregnant women should be cautioned against consuming candies, spices, and other foods that have been brought into the country from travelers abroad, especially if they appear to be noncommercial products, since their safety is unknown.

Obstetrical providers should advise pregnant women not to expose their fetuses to the risks of herbal medicines and supplements (Marcus and Snodgrass 2005). Herbal medicines and supplements are often regarded as safe by the public and some health care providers, but there is no scientific basis for that belief. In addition, certain herbal medicines and supplements are known to be contaminated with lead and, therefore, should be avoided. There are no rigorous scientific studies of the safety of herbal medicines and supplements during pregnancy, and the Teratology Society has stated that it should not be assumed that they are safe for the embryo or fetus (Friedman 2000).

The literature also contains numerous reports of excessive lead intake associated with the use of lead-glazed ceramic pottery produced by artisans or small manufacturers overseas. As noted earlier, pregnant women should be warned that lead leaches out of these products if they are used for food preparation or storage, es-

pecially if used to store acidic liquids such as wine or juice. Leaded crystal glassware is another potential lead source, but one that has not been linked with lead poisoning cases.

On occasion, products available through domestic channels of commerce are found to cause lead exposures to consumers. Recent exposures of concern reported by the media have included jewelry, toys, and other products. In some cases, federal agencies have authority to issue recalls of contaminated products, but sometimes they can only issue warnings. For instance, dietary supplements sold in the United States are not subject to FDA premarket approval, but FDA has authority to act if products are adulterated (e.g., lead contaminated) or misbranded. In either instance, consumer education is essential to avoiding these exposures. Consumers and health care providers can monitor FDA and CPSC recalls and CDC alerts in order to be apprised of newly recognized products of concern. Local health departments can also communicate this information to communities and medical providers. Pregnant women should be given an updated list of products found to be contaminated with lead at their prenatal visits. [For more information, see Chapter 4 and American Academy of Pediatrics (2005); Binns et al. (2007);Centers for Disease Control and Prevention (2002)]. The Consumer Product Safety Improvement Act (CPSIA), which took effect in February 2009, lowered the allowable lead content of consumer products intended for children 12 and younger, setting the standard at 600 ppm of lead in any accessible part. Beginning in August 2009, the allowable concentration declined to 300 ppm, and in August 2011 it will decline to 100 ppm. Starting in 2010, manufacturers must test their products and certify that they meet CPSIA standards. In the meantime, products exceeding the new standard remain prohibited and are subject to recall.

Avoid using lead-contaminated drinking water

Lead found in drinking water is usually due to corrosion that causes lead to leach out of plumbing pipes. The Safe Drinking Water Act (1991) prohibited the sale of lead-containing pipe for residential use (U.S. Environmental Protection Agency 1991). Homes built before 1986 are more likely to have lead in pipes, fittings, solder, fixtures, or faucets. Therefore, owners of older homes may want to test their water for lead. Certain attributes of the water, such as its temperature and pH, as well as the presence of additives, can all affect lead levels. Families with private wells as a water source will need to test their water to determine if lead contamination is a problem, as this is not regulated by EPA.

The EPA's community action level for lead in tap water is 15 ppb. If test results exceed this level, public water systems must comply with public education requirements, as well as conduct additional testing. Such public water systems may also be required to conduct source water treatment and/or lead service line replacement. Reducing lead levels in water may also require replacing internal plumbing such as pipes or fixtures or both. Until the source(s) of lead is removed, homeowners should employ several strategies to minimize their exposure to lead in tap water. Flushing the system for several minutes after nonuse discards water that has been standing in the system and is more likely to contain lead. All tap water used for consumption—whether for drinking, cooking, or particularly for preparation of infant formula—should be flushed before use. Use of bottled or filtered water are other alternatives, although not all filtration systems remove lead and not all bottled water is guaranteed to be lead-free. For detailed instructions for flushing water, along with testing information and federal regulations, see the EPA Lead in Drinking Water Web page (http://www.epa.gov/safewater/lead/index.html).

Avoid exposure to lead hazards in housing (paint, dust, soil)

As noted in Chapter 4, lead-based paint hazards are a major source of exposure for young children. In contrast, the research literature suggests that pregnant women are more likely to be exposed to lead-based paint hazards associated with renovations in older homes. Nevertheless, pregnant women should be educated about the potential risks associated with lead-based paint in older housing for several important reasons. First, pregnant women should understand the importance of using lead-safe work practices in older homes during repair, renovation, repainting, or remodeling work. Failing to minimize and contain dust generated by any ac-

tivity that disturbs paint can increase or create exposure risk. Dangerous paint removal and repair techniques that generate lead dust or fumes such as dry scraping, sanding, burning of paint with a torch, or using a high-temperature heat gun should be avoided—and may be illegal in some jurisdictions or in federally subsidized housing. Without appropriate education, there is a risk that families (or renovation workers) will inadvertently create or worsen lead-based paint hazards as they work diligently to prepare the baby's room or make other home improvements, thereby exposing the pregnant woman and fetus to lead during the pregnancy or afterward when the baby comes home.

Federal law requires that property owners disclose known lead-based paint and lead hazards to prospective buyers and renters of older homes and that remodeling contractors give lead information to residents before renovating homes built before 1978. A new EPA regulation (promulgated April 2008; effective April 2010) requires lead-safe work practices during renovation/repainting projects, and includes strict controls on disturbance of lead paint by a contractor performing renovation in a residence where a pregnant woman resides (see http://www.epa.gov/lead/pubs/renovation.htm). Pregnant women and their families should be encouraged to inquire whether painters or other contractors scheduled to perform work in their homes have received training in lead-safe work practices.

Families should also understand the importance of maintaining painted surfaces in older homes. While intact lead-based paint poses little risk, peeling paint or other signs of paint deterioration in a pre-1978 home can result in lead exposure hazards. If there is peeling paint (or any other indication of a problem) in the home of a family that is expecting or has young children, and lead-based paint is suspected to be present, the homeowner or tenant should contact the local health department for advice on options such as testing and remediation.

Appropriate remediation strategies vary according to the location and condition of the lead-based paint and the extent of the contamination. Interventions can include a range of activities such as professional cleaning; thorough repair or replacement of components (e.g., entire windows, window sashes, trim/molding, or door jambs), paint stabilization, complete repainting, or complete paint removal. All of these interventions have been found to significantly reduce lead dust levels for at least 3 years postintervention, with the more intensive treatments found to be associated with greater post-intervention reductions (Dixon et al. 2005). In cases where heavy soil contamination has occurred, the soil may need to be removed. However, when less contamination is present, techniques such as planting with ground covers or installing gravel pathways, drip line boxes, or raised planting beds and play areas may be sufficient (Binns et al. 2004; Dixon et al. 2006).

After interventions have been completed in the home, the home should not be reoccupied until it has passed lead dust clearance testing, indicating that the home has been adequately cleaned and that invisible lead dust has not been left behind. Numerous resources are available for the general public. For more information, see Chapter 11, Resources and Referral Information.

Minimize lead exposure from point sources

Women who live close to active lead mines, smelters, or battery recycling plants should take precautions to avoid exposure to lead via inhalation exposures or ingestion of hazardous waste (e.g., mine tailings, acid mine drainage) through contamination of the home environment from industrial lead dust or fumes.

Avoid hobbies and recreational activities that may involve lead exposure

Numerous recreational activities can result in exposure to lead. These activities include crafts (print making, stained glass, ceramics), outdoor sports (hunting and fishing), and liquor distillation, among others. [See Appendix IV for a detailed list.] Since women may not know that these activities carry a risk for lead exposure, consumer education is critical. General safety procedures such as performing these activities in well-ventilated spaces, frequent hand washing, and the use of jacketed ammunition at shooting ranges, can all minimize the risk of lead exposures from recreational activities. Under some circumstances, consumption of game meat

(e.g., venison, wild fowl) harvested with lead ammunition may pose a risk for excess lead exposure (Kosnett 2009). Health care facilities providing care to pregnant women should provide informational brochures to pregnant women on the risks associated with these activities.

ENVIRONMENTAL AND CASE MANAGEMENT: ROLE OF PUBLIC HEALTH AGENCIES

This section describes the essential role of public health agencies in assuring appropriate services for pregnant women needing intervention for lead exposure above background levels. Such public health services are recommended at various blood lead levels to complement ongoing medical management being provided by the woman's health care provider (see Table 6-1). Specifically, public health agencies ensure that lead hazards in the home environment are assessed and remediated. Public health agencies also provide case management services to ensure that all appropriate services are provided. Public health agencies can also provide guidance about reimbursement issues regarding environmental investigation or case management and make referrals to private providers, such as lead risk assessors, if necessary.

Environmental Investigation and Management

As previously noted, the critical element in the prevention of lead exposure is the control or elimination of all sources of lead, which must include the home environment to be effective. The goal of environmental management is to ensure a lead-safe home for mothers and babies. To this end, it is recommended that an investigation of the home environment, which is variously called an environmental investigation, exposure assessment, or risk assessment, be conducted for all women and newborn infants with BLLs of ≥15 µg/dL in order to identify potential sources of lead and pathways of exposure and to identify appropriate activities to reduce or prevent further lead exposure. This investigation and subsequent control activities should be carried out by the local or state health department, or under its supervision, as part of case management activities for pregnant and lactating women identified with blood lead levels ≥15 µg/dL.

The investigation should include questions about potential lead exposure pathways, a visual inspection of the home and other relevant environments, and testing of specific media for the presence of lead (such as water, household dust, soil, paint chips, foods, ethnic remedies, spices, ceramic ware, or other suspected sources of lead), as indicated. Examples of environmental management protocols for pregnant women are found in Appendix VIII (New York City Department of Health [NYC DOH] Pregnancy Risk Assessment Form), which is used for all women with prenatal BLLs of ≥15 µg/dL); Appendix IX (Minnesota DOH Assessment Interview Form); and Appendix X (Minnesota DOH Lead-Based Paint Risk Assessment Form), which is used for both pregnant women and for children with elevated blood lead levels). An example of an environmental management protocol for infants of mothers with elevated prenatal blood lead levels who do not have elevated BLLs is found in Appendix XI (NYC DOH Primary Prevention Information Form). An example of a protocol for environmental risk assessment for case management of young infants and children with blood lead levels of 15 µg/dL or higher is provided in Appendix XII (NYC DOH Child Risk Assessment Form).

At a minimum, environmental management should include isolating the expectant mother from known exposure sources, by workplace removal for occupational exposures and through temporary relocation until hazard remediation has been completed and clearance achieved for lead-based paint hazards in the home. Local and state health departments may also utilize information and resources provided by the Centers for Disease Control and Prevention's National Center for Environmental Health (NCEH) and other agencies and organizations [see Chapter 11 for resources and referral information] to provide the most current and updated case management services to their constituents (Centers for Disease Control and Prevention 2002).

Case Management

This section is intended to facilitate the management of pregnant and lactating women and newborn infants with lead exposure above background levels by providing information and guidance to health department personnel who provide or oversee care coordination and follow-up activities.

Case management of pregnant women with lead exposure involves coordinating, providing, and overseeing the services required to reduce their BLLs to prevent harm to the developing fetus. It is based on the efforts of an organized team that includes the pregnant woman and newborn infant's health care providers. A hallmark of effective case management is ongoing communication with the health care and other service providers and a cooperative approach to solving any problems that may arise during efforts to decrease the mother-infant pair's BLLs and eliminate lead hazards in the their environment.

CDC recommends that public health agencies provide case management services for pregnant women with blood lead levels ≥15 µg/dL (See Table 6-1). These services are adapted from the current model of case management adopted by CDC for young children, which has eight components: a) client identification and outreach, b) individual assessment and diagnosis, c) service planning and resource identification, d) the linking of clients to needed services, e) service implementation and coordination, f) the monitoring of service delivery, g) advocacy, and h) evaluation (Centers for Disease Control and Prevention 2002). Typical case management activities could include the following, depending upon the patient's needs and local resources:

- Assess factors that may impact the woman's BLL (including sources of lead, nutritional status, access to services, family interaction, and understanding).
- Visit the woman's residence and other sites where the woman spends significant amounts of time, such as a job site, to conduct a visual investigation of the site and identify sources of environmental lead exposure. Such visits may be made by a case manager and/or by certified environmental investigators or risk assessors.
- Develop a written plan for intervention.
- Oversee the activities of the case management team.
- Coordinate implementation of the plan, including collaboration with the primary health care provider(s) and other specialists.
- Evaluate compliance with the plan and the success of the plan.
- Ensure that a woman receives services in a timely fashion consistent with guidance.

Another variable, the duration of management, will depend on when the blood lead level ≥5 µg/dL is identified—during the prenatal period, at birth, or while the mother-infant pair is nursing. The interventions recommended in this report are for the secondary prevention of adverse health effects from lead exposure; that is, to prevent further lead exposure and to reduce BLLs in pregnant women who have been identified as having lead exposure. However, the ultimate goal is primary prevention of any lead exposure of the developing fetus or newborn infant. Of course, primary prevention is also indicated for women of reproductive age who may become pregnant, not only those who are already pregnant. The importance of primary prevention should not be overlooked, since the behavioral and cognitive effects of lead exposure in young children may be irreversible.

Practices and resources for case management of lead exposure vary markedly among states, cities, and jurisdictions. (In some communities, case management is called care coordination.) The sources of exposure and prevalence of blood lead levels above background levels among pregnant and lactating women and newborn infants also vary by geographic location and community-specific risk factors and may not be readily identifiable. Therefore, users of these guidelines may need to modify them to meet the needs unique to their specific communities. CDC provides technical assistance for the development and implementation of case management protocols.

Box 6-1: Medical Management of Pregnant Women With BLL ≥5 µg/dL

This box provides clinicians with a concise reference on general considerations in medical management of their patients with confirmed lead exposure above background levels. Readers are encouraged to refer to the relevant chapters for additional information.

Counseling patients on identifying and avoiding lead sources (Chapter 4)

For all patients, but especially those with known lead exposures, health care providers should provide guidance regarding sources of lead and help identify potential sources of lead in patients' environments. Public health agencies may have additional information on community-specific risk factors based on geographic location, occupation, or ethnic background. If not completed prior to determination of initial blood lead level, providers should take a complete occupational and environmental history, including questions that may identify the presence of risk factors for lead exposure.

Identification and counseling regarding pica behavior (Chapters 4 and 6)

Many studies agree that pica behavior is likely to be underreported. Identifying pica in a clinical setting may best be accomplished by treating it as a sensitive issue: proceeding from general to more-specific questions and from less-intrusive to more-intrusive questions. A recommended approach is to ask women specifically about techniques being used to minimize the discomforts of pregnancy and about cravings, inquiring first about general cravings in pregnancy, then about specific cravings for ice, and finally cravings for other less commonly ingested nonfood items. Follow-up questions inquiring about the ingestion of other substances commonly used by members of a woman's community may also help elicit a history of pica. If a substance is consumed due to cravings, then substitution with a similar, but uncontaminated, substance could be suggested. When associated with a psychiatric disorder, appropriate referrals for counseling and behavior modification are warranted. Women who engage in pica behavior, regardless of the substance consumed, may benefit from nutritional counseling due to the documented associations between nutritional deficiencies and pica.

Nutritional assessment and referrals (Chapter 7)

Pregnant and lactating women with a current or past BLL ≥5 µg/dL should be assessed for the adequacy of their diet and provided with prenatal vitamins and nutritional advice emphasizing calcium and iron intake. A balanced diet with a dietary calcium intake of 2,000 milligrams daily should be maintained, either through diet or by supplementation or by a combination of both. Additionally, iron status should be evaluated and supplementation provided in order to correct and prevent any iron deficiency. Women with anemia (defined in pregnancy as a hemoglobin level <11 g/dL in the first trimester and third trimester and <10.5 g/dL in the second trimester), requires higher dosing (Institute of Medicine 1990). Generally, pregnant women with iron deficiency anemia should be prescribed 60 to 120 mg of iron daily in divided doses. Dosage can be reduced to 30 mg daily once anemia is corrected. Women receiving supplemental iron or calcium should be encouraged to split the dose, taking no more than 500 mg of calcium or 60 mg of iron at one time, as only small amounts of these nutrients can be absorbed at any one time. Obstetrical providers should advise pregnant women not to expose their fetuses to the risks of herbal medicines, since there is no evidence of their safety and some are known to be lead-contaminated.

Interpretation and follow-up of blood lead tests (Chapter 5)

Pregnant women identified with blood lead levels ≥5 µg/dL should be tested per Table 5-3. Follow-up blood lead testing should be performed according to schedules provided in Table 5-1 for newborns and Table 5-2 for infants under 6 months of age. Adjust the frequency of follow-up tests according to the chronicity of exposure; risk factors for continued, repeat, or future exposure; and types of clinical interventions. Occupationally exposed women should be referred to an occupational physician or center treating occupationally exposed adults and removed from the workplace lead exposure at BLL ≥10 µg/dL. If not reported directly by the clinical laboratory, the health care provider should notify the Lead Poisoning Prevention Program of the local or state health department of BLLs ≥10 µg/dL. Communication with the local or state health department and the pediatric health care provider is crucial in ensuring appropriate follow-up care and developmental monitoring and referrals. Pregnant women identified with blood lead levels ≥5 µg/dL should be tested at the time of birth to establish a baseline to guide postnatal care for mother and child, and followed up according to the testing schedule in Table 9-1. If past exposure to lead was higher than for most people, maternal blood lead levels may increase slightly during lactation due to the liberation of lead from bone stores.

Assisting with identification of lead sources in the environment (Chapters 4 and 6)

The essential activity in management of pregnant women with blood lead levels ≥5 µg/dL is removal of the lead source, disruption of the route of exposure, or avoidance of the lead-containing substance or activity. Source identification beyond obtaining a thorough environmental and occupational history should be conducted in collaboration with the local health department when BLLs ≥15 µg/dL, which will conduct an environmental investigation of the home environment in most jurisdictions. This process usually includes in-home interviews and collection of environmental samples to confirm lead sources and pathways of exposure. Health care providers can assist by providing information to health departments on suspected sources identified during patient care. Findings should be shared with the health care providers of the mother and infant.

Chelation therapy (Chapter 8)

In consultation with a lead poisoning expert, pregnant women with confirmed BLLs ≥45 µg/dL may be considered for chelation therapy and should be considered as high risk pregnancies. Immediate removal from the lead source is still the first priority. In some cases, women may need hospitalization. Reserving the use of chelating agents for later in pregnancy is consistent with the general concern about the use of unusual drugs during the period of organogenesis (National Research Council, 2000). However, BLLs ≥70 µg/dL may result in significant maternal toxicity and chelation therapy should be considered, regardless of trimester, in consultation with experts in lead poisoning and high-risk pregnancies. Chelation therapy should also be considered in neonates and infants less than 6 months of age for a confirmed BLL ≥45 µg/dL.

Counseling on breastfeeding (Chapter 9)

Initiation of breastfeeding should be encouraged for mothers with BLLs <40 µg/dL. At maternal blood lead levels between 20-39 µg/dL, breastfeeding should be intiated accompanied by sequential infant BLLs to monitor trends. A woman with a confirmed BLL ≥40 µg/dL should not initiate breastfeeding. She should be advised to pump and discard her breast milk until her blood lead has declined to <40 µg/dL. Breastfeeding should continue for all infants with BLLs <5 µg/dL or trending downward. For breastfed infants whose blood lead levels are rising or failing to decline by 5 µg/dL or more, environmental and other sources of lead exposure should be evaluated. If no external source is identified, and maternal BLLs >20 µg/dL and infant BLLs ≥5 µg/dL, then breast milk should be suspected as the source, and temporary interruption of breastfeeding until maternal blood lead levels decline should be considered.

Table 6-1. Recommended Actions by Blood Lead Level in Pregnancy

BLL	Health Care Providers	Public Health Providers
<5	• Provide anticipatory guidance routinely and health education materials to all pregnant and lactating women	• Collect all blood lead test results • Develop and disseminate guidelines and health education materials to providers • Provide community-specific risk factors and population-based blood lead testing guidance to clinicians
5-9	Above actions plus • Attempt to determine source(s) of lead exposure and counsel patients on strategies to reduce exposure • For occupationally exposed women, review proper use of personal protective equipment and consider contacting the employer • Assess nutritional adequacy • Confirmatory and follow-up testing (see Table 5-3)	As above
10-14	Above actions plus • Notify lead poisoning prevention program of local health department if not reported by laboratory • Refer occupationally exposed women to occupational medicine specialists • For occupationally exposed women, recommend removal from exposure	Above actions plus • Send out health education materials to patient • For occupationally exposed women, remove from exposure
15–44[a]	Above actions plus • Assist local health department with complete exposure source assessment	Above actions plus • Perform or refer for environmental investigation, source reduction/lead hazard control, case management
≥45[b]	Above actions plus • Treat as high-risk pregnancy • Consider chelation (inpatient) (see Chapter 8) in consultation with lead poisoning expert	Above actions plus • Facilitate consultation with an identified lead poisoning expert experienced in managing chelation in pregnant women

[a]Environmental interventions to control lead exposures at blood lead levels below those in this chart support the goal of lead-safe housing for all children and are appropriate in jurisdictions with resources available to provide such services.

[b]Blood lead levels ≥70 µg/dL may result in significant maternal toxicity; therefore, chelation should be considered regardless of trimester of pregnancy and in consultation with an identified lead poisoning expert (see Chapter 8 for more details).

Table 6-2. Suggested Factors to Assess and Characterize Pica Behavior

Topic	Reason Why Information Is Important	Specific Questions to Ask
Demographics	Context, identify populations at risk	Age, race, ethnicity, country, and region of origin
Substance(s) consumed	Determine if substance(s) are harmful and if extent of use likely to pose health risks, identify source of pica substance(s) for public health interventions if needed	What substance(s) consumed? Dose consumed (amount and frequency)? Substance consumed throughout pregnancy? Where obtained? (Be as specific as possible in case a sample needs to be obtained for testing for contamination)
Reason for use	Useful in being able to elicit a pica history in women of similar background or experiencing similar symptoms, helpful in developing an appropriate plan to help individual woman stop the intake of harmful substances	Reason(s) for use: treatment for specific symptom, general health, or spiritual or emotional well-being
Pica behavior	Understanding of the persistence of the behavior and a clue to how difficult it will be to eradicate	Age at onset? Use affected by hormonal changes (menses, pregnancy, lactation) or stress? Substitution if usual pica substance not available? Is it truly "pica" behavior or a manifestation of an obsessive-compulsive disorder?
Pregnancy history	Improve the understanding of how pica behavior affects pregnancy outcomes	Current pregnancy: gestational age at delivery, birth weight of child, preeclampsia, gestational diabetes Previous pregnancy history: spontaneous abortions, preterm births, low birth weight or macrosomia
Community context	Information will be useful in identifying communities at risk and in planning public health interventions if needed	Current community? Who else consumes substance in community (family, neighbors)? What quality(ies) about the substance is/are important? What problems are thought to be associated with its use?

Key Points for Nutrition and Lead

- The human body's nutritional status affects the absorption, deposition, and excretion of lead and may also affect lead toxicity.
- Lead exposure can also modify the body's ability to utilize nutrients.
- Avoidance of lead exposure remains the primary preventive strategy for reducing adverse health effects. However, the existence of nutrient-lead interactions suggests that optimizing nutritional status during pregnancy and lactation may assist in preventing the adverse consequences of lead exposure.

General Nutritional Recommendations for Pregnant and Lactating Women

- All pregnant and lactating women should eat a balanced diet in order to maintain adequate amounts of vitamins, nutrients, and minerals.
- All pregnant and lactating women should be evaluated for iron status and be provided with supplementation in order to correct iron deficiency.
- All pregnant and lactating women should be evaluated for the adequacy of their diets and be provided with appropriate nutritional advice and prenatal vitamins.
- Women in need of assistance should be referred to programs, such as WIC or the Supplemental Nutrition Assistance Program (SNAP) (formerly food stamps).
- All pregnant and lactating women should avoid the use of alcohol, cigarettes, herbal medicines, and any other substance that may adversely affect the developing fetus or infant.

Recommendations for Pregnant and Lactating Women with Blood Lead Levels ≥5 µg/dL

- In pregnant and lactating women with BLLs ≥5 µg/dL or with a history of lead exposure, a dietary calcium intake of 2,000 milligrams daily should be maintained, either through diet or in combination with supplementation.

OVERVIEW OF THE RELATION BETWEEN NUTRITION AND LEAD

Pregnancy and the first 2 years of life are exceptionally important intervals with respect to adequate maternal and child nutrition (Horton 2008). Pregnancy and lactation are also critically important periods from a toxicological perspective because of the special significance of the potential for adverse effects of toxic exposures on early human development. If inadequate nutritional status increases susceptibility to the toxic effects of lead, lifelong adverse effects are more likely. In addition, lead exposure can interfere with the metabolism of nutrients—an especially important consideration when nutritional status is marginal. This chapter provides an overview of the information on dietary intake and lead levels in pregnant women. These data are limited. Any beneficial effects of dietary supplementation must be demonstrated in well-designed (randomized, placebo-controlled) clinical trials. However, given the importance of basic nutrition in normal pregnancy and lactation, this chapter provides practical recommendations based on the limited suggestive data available for primary and secondary prevention of lead exposure. Recommended dietary intakes (dietary reference intakes [DRIs]—formerly called RDAs) are from the Institute of Medicine, Food and Nutrition Board, unless specifically noted otherwise, and are provided for reference as Appendix XIII (Institute of Medicine 1997, 2001).

Decades of laboratory and clinical investigation have confirmed that the body's nutritional condition affects lead absorption, deposition, metabolism, and excretion (for reviews see Ahamed and Siddiqui 2007; Bogden et al. 2001; Mahaffey 1980, 1985; Mahaffey et al. 1992; Ros and Mwanri 2003). The physiological mechanisms that are the basis for nutrition/lead interactions are multiple and include nutrients: binding lead in the gut, competing with lead for absorption, altering intestinal cell avidity for lead, or altering affinity of target tissues for lead (Ballew and Bowman 2001). Lead can modify the metabolism of nutrients (Pounds, 1991; Sauk and Somerman 1991). For example, changes in iron metabolism and changes in the formation of the metabolically active forms of vitamin D occur with lead exposure. As understanding of cellular biology has advanced, the mechanisms through which nutritional status (at least for the divalent cations, calcium and iron) alter the metabolic response to lead are becoming clarified (Godwin 2001).

Avoidance of lead exposure remains the primary preventive strategy for reducing adverse effects of lead exposure. However, the existence of nutrient-lead interactions suggests that optimizing nutritional status during pregnancy and lactation may reduce the adverse consequences once lead exposure has occurred. Although the lead-nutrient interaction data are limited and somewhat inconsistent, ensuring adequate intakes of minerals such as calcium; iron; selenium; and zinc, and vitamins C, D, and E is a strategy that is generally health promoting, is associated with few risks, and may confer additional benefits to lead-exposed pregnant and lactating women.

Whether there are benefits for lead poisoned pregnant and lactating women resulting from ingestion of dietary supplements in excess of nutritional requirements is not clear and super-supplementation is not recommended. Differences in response between marginally adequate and super-nutritional status may be physiological. For example, the physiological mechanisms that foster adaptation to low dietary intakes (e.g., increased production of binding proteins in the gastrointestinal tract that can transport lead, as well as calcium or iron) may differ significantly from those that occur when nutrient intakes are higher than required. Dietary supplementation with nutrients at levels higher than those required by nonexposed women may constitute a secondary prevention effort aimed at reducing circulating levels of lead in the mother and at reducing lead exposure to the developing fetus and nursing infant.

Studies of the effects of nutrition and blood lead levels are complicated by a number of different factors. A general problem is that variability in the nutritional status of subjects can impact whether there is a response to changes in the nutrient level. For example, iron absorption is increased when the body is deficient in iron, but when the body is iron-replete absorption of additional iron is inhibited (Finch 1994). These same mechanisms also influence the percent of lead that is absorbed. Specific problems related to observational studies are discussed below.

OBSERVATIONAL STUDIES OF ASSOCIATIONS BETWEEN BLOOD LEAD AND MATERNAL DIET

The majority of the research on the influence of nutrition on lead status during pregnancy and lactation has been observational. Such studies can only determine the associations between nutritional status and lead poisoning, not whether these associations are causal. Observational studes are further complicated because the intercorrelations between nutrients in the diet limit the identification of the effects of specific dietary components Observational studies on the association of maternal diet and lead have shown varying results.

In an observational study of maternal diet during pregnancy, higher intakes of calcium, iron, and vitamin D were associated with lower neonatal blood lead levels (Schell et al. 2003). Before treatment, more than 50% of the mothers had dietary intakes below the recommended dietary allowances for zinc, calcium, iron, vitamin D, and kilocalories. Maternal and neonatal blood lead levels were correlated and all of the neonatal blood lead levels were low (geometric mean = 1.58 µg/dL).

West (1994) investigated the relationship between prenatal vitamin supplement use and maternal blood lead levels and pregnancy outcomes in 349 African American women. Supplement users had significantly

lower blood lead levels than those who did not use supplements ($p = 0.0001$). This study did not describe the content of the supplements consumed or provide adherence data, but levels of calcium and vitamins C and E were confirmed by blood analysis and were higher among the reported supplement-users, suggesting that the self-reports were accurate.

Among postpartum women in Mexico City, lower levels of bone lead were associated with higher intakes of calcium, vitamin D, phosphorus, magnesium iron, zinc, and vitamin C, though these relationships showed inconsistent trends (Ettinger et al. 2004). Gulson et al. (2006) measured daily intakes of the micronutrients calcium, magnesium, sodium, potassium, barium, strontium, phosphorus, zinc, iron, and copper from 6-day duplicate diets (2-13 collections per individual) and blood lead concentrations in a small number of mother-child pairs (total of 21 pregnant and 15 nonpregnant subjects in one cohort, nine pregnant subjects in a second cohort, and one group of ten 6- to 11-year-old-children) to evaluate the association of dietary intakes of selected micronutrients and blood lead. They found no statistically significant relationship between blood lead concentration and intake of specific micronutrients (Gulson et al. 2006).

ROLE OF SPECIFIC NUTRIENTS WITH RESPECT TO LEAD

Calcium

Association of dietary calcium intake and lead

Increased lead absorption and tissue retention among overtly calcium-deficient experimental animals have been confirmed in multiple species. As shown in experimental animal studies reported in the 1970s, a diet clearly deficient in only calcium when fed to rats for several months produced much higher tissue stores of lead than occurred in animals fed comparable amounts of lead plus a calcium-adequate diet (Mahaffey et al. 1973; Mahaffey-Six and Goyer 1972). Unusually high deposition of lead in nonosseous tissues (including the kidneys) occurred in contrast with less dramatic elevations of bone lead (Mahaffey et al. 1973). This difference likely reflects impaired bone formation and deposition of lead into bones of the high-lead, low-calcium animals (Mahaffey et al. 1973). The increased absorption and retention of lead by calcium-deficient animals has been confirmed in other species (among others, see information for dogs (Hamir et al. 1982; Stowe and Vandevelde 1979) and horses (Willoughby et al. 1972). Generally, the major calcium effects on lead absorption and distribution occur when dietary calcium is deficient (Hertz-Picciotto et al. 2000). Little influence of calcium on lead metabolism is observed by increasing calcium intake above required levels in animal studies, i.e., the equivalent of super supplementation (e.g., Barton et al. 1978; Mahaffey et al. 1973).

Confirmation of the impact of low dietary calcium intakes has also been found among human subjects who were also shown to have increased lead absorption when their diets were low in calcium (Heard and Chamberlain 1982). Several cross-sectional studies of calcium intake and blood lead levels in women of childbearing age and pregnant women have shown an inverse relationship between calcium-rich foods or calcium intake and blood lead levels. Lacasana-Navarro et al (1996) observed a statistically significant association among women of reproductive age between increased calcium intake and reduced risk of blood lead levels >10 µg/dL. Farias et al. (1996) showed that consumption of foods providing calcium (corn tortillas and milk products) was associated with reduced blood lead levels. Researchers also observed a statistically significant trend among women of reproductive age between decreased risk of elevated blood lead levels (>10 µg/dL) with increasing calcium intake (Lacasana-Navarro et al. 1996). Higher milk intake during pregnancy has also been associated with lower maternal and umbilical cord lead levels in postpartum women in Mexico (Hernandez-Avila et al. 1997).

Dietary calcium supplementation and lead levels

During pregnancy and lactation, lead accumulated in the maternal skeleton is released (Gulson et al. 1999; Manton et al. 2003; Osterloh and Kelly 1999), with greater mobilization of lead during lactation than during pregnancy (Gulson et al. 1998). Calcium supplements have been suggested as a means of reducing mobiliza-

tion of skeletal mineral. Observations of the variability in release of skeletal lead reinforced the suggestion that low calcium intake may contribute to mobilization of skeletal lead during pregnancy (Gulson et al. 1999). Use of calcium supplements to meet fetal demand for calcium and thereby reduce maternal bone mobilization has been described. Results from Gulson et al. (2004) indicated that calcium supplements were ineffective in minimizing the mobilization of lead from the skeleton during lactation; however, this small observational study lacked a control group and was not designed to properly account for other potential confounding factors.

Calcium supplementation (1,200 mg at bedtime) during the third trimester of pregnancy has been shown, in a randomized crossover trial design, to reduce maternal bone resorption by 14% on average in comparison to placebo (Janakiraman et al. 2003), suggesting that calcium supplements may reduce maternal bone lead mobilization during the third trimester of pregnancy.

Two large randomized clinical trials have been conducted to assess whether calcium supplements reduce blood lead levels during pregnancy and lactation. In a randomized, double-blind, placebo-control trial of calcium supplementation during lactation, Hernandez-Avila et al. (2003) showed that 1,200-mg daily dietary supplementation with calcium carbonate among lactating women reduced maternal BLLs 15%-20% over the course of lactation. Compared with women who received the placebo, those who took supplements had a modest decrease in their blood lead levels of -0.12 µg/dL at 3 months (95% CI = -0.71 to 0.46 µg/dL) and -0.22 µg/dL at 6 months (95% CI = -0.77 to 0.34 µg/dL). The effect was more apparent among women who were most compliant with supplement use and had patella bone lead >5 µg/g bone (-1.16 µg/dL; 95% CI = -0.23 to -2.08). During the second and third trimesters of pregnancy, calcium supplementation (1,200 mg) was associated with an average reduction of 19% in blood lead concentration in relation to placebo ($p<0.001$) (Ettinger et al. 2009). In another randomized control trial, calcium supplementation (1,200 mg) was associated with modest reductions in blood lead when administered during pregnancy. These effects were strongest in the most-compliant women, including those who: consumed >75% pills (-24%, $p<0.001$); or had baseline blood lead greater than 5 µg/dL (-17%, $p<0.01$); or reported use of lead-glazed ceramics and high bone lead (-31%, $p<0.01$). In the subset of most-compliant women with high patella bone lead (>5 µg/g) and reported use of lead-glazed ceramics, the reduction in blood lead of 31% corresponds to an average reduction of 1.95 µg/dL (95% CI = -0.78 to -2.87). Bone resorption was also reduced by 13% in the supplement group compared with the placebo group ($p = 0.002$) (Tellez-Rojo et al. 2006). Calcium supplementation was also associated with 5%-10% lower breast milk lead levels among these women over the course of lactation (Ettinger et al. 2006), suggesting that calcium supplementation may also be an intervention strategy to reduce lead in breast milk from both current and previously accumulated sources. Such data support the role of calcium supplementation in decreasing bone resorption, which can release bone lead stores. Calcium supplementation may also decrease intestinal absorption of lead.

Overall, calcium supplementation has been associated with modest reductions in blood lead levels both when administered during pregnancy and lactation. Suppression of bone resorption appears to be the most likely mechanism, although reduced absorption of lead from the gastrointestinal tract may also contribute to this change. It has been suggested that high levels of calcium are needed to supply the nutritional needs of the developing fetus (Johnson 2001).

Calcium status in U.S. women

Calcium requirements during pregnancy and lactation have been investigated extensively. The increased fetal/infant demand for calcium is met by increasing maternal gastrointestinal absorption, decreasing renal excretion, and increasing bone mineral mobilization (Kovacs and Kronenberg 1997). Physiological adaptations (including endocrine responses) are part of why there is no simple relationship between dietary calcium intake and calcium availability to mother, fetus, or infant (Prentice 2000a). In general, however, Americans do not meet dietary recommendations for calcium (Ma et al. 2007), with ethnic minorities and socially disadvantaged groups more likely not meeting dietary calcium recommendations (Affenito et al. 2007). The recommended

intakes for calcium are 1,300 mg for pregnant and lactating women 18 years and younger and 1,000 mg for pregnant and lactating women 19 years of age and older.

Estimated calcium intake during pregnancy in the United States varies substantially. Based on data from 1999-2000 NHANES, average calcium consumption for women of childbearing age was between 820 and 940 grams from both diet and supplements. Earlier data from NHANES II showed that for white women in the 18-through-39 year age group mean calcium intake from food was 642 mg/day, contrasted with 467 mg/day among black, non-Hispanic women (Looker et al. 1993). African Americans in all age groups have been shown to consume fewer mean servings of total dairy, milk, cheese, and yogurt than non-African-Americans and have lower calcium intakes (Fulgoni et al. 2007; Weinberg et al. 2004). Meeting dietary recommendations for calcium on a dairy-free diet is difficult (Gao et al. 2006), but can be made easier through the use of calcium-fortified foods such as citrus juices (Gao et al. 2006) and consumption of ready-to-eat cereals, which facilitate milk intake (Song et al. 2006). In contrast to several of the studies cited above, the assessment by Harville et al. (2004) evaluated total oral calcium intake including both food and antacids. Although median oral calcium intake exceeded 1,200 mg/day, more than 10% of the youngest women consumed <600 mg calcium/day. Within the overall group, 10% of African-American women and 6% of white women reported being either lactose intolerant or allergic to milk. However, there was no difference in calcium intake (both approximately 1,200 mg/day) for women reporting lactose intolerance and not being intolerant. It should be noted that in this particular study, many of the women were enrolled in the Women, Infants, and Children (WIC) program which supplies milk and cheese. In this study racial differences in calcium intake were not significant.

Calcium requirements are increased substantially during pregnancy and lactation to meet the demands of the developing fetus and nursing infant (Prentice 2000b). Approximately 25 to 30 grams of calcium are transferred to the fetus during pregnancy, with the majority of this transfer occurring during the third trimester (Institute of Medicine 1990). The major physiological adaptation of the mother to meet this increased calcium requirement is increased efficiency in intestinal absorption of calcium. Decreased renal excretion of calcium and increased bone mineral mobilization are other maternal mechanisms used to meet the needs of the fetus. The Institute of Medicine (IOM) currently recommends 1,000 mg calcium per day for pregnant and lactating women 19-50 years (and 1,300 mg per day for pregnant and lactating women <19 years) (Institute of Medicine 1997). Optimal calcium intake may be achieved through diet, calcium-fortified foods, calcium supplements, or various combinations of these.

NIH has articulated several challenges to optimate calcium intake (National Institutes of Health 1994). High oxalate and phytate in a limited number of foods can reduce the availability of calcium in these foods. Other factors, such as drugs (glucocorticoids), can decrease calcium absorption. There are also genetic factors that may significantly influence many aspects of calcium metabolism. Vitamin D metabolites enhance calcium absorption. Sources of vitamin D, besides supplements, include sunlight, vitamin D-fortified liquid dairy products, cod liver oil, and fatty fish. Calcium and vitamin D need not be taken together to be effective. Excessive doses of vitamin D may introduce risks such as hypercalciuria and hypercalcemia and should be avoided. In addition, high levels of calcium intake have several potential adverse effects but there are adaptive mechanisms that protect from calcium intoxication at calcium intakes less than approximately 4 g/day. Even at intake levels less than 4 g/day, people may be more susceptible to developing hypercalcemia or hypercalciuria and high blood calcium levels may produce renal damage. There is also some concern that increased calcium intake might interfere with absorption of other nutrients, such as iron, or medications. Ingestion of some forms of calcium supplements or milk may reduce iron absorption by as much as 50%. However, calcium formations that contain citrate and ascorbic acid enhance iron absorption.

There are two randomized placebo-controlled trials that aimed to decrease lead exposure to fetus and nursing infant by providing 1,200 milligrams of daily calcium supplementation to maternal diet during pregnancy (Ettinger et al. 2008) and lactation (Hernandez-Avila et al. 2003). Both studies found that, on average, women in the calcium supplement group had 20% lower maternal blood lead levels than the placebo group at the end

of follow up, suggesting decreased potential for exposure to the fetus and nursing infant. These studies were carried out in Mexico City, Mexico where the estimated average dietary calcium intake was about 800 milligrams per day, similar to estimates in the United States. NHANES data on dietary intake of selected minerals in 1999-2000 indicate that for women aged 20-39, the average dietary intake of calcium is 797 mg (Ervin et al. 2004). In pregnant women with exposure to lead, high calcium intake (2,000 mg/day) may diminish pregnancy-induced increases in blood lead levels by decreasing intestinal absorption of lead or by decreasing maternal bone resorption (mobilization), thereby reducing exposures to the fetus (Johnson 2001). Thus, the amount of calcium supplement should be adjusted by combining estimated average dietary intake and supplementation in order to achieve the recommended calcium intake of 2,000 mg per day. Care should be taken as some calcium supplements, particularly those derived from natural sources (bonemeal, dolomite, or oyster shell), have been found to contain high levels of lead (Bourgoin et al. 1993; Ross et al. 2000; Scelfo and Flegal 2000).

Summary

In summary, calcium supplementation in pregnant women with elevated blood lead levels may be beneficial in reducing blood lead levels. For pregnant and lactating women with BLLs ≥5 µg/dL or a history of lead exposure above background levels, a dietary calcium intake of 2,000 mg daily should be maintained either through diet or in combination with supplements.

Iron

Association of dietary iron intake and iron status with lead levels

Both low iron status and elevated lead exposure impair hematopoiesis and intellectual development during gestation and infancy (Black et al. 2008). Exposure to lead and reduced iron status result in greater impairment than the lead-associated impairment in heme biosynthesis alone (Kwong et al. 2004; Mahaffey-Six and Goyer 1973). Such findings were confirmed in humans, as well as experimental animals (Barton et al., 1978; Mahaffey 1983).

Iron absorption is highly regulated physiologically and iron absorption is reduced when iron stores are enlarged (Finch 1994). Overall, variation of iron stores in a normal range do not increase lead absorption, but iron deficiency raises the level of divalent metal transporter proteins which carry lead as well as iron (Morgan and Oates 2002). The ability to control iron absorption through regulation of the molecular mechanisms of iron absorption appears during late infancy (Leong et al. 2003).

Iron deficiency is associated with increases in absorption and deposition of lead (Barton et al. 1978). Several cross-sectional studies in children showed an inverse relationship between iron status and blood lead (Bradman et al. 2003; Choi and Kim 2003; Hammad et al. 1996). Consistent with pediatric studies, cross-sectional studies of lead-exposed adults have found that lower serum iron and dietary intake, as well as increased rates of iron deficiency anemia, were associated with higher blood lead levels and better iron status was associated with lower blood lead levels (Baghurst et al. 1987; Graziano et al. 1990; Kim et al. 2003). These studies have generally used dietary intake or laboratory tests (e.g., serum iron or ferritin) to determine iron status.

There are few studies that have investigated the association between iron intake or iron status and blood lead levels. These studies do not provide consistent findings. Schell et al. (2003) studied the effect of maternal diet during pregnancy on neonatal blood lead levels. Among the nutrients studied, iron had the largest impact on newborn lead levels: a two standard-deviation decrease in maternal iron intake (from 30.2 to 11.8 mg/day) was associated with a 0.51 µg/dL increase in newborn lead (29% of the mean newborn lead level of 1.72 µg/dL). More than 50% of mothers in this study had intakes below the recommended dietary allowance for iron in pregnancy. However, data from a nationally representative population survey that included reproductive-aged women (N = 4,394 women aged 20-49 years) found a positive association between dietary iron intake and blood lead levels (Lee et al. 2005).

Dietary iron supplementation and lead

Studies of the association between iron status and blood lead levels found that children with iron-deficiency had higher blood lead levels than iron-replete children (Markowitz et al. 1990; Wright et al. 1999, 2003). Consequently, many experts recommend that iron supplementation be prescribed only to iron-deficient children, irrespective of lead exposure, and do not recommend universal iron supplementation for the prevention or treatment of lead poisoning in children (Wright et al. 1999).

Iron supplementation has been shown to prevent lead-induced disruption of the blood-brain barrier during rat development (Wang et al. 2007a). The supplemental iron protected the blood brain barrier from changes in permeability caused by lead (Wang et al. 2007a) and was also protective against lead-induced apoptosis (Wang et al. 2007b). A prospective study of the effects of prenatal lead exposure on child development was carried out in Yugoslavia with outcomes assessed at age 4 years (Wasserman et al. 1994). Because 34% of the cohort was iron deficient (hemoglobin concentrations <10.5 g/dL at age 2 years and serum ferritin concentrations <12 ng/dL), iron supplements were provided when children were 18 to 38 months of age. Treatment of iron deficiency improved the hematological profile. Low-iron status and elevated lead exposure both affect infants' intellectual development. Lead exposure was associated with cumulative losses in cognitive function during the preschool years. Deficits attributable to iron-deficiency anemia at age 2 (Wasserman et al. 1992) appear to have been reversed by age 4 in response to iron supplementation.

Effectiveness and strategies for iron supplementation during pregnancy have been evaluated, indicating that the efficacy of the supplement intervention is dependent on the following: composition of the diet; presence of a condition, such as pregnancy, that would alter iron absorption or loss; composition of the supplement; severity of the iron deficiency at baseline; and the duration of the intervention (Beard 2000). There have been no supplementation trials addressing the effects of iron on lead levels in pregnancy and the research data are too scanty to determine the relationship between maternal iron intake and maternal or neonatal blood lead levels. However, given that iron deficiency is common among pregnant women (Kraemer and Zimmermann 2007), until further data are available, all women should be evaluated for the adequacy of their iron status and intake and be provided with appropriate nutritional advice and supplements if deficiencies exist.

Iron status in U.S. women

Pregnancy is the most at-risk period for developing iron-deficiency anemia (American College of Obstetrics and Gynecology 2008; Beard 2000). The current recommended intakes for iron are 27 mg in pregnant women and 10 mg in lactating women (Institute of Medicine 2001). While there is some uncertainty regarding the most useful indicators of iron status during pregnancy, cell indices (including mean cell volume, percent hypochromic red blood cells, percent reticulocytes, and cellular hemoglobin in reticulocytes) have been recommended as indicators of iron status (Ervasti et al. 2007), but their usefulness in diagnosing iron deficiency longitudinally needs to be confirmed.

Based on NHANES III data, 9% to 11% of adolescent girls and women of childbearing age were iron deficient [defined as having an abnormal value for at least two of three laboratory tests for iron status that included erythrocyte protoporphyrin, transferrin saturation, or serum ferritin] (Looker et al. 1997). Iron-deficiency anemia was found in 5% of women, which corresponds to an estimated 3.3 million U.S. women. Iron deficiency was more common among women who were from minority, low-income, and multiparous groups (Looker et al. 1997, 1999). Among women ages 19 through 50 years who participated in NHANES during the years 1988 through 1994, 72 ± 4% of pregnant women and 60 ± 4% of lactating women (Cogswell et al. 2003) were iron deficient. Use of supplements containing iron was associated with a significant reduction in the prevalence of iron deficiency among women ages 19-through-50 years, but the study lacked statistical power to make this assessment for pregnant and lactating women (Cogswell et al. 2003). Low-income women and minority women were less likely to consume supplements (Cogswell et al. 2003). Analyses of data from the Special

Supplemental Nutrition Program for Women, Infants, and Children in 12 U.S. states indicated that the prevalence of post-partum anemia was 27%, reaching 48% among non-Hispanic black women (Bodnar et al. 2001). Using NHANES III data, Bodnar et al. (2001) estimated that, among women with a poverty index ratio >130%, postpartum women (up to 12 months postpartum) had the highest rates of iron deficiency of between 12% and 13%. Mexican-American females have a higher prevalence of iron-deficiency anemia than did non-Hispanic white females (Frith-Terhune et al. 2000).

Summary

Studies of the effect of iron supplementation in lead poisoned women are not available. Thus, iron supplementation in pregnant and lactating women should be consistent with those given for pregnancy and lactation. No additional iron supplementation is recommended for women with elevated BLLs. However, the iron status of all pregnant women should be evaluated and supplementation should be provided to correct any deficiency.

Zinc

Deficiencies of other trace elements, such as zinc, may increase both lead absorption and lead toxicity (Cerklewski and Forbes 1976). Although of substantial importance worldwide (Black et al. 2008), zinc deficiency is not common in the United States (Hotz et al. 2003). Suboptimal zinc status may be caused by lack of zinc in the diet, but more likely is caused by inhibition of zinc absorption by factors such as other trace metals (e.g. iron, copper, lead, cadmium) (Lonnerdal 2000). Serum zinc concentration is influenced by multiple covariables and declines during pregnancy, presumably reflecting hemodilution that occurs during pregnancy (Hotz et al. 2003). In general, dietary protein is associated with increased zinc absorption and the U.S. population generally receives sufficient protein from dietary sources. Hence, zinc deficiency is not considered of major importance in altering susceptibility to lead toxicity in the U.S. population.

Ascorbic Acid (Vitamin C)

Another category of nutrient-lead interactions involve nutrients noted for their antioxidant properties (e.g., ascorbic acid [vitamin C], vitamin E, selenium, thiamine). Antioxidants are involved in the prevention of cellular damage that occurs from free radicals (atoms or groups of atoms that can be formed when oxygen interacts with certain molecules). The role of the antioxidant nutrients in altering the outcomes of lead exposure is not well established. Supplementation with vitamin C and other antioxidants (such as vitamin E and selenium) may prevent lead-induced oxidative damage due to lead exposure and bolster the body's antioxidant defense system. Unfortunately, the research conducted to date is insufficient in either quality or quantity to evaluate many of these hypotheses.

In addition to its antioxidant properties, vitamin C has been suggested as acting as a natural chelating agent that enhances the urinary elimination of lead from the body (Simon and Hudes 1999). Two large cross-sectional studies in adults have found associations between blood lead levels and dietary intake or serum levels of vitamin C (Lee et al. 2005; Simon and Hudes 1999). In an analysis of nutritional data provided by over 15,000 adult participants in NHANES III, Simon and Hudes (1999) found that adults in the highest two serum vitamin C tertiles had a 65% to 68% lower prevalence of elevated blood lead levels compared to adults in the lowest tertile ($p = 0.03$). In another analysis of NHANES III data, Lee et al. (2005) described the relationship between serum vitamin C and blood lead levels in over 4,000 reproductive-aged women (20-49 years). Women with high serum vitamin C levels had a 2.5 lower odds of having blood lead levels in the highest decile (>4 µg/dL). Among postpartum women in Mexico City, higher intakes of vitamin C were associated with lower levels of breast milk lead (Ettinger et al. 2004).

Studies with human subjects have also found that supplementation with vitamin C reduced lead levels (Dawson et al. 1999). One study randomly assigned nonoccupationally exposed male smokers into three

treatment groups (placebo N = 25, Vitamin C 200 mg daily N = 25, and vitamin C 1,000 mg daily N = 25). Baseline blood lead levels were low and similar to that reported by other studies of the general population. Supplementation with 1,000 mg of vitamin C (but not 200 mg) reduced blood lead levels by 81% (Dawson et al. 1999). However, according to a literature review by Hsu and Guo (2002), the benefit of vitamin C supplementation seems to be found most consistently in studies with subjects with lower lead levels. Human and animal studies with higher blood lead levels in general tend to show minimal to no improvement with vitamin C supplementation.

Determining the dose of vitamin C needed to lower blood lead levels is unclear in that dose-response was not typically observed in these studies. Blood lead levels were lowered only in those studies which the vitamin C intake exceeded nutritionally recommended intakes. The safety of exceeding these levels is unclear. In summary, the research to date suggests that vitamin C may lower blood lead levels. However, further research is needed to confirm these conclusions, since the studies conducted to date have relatively small numbers of subjects and do not include pregnant or lactating women.

Vitamin D

A final category of nutritional interactions with lead is interference by lead with formation of metabolites of the nutrient. The primary example of this is the severe compromise found in formation of the metabolites of vitamin D (i.e., the endocrine function of vitamin D) as lead exposure increases (Mahaffey et al. 1983; Rosen et al. 1980; Smith et al. 1981). Lead is well established as inhibiting the renal synthesis of 1,25-dihydroxyvitamin D in rats (Smith et al. 1981), chicks (Fullmer 1995), and young children (Rosen et al. 1980). As the body burden of lead increases (exposures associated with children's blood across blood lead concentrations of 12 to 120 µg/dL), there is a linear decline in 1,25-dihydroxyvitamin D (Mahaffey et al. 1983). To date, this interaction has not been evaluated among pregnant or lactating women.

Important sources of vitamin D are from synthesis of vitamin D through sunlight activation of pro-vitamin D present in skin and dietary intake (Holick 2007). Many factors influence the efficiency of cutaneous production of vitamin D. In winter months, ultraviolet B rays, needed to promote cutaneous vitamin D production, are absent at latitudes above 35° N (i.e., north of Memphis, Tennessee). Dark-skinned individuals require exposures about 5-10 times as long as light-skinned individuals to achieve similar levels of cutaneous vitamin D production. (Holick 2004). Even in summer months, sun exposures outside the peak sun hours of 10:00 AM to 3:00 PM have limited impact on cutaneous vitamin D synthesis (Holick 2003). Application of sunscreen blocks production of vitamin D (Holick 2007). Higher prepregnancy body mass index is associated with lower vitamin D status (Bodnar 2007a). Additionally, women who wear concealing clothing or are house-bound may have low vitamin D. Clinicians should therefore be aware of the potential for multiple risk factors for inadequate vitamin D status among certain recent immigrants who may not receive adequate exposure to sunlight.

Vitamin D status in U.S. women

The recommended adequate intake of vitamin D in both pregnant and lactating women is 200 IU. However, only about half of U.S. women ages 19-50 years get this amount of vitamin D daily from diet or supplement sources (Moore et al. 2004). The lowest mean dietary intakes of vitamin D in the U.S. population (based on data from food consumption patterns identified in the NHANES III and multiple years of the Continuing Survey of Food Intakes by Individuals [http://www.ars.usda.gov/Services/docs.htm?docid=14392]) were among teenage girls and women (Moore et al. 2004). The American Academy of Pediatrics (AAP) recommends that all children and adolescents receiving <400 IU/day from foods receive a supplement of 400 IU vitamin D daily (Wagner et al. 2008). In adults, daily supplementation with 400 IU vitamin D increases 25(OH)D by 7.0 nmol/L (Heaney 2003). Supplementation of a pregnant woman with 400 IU vitamin D, as in prenatal vitamins, has little effect on her 25(OH)D concentration (Wagner 2008).

Inadequate vitamin D status is common among women in the United States (Bodnar et al. 2007a,b; Hollis 2005; Hollis and Wagner 2004; Looker et al. 2008; Specker 2004; Specker et al. 1994). There is no universal consensus on adequate levels of 25-hydroxyvitamin D, but 75-80 nmol/L (Calvo and Whiting 2006) is a common benchmark. The AAP recommends that pregnant women maintain a 25(OH)D level of ^{3}80 nmol/L (32 ng/mL) (Wagner et al. 2008).

Based on NHANES 2000-2004 data, lower-than-optimal serum 25-hydroxyvitamin D levels were frequent (Looker et al. 2008); 49.1% of non-Hispanic white pregnant women, 76.4% of Mexican-American pregnant women, and 92.2% of non-Hispanic black pregnant women had serum 25-hydroxyvitamin D <75 nmol/L and 8.5%, 74.6%, and 41.6%, respectively, had serum 25-hydroxyvitamin D <50 nmol/L (Looker et al. 2008). Among a sample of pregnant women residing in northern United States, 25(OH) vitamin D levels were considered ≤ 80 nmol/L in 83.3% of black women and 47.1% of white women; more than 90% of these women used prenatal vitamins (Bodnar et al. 2007b).

Summary

Because data on the association of lead and Vitamin D are limited, no specific recommendation is made for supplementation of vitamin D in lead poisoned pregnant or lactating women. Adequate levels of vitamin D should be maintained.

NUTRITIONAL ASSESSMENT AND REFERRALS

All pregnant women should be assessed for the adequacy of their diets and be provided with appropriate nutritional advice and prenatal vitamins. This should be reinforced and maintained throughout pregnancy and lactation. General nutritional guidance is readily available; for example, see Dunlop et al. (2008) and Gardiner et al. (2008). Nutritional assessment of pregnant and lactating women with blood lead levels ≥5 µg/dL should be, at a minimum, consistent with anticipatory guidance, evaluation, and nutritional recommendations for all pregnant and lactating women. However, in pregnant and lactating women with a current or past BLL ≥5 µg/dL, certain nutritional recommendations should particularly be reinforced. Calcium and iron are of particular focus here for reasons that are related to how calcium and iron influence blood lead levels and pregnancy outcomes. A balanced diet with a dietary calcium intake of 2,000 milligrams daily should be maintained through diet, supplementation, or a combination of both. Additionally, iron status should be evaluated and supplementation provided in order to correct and prevent any iron deficiency. Anemia is the most easily identifiable indicator of functional iron deficiency. The Institute of Medicine (IOM) recommends starting iron supplementation after 12 weeks of pregnancy with the lowest dose needed. Women with anemia (defined in pregnancy as a hemoglobin level less than 11 g/dL in the first trimester and third trimester, and less than 10.5 g/dL in the second trimester), require higher dosing (Institute of Medicine 1990). Generally, pregnant women with iron deficiency anemia should be prescribed 60 to 120 mg of iron daily in divided doses. Dosage can be reduced to 30 mg daily once anemia is corrected. Women receiving supplemental iron or calcium should be encouraged to split the dose, taking no more than 500 mg of calcium or 60 mg of iron at one time, as only small amounts of these nutrients can be absorbed at any one time.

Referrals and Resources

Practitioners who interact with pregnant or lactating women should routinely screen for the presence of nutrient deficiencies like iron deficiency. Although comprehensive assessment of dietary adequacy is not routinely conducted in medical office visits, all pregnant and lactating women should be screened for the adequacy of their diets. If the presence of dietary inadequacy is suspected, women should be provided appropriate nutritional advice and should be referred to resources designed to improve knowledge and/or access. Appendix XIII contains nutritional reference information, including dietary reference intakes: recommended vitamin and elements intakes for individuals, tolerable upper intake levels, food sources for key nutrients, dietary

assessment tools, and other background information. Resources that might be useful for referrals or interactions with patients are summarized in this section.

Registered dietitian

A registered dietitian (RD) is a health professional who has received specialty training in food and nutrition. Using various dietary assessment tools, an RD can conduct a thorough assessment of an individual's dietary intake and can identify dietary inadequacies. Local RDs can be located by contacting local health care facilities, such as hospitals or health centers, or by using the Find A Nutrition Professional link of the American Dietetic Association Web site (http://www.eatright.org).

WIC

The Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) is a federal grant program that provides nutritious foods, nutrition education, and referrals to low-income (at or below 185% of the U.S. poverty income guidelines) pregnant and lactating women (in addition to infants and children) who are at nutritional risk. The two major types of nutrition risk recognized for WIC eligibility are medically based risks—such as anemia, underweight, overweight, history of pregnancy complications, or poor pregnancy outcomes—and dietary risks—such as failure to meet the dietary guidelines or inappropriate nutrition practices.

In most WIC state agencies, WIC participants receive checks or vouchers to purchase specific foods each month that are designed to supplement their diets. The foods provided are high in one or more of the following nutrients: protein, calcium, iron, and vitamins A and C. These are the nutrients frequently lacking in the diets of the program's target population. Detailed information about WIC including eligibility criteria, contact information, and instructions for applying can be found on the WIC Web site (http://www.fns.usda.gov/wic/).

Supplemental Nutrition Assistance Program (formerly the Food Stamp Program)

The Supplemental Nutrition Assistance Program (SNAP) is a federal program that provides low-income households with subsidies they can use like cash at most grocery stores. The assistance can be used to buy breads and cereals; fruits and vegetables; protein foods like meat, fish, and poultry; and dairy products. For additional information, call 1-800-221-5689 or visit the SNAP Web site (http://www.fns.usda.gov/snap/).

MyPyramid

The USDA Center for Nutrition Policy and Promotion launched the MyPyramid for Pregnancy and Breastfeeding Web site in May 2008 (http://www.mypyramid.gov/mypyramidmoms/). This Web site allows pregnant and lactating women to create a personalized MyPyramid Plan for Moms that shows what and how much to eat from each food group during each trimester of pregnancy and each stage of breastfeeding. The site also provides additional information on nutritional needs during pregnancy and breastfeeding, weight gain during pregnancy and weight loss during breastfeeding, dietary supplements, food safety, and special health needs.

Key Recommendations for Chelation Therapy

- Chelation therapy should be considered for pregnant women with confirmed blood lead levels ≥45 µg/dL on a case-by-case basis, in consultation with an expert in lead poisoning.
- Pregnant women with confirmed BLLs ≥45 µg/dL should be considered as having high-risk pregnancies and managed in consultation with an expert in high-risk pregnancy.
- Pregnant women with life-threatening lead encephalopathy should be chelated regardless of trimester.
- Insufficient data exist regarding the advisability of chelation for pregnant women with BLLs <45 µg/dL.
- Infants (0-6 months of age) with a confirmed BLL of ≥45 µg/dL should be considered as candidates for chelation in consultation with an expert in pediatric lead chelation therapy.
- Before considering chelation therapy for a pregnant woman (or infant), blood lead levels should be repeated and confirmed using an additional venous blood lead sample collected within 24 hours.
- Chelation therapy must occur in a lead-safe environment; therefore, prior to initiating chelation therapy, the patient should be removed from further lead exposure (see Chapter 6).

INTRODUCTION

There is a potential role for chelation therapy to treat pregnant woman and newborns, and, in some cases, chelation may be life-saving. However, the scientific evidence to support its use is very limited, and chelation during pregnancy and in the early postpartum period should be initiated only in consultation with an expert in treatment for lead poisoning.

OVERVIEW OF CHELATION

Chelation therapy utilzes the chemical characterstics of a chelating agent to remove lead from participation in biological reactions in the body, by binding the agent with the metal (lead) to form a chelate. A chelate is defined as a "complex formation involving a metal ion and two or more polar groupings of a single molecule" (Stedman's 2008). Notice that this definition does not indicate the fate of the chelated metal. Possibilities include excretion of the chelate, persistence in the tissue where the bonding occurred, or redistribution to other tissues. Ideally, the drug should effectively increase lead excretion, be easily administered, be affordable, and be safe. The consequences of lead removal should be to halt further toxicity and to reverse previous lead effects (Markowitz 2000).

DRUGS AVAILABLE IN THE UNITED STATES

There are four drugs ($CaNa_2EDTA$, DMSA, BAL, PCA) in use for lead chelation in the United States (Table 8-1) and others are in use elsewhere. None of these drugs specifically bind only lead and, thus, some loss of essential elements also occurs. The toxicity profiles of these drugs differ. Two of the drugs are administered orally (DMSA, PCA) and two must be given parenterally (BAL im only; $CaNa_2EDTA$ im or iv). The latter two require expert nursing care and are always used in the hospital. The former two are used in both inpatient and outpatient settings. All of these drugs increase lead excretion, primarily through the kidneys (Aposhian 1982; Graziano et al. 1999). There may also be tissue redistribution during or as a consequence of chelation.

The introduction of chelating agents for the treatment of severe lead poisoning (blood lead ≥70 µg/dL) was associated with a marked decline in lead-related mortality in children, from 30% to <1% (Chisolm 1968). Chelation treatment at lower blood lead levels, where mortality is not a major concern, is associated with a fall in blood lead levels and an improvement in biochemical markers of lead toxicity, such as erythrocyte protoporphyrin (EP) levels and delta-aminolevulinic acid dehydratase (ALAD) activity (Graziano et al. 1991; Piomelli 1996). Depending on the amount of lead in the body prior to chelation, the effect of treatment on blood lead is generally temporary, with levels increasing within 2 weeks after the conclusion of a course of treatment in many patients. The effect on the biochemical markers of toxicity is disparate. ALAD activity declines as blood lead rebounds, whereas EP levels tend to fall if no further lead absorption occurs, despite the rebound in blood lead. All of the drugs increase the excretion of essential metals, but to differing degrees. DMSA appears to be the most specific for binding heavy metals such as lead and mercury. The excessive loss of essential metals has been postulated to account for the observed teratogenicity associated with all of the agents tested in animal studies.

Utility of These Drugs in Other Populations

Candidates for chelation therapy differ by age group. Previous CDC guidelines (1991) established a blood lead level of ≥45 µg/dL as the indication for treatment of children regardless of symptoms. At these levels, gastrointestinal symptoms may occur in a a large number of children; biochemical toxicity is demonstrable in the majority of children (elevated EP level, decreased ALAD activity); and, subclinically, cognitive scores are likely lower. Additionally, and of importance, such children are very likely to excrete large amounts of lead in response to chelation treatment—much greater amounts than they would spontaneously excrete over periods of time comparable to a course of chelation. However, the amount excreted is only a small fraction of the total lead in the body. Though symptoms and biochemical markers of toxicity may improve post chelation, there is no documentation of cognitive improvements in nonencephalopathic children. For blood lead levels of <45 µg/dL, chelation treatment can also lower blood lead levels and improve biochemical markers of toxicity temporarily. However, there is no evidence that lead excretion is substantially increased for the majority of children. A randomized placebo-controlled trial of succimer for children with initial BLLs of 20–44 µg/dL also failed to demonstrate any difference in mean cognitive scores when tested 2 years later (Rogan et al. 2001). There are no published guidelines identifying a specific blood lead level as requiring chelation therapy in adults nor is there a universal protocol for which agents to use, dose, or duration of treatment.

CONCERNS ABOUT CHELATION THERAPY DURING PREGNANCY

Consideration of chelation therapy during pregnancy requires identification of the targeted beneficiary and estimation of the anticipated benefits and risks. Limited availability of research findings on comparable patients means that extrapolation from data on other types of patients are necessary to make treatment decisions. Since the correlation between maternal and newborn blood lead levels is high as measured by cord and maternal blood lead levels determined at delivery, maternal blood lead level can be used as a proxy for the fetus' blood lead level. Therefore, if the known risks and benefits of chelation treatment for lead poisoned children are extrapolated to fetuses, then a blood lead level ≥45 µg/dL in the mother's blood would trigger chelation treatment of the fetus in situations where the fetus is the intended beneficiary of the treatment. If the intended beneficiary of chelation therapy is the pregnant woman, then there is insufficient clinical data to guide decisions about treatment by blood lead level in the absence of symptoms.

No chelation-attributable toxicities have been reported in the existing published case reports. However, very limited information is available to understand any potential short- or long-term effects. Use of chelating agents should therefore only be considered in consultation with experts in lead poisoning and high risk pregnancies.

CLINICAL EVIDENCE IN PREGNANCY AND IN THE NEWBORN

The literature search identified only case reports of chelation therapy during pregnancy (see Table 8-2) and early postpartum (see Table 8-3). In general, maternal blood lead levels decline after a course of chelation and neonatal blood lead levels at birth were also lower than peak maternal levels during the pregnancy. However, very limited information is available to determine if any long term benefit is derived from *in utero* treatment or whether adverse effects occur from chelation. In the few case reports, babies did not appear to have gross developmental delays.

The women in the case reports were selected for chelation therapy based on their blood lead levels with the lowest pretreatment level reported as 44 µg/dL, although in that case a prior blood lead of 62 µg/dL was observed. All women appeared to have been treated during the second half of pregnancy. All but one of the women were treated with varying amounts and for varying durations with $CaNa_2EDTA$. A single patient also received BAL in addition to $CaNa_2EDTA$. A single case reported the exclusive use of DMSA. In all cases, $CaNa_2EDTA$ therapy was associated with a decline in maternal blood lead levels. There was no change in maternal blood lead after the one case of treatment with DMSA (18-day course). However, she was treated as outpatient without apparent oversight for either compliance or ongoing lead exposure. In all but one case a healthy newborn was delivered. The exception occurred in a case where maternal blood lead pretreatment was 104 µg/dL. The woman received $CaNa_2EDTA$ and BAL. The 1.6 kg infant was born prematurely after antepartum hemorrhage 36 hours into treatment. This baby was later noted to have developmental delay and hearing deficit. No consistent pattern in cord blood lead levels was apparent in the few cases where they were reported. The interval between chelation and delivery also varied from months to minutes. Cord blood lead levels were higher than maternal blood lead in the case treated with DMSA and in that of the sick premature infant described. In the other cases cord blood lead levels were lower than maternal prechelation levels. In several reports, chelation treatment was not initiated until shortly before or soon after delivery and was directed toward the newborns. Various drugs at full dosages have been used singly or in combination: $CaNa_2EDTA$ alone, $CaNa_2EDTA$ and BAL, $CaNa_2EDTA$ and DMSA, and DMSA alone. In general, chelation therapy was well tolerated by the infants.

Exchange transfusion has been used, in combination with chelation therapy, to successfully lower blood lead levels in neonates (Hamilton et al. 2001; Mycyk and Leikin 2004). In one case report, after a single-volume exchange transfusion, the infant with a cord blood lead level of 100 µg/dL was chelated on day 2 with a combination of BAL and $CaNa_2EDTA$ for 5 days, at the end of which the blood lead was 37 µg/dL (Mycyk and Leikin 2004). Chelation was continued for 19 days with DMSA, at the end of which the infant's blood lead was 38 µg/dL. Both the exchange and chelation treatments were described as "well tolerated." Of particular interest in this case is that maternal blood lead at preconception was 117 µg/dL and declined to 72 µg/dL by the third trimester. The mother was not chelated during her pregnancy. The baby was delivered at 40 weeks with a blood lead level of 100 µg/dL, weighed 3.7 kg, and achieved normal developmental milestones at 1 month of age. Another case report (Hamilton et al. 2001) describes a double-volume exchange transfusion plus 5 days intravenous $CaNa_2EDTA$ where the infant blood lead of 114 µg/dL fell to 12.8 µg/dL immediately following the exchange transfusion. Caution is advised, however, as Bearer et al. (2000, 2003) report on blood transfusions in newborn premature infants as an unexpected source of lead exposure. The relative benefits/risks of chelation versus exchange transfusion have not been investigated.

SUMMARY AND RECOMMENDATIONS REGARDING CHELATION THERAPY

While chelation may be beneficial especially in protecting the mother with very elevated blood lead levels, given the lack of controlled studies and the paucity of even published case reports or series, chelation therapy should be undertaken only with advice from experts in this field. Such decision making should weigh the lack of definitive evidence of safety for the fetus (especially in the first trimester) against the extensive safety profile

and experience with these drugs in children and adults. Recommendations for chelation therapy prenatally and postnatally are presented below:

Prenatal Chelation of the Mother

BLLs ≥70 µg/dL may result in significant maternal toxicity and chelation therapy should be considered, regardless of trimester, in consultation with an expert in the management of lead poisoning, high-risk pregnancies, and neonatology. Lead poisoning may be life threatening at levels greater than 100 µg/dL, though many cases have been described where patients with such levels were asymptomatic. Encephalopathic pregnant women should be chelated regardless of trimester.

Pregnant women with confirmed BLLs ≥45 µg/dL (repeated on at least two venous blood samples collected within 24 hours) may be considered for chelation therapy and should be managed in conjunction with experts in high-risk pregnancy and lead poisoning. Immediate removal from the lead source is still the first priority and, in some cases, pregnant women may require hospitalization. When chelation is being considered, it should be performed in an inpatient setting only with close monitoring of the patient and in consultation with a physician with expertise in the field of lead chelation therapy. Data regarding the reproductive risk associated with chelation during pregnancy are sparse. Most case reports of infant outcomes report on the use of chelating agents after the first trimester (see Table 8-2). Reserving the use of chelating agents for later in pregnancy is consistent with the general concern about the use of unusual drugs during the period of organogenesis (National Research Council, 2000). However, severe maternal lead intoxication, such as encephalopathy, will warrant chelation regardless of the stage of pregnancy. (Contact the CDC Healthy Homes and Lead Poisoning Prevention branch [http://www.cdc.gov/nceh/lead] or the American College of Medical Toxicology [http://www.acmt.net] for a list of experts).

Neonatal Chelation of the Infant

Chelation should be considered in neonates and infants less than 6 months of age for a confirmed BLL ≥45 µg/dL in consultation with a pediatric expert in lead chelation therapy. The limited data published suggest that toxicities for 0- to 6-month-olds are no different than those of 6- to 12-month-olds. Chelation treatment must occur in an environment free of lead hazards; therefore, prior to initiating chelation therapy, the patient should be removed from further lead exposure. Very limited data are available on the use of exchange transfusion as an alternative in this age group.

Chelating Agents

Three of the four available chelating agents ($CaNa_2EDTA$, BAL, DMSA) have been used during pregnancy and may be considered. Data for penicillamine used in pregnancy are unavailable. (This drug is FDA-approved for use in children, but its use in pregnancy is not approved.) The most experience, little as it is, has been with $CaNa_2EDTA$. This drug may be used intravenously at regular doses for 5 days. [Important Note: Calcium edetate ($CaNa_2EDTA$) must not be confused with edetate disodium (Na_2EDTA). From 2003 to 2005, three individuals—including two children—died of cardiac arrest caused by hypocalcemia during chelation therapy, as a result of inadvertent treatment with edetate disodium (Na_2EDTA) (Brown et al. 2006).]

Table 8-1. Chelating Agents Used to Treat Lead Poisoning

Name	Synonym(s)	Chemical Name	Number of Reported Cases[a] Used in Pregnancy
Calcium Edetate[b]	Calcium disodium versenate, versenate, edetate disodium calcium ($CaNa_2EDTA$)	Calcium disodium ethylene diamine tetraacetate	6
Succimer[c]	Chemet™, meso-2,3-dimercaptosuccinic acid (DMSA)	Meso 2,3-dimercaptosuccinic acid	1
BAL[d]	Dimercaprol, British anti-Lewisite, BAL in Oil (BAL)	2,3-dimercapto-L-propanol	1
D-penicillamine	Penicillamine, PCA, cuprimine (D-pen)	3-mercapto-D-valine	0

[a]See Tables 8-2 and 8-3 for details of the case reports

[b]Never use edetate disodium (Na_2EDTA) alone without calcium (Brown et al. 2006)

[c]Succimer did not lower BLL after 1 course of treatment (Horowitz et al. 2001)

[d]Used together with Calcium Edetate ($CaNa_2EDTA$) (Tait et al. 2002)

Table 8-2. Published Experience with Chelating Agents During Pregnancy in Humans

Authors/Location/Year Published	Blood Lead (µg/dL)	Timing of Chelation	Drug Used Dose/Route	Biochemical Outcome	Chronic vs Acute	Clinical History/ Reported Outcomes
Abendroth et al./ Germany/1971	80	5th month	$CaNa_2EDTA$ 0.5 g/ day iv 3x/wk wkly for 4wks	BLL 30 µg/dL at end of chelation	Acute (3 wks)	"Good health" at 4 years of age
Angle and McIntyre/ Nebraska/1964	240	8th month	$CaNa_2EDTA$ 75 mg/ kg/d, iv/7d	At delivery 4 wks post Rx urinary copropor. negative in mother and baby	Chronic	4 wks post-treatment, cord BLL <60 µg/dL; "normal neurological and developmental assessment at 4 years of age"
Timpo et al./ New York/1979	86	8th month	$CaNa_2EDTA$ 1g/iv bid/ 3d	BLL >41 2d post Rx; 26 µg/dL 1 wk postpartum	Chronic	8 days post-treatment, cord BLL 60 µg/dL; BLL 72 at 2 wks postpartum. 38 wks gestation, wt 2,665 g, length 45 cm, hc 32 cm (all within normal limits), "normal developmental evaluation at 1 8 months of age"
Horowitz and Mirkin/ Oregon/2001	44	7th month	DMSA 30mg/kg/po/ for 5d and 20 mg/kg/ po for 13d - all outpatient	BLL 44 µg/dL at end of chelation	Chronic	Cord BLL 126 µg/dL; healthy appearing at birth, 37 week gestation, wt 3,040 g, lt 48 cm, hc 35 cm, "described by pediatrician as appearing normal at 6 months of age"
Olmedo et al./ New York/1999 (abstract only)	130	8th month	$CaNa_2EDTA$ 1g/iv/d/ for 2d; baby delivered after 2d	BLL 48 µg/dL after 2d	Acute (1 wk)	Cord BLL 78 µg/dL; healthy appearing 2.4 kg baby
Tait et al./ Australia/2002	104	7th month	$CaNa_2EDTA$ iv/dose not reported/2d, and BAL im/dose not reported/2d	BLL 46 µg/dL 12 hr before delivery	Chronic	Cord BLL 152 µg/dL;antepartum hemorrhage immediately prior to delivery; wt 1.6 kg (75%), diaphragmatic palsy at birth, developmental delay, unilateral deafness
Klitzman et al./ New York/2002	53	8th month	$CaNa_2EDTA$ 1 g/ iv/d/5d	BLL 20 µg/dL at delivery	Chronic	Cord BLL 20 µg/dL; healthy appearing newborn

Table 8-3. Published Experience with Chelating Agents during Early Postpartum in Humans

Authors/Location/ Year Published	Blood Lead (µg/dL)	Prescribed Treatment	Drug Used Dose/Route	Biochemical Outcome	Chronic vs Acute	Clinical History/ Reported Outcomes
Singh et al./ Boston/1978	50 @ birth; 50 @ 3 wks	Chelation @3 wks $CaNa_2EDTA$	$CaNa_2EDTA$	1 month postchelation Pb 27; recurrent rebound Pb 46 for 9 mos. without further chelation	Chronic (>6 wks)	Apgar 9/10, birth weight 3,200 g, 40 wks, normal birth exam; normal Denver @ 10 months
Timpo et al./ New York/1979	Cord 60; 72 @ 14 days	Chelation @2 weeks $CaNa_2EDTA$	$CaNa_2EDTA$ 150 mg/d x 5d iv	post chelation Pb 49; repeat chelation at 5 mos for Pb 49	Chronic	Apgar 6/8, birthweight 2,865g, 38 wks; normal EEG and developmental evaluation @18 mos.
Sensirivatana et al./ Bangkok/1983	113 @ 2 mos.	Chelation @2 mos. $CaNa_2EDTA$/BAL, then PCA	$CaNa_2EDTA$ 50 mg/kg/day x 5d (3 courses); BAL 15 mg/ kg/day x 5d; PCA 40 mg/ kg/day x 5d	post $CaNa_2EDTA$/BAL chelation 62	Chronic	Birth weight 3,250g; seizures @ presentation; Gesell Devl.Test: @3 mos. mental age 1.5 mos., @9 mos.- mental age 8.5 mos., @16 mos.- mental age 18.5 mos.
Ghafour et al./ Kuwait/1984	66 @ 12 days; 81 @ 17 days	Chelation @17 days $CaNa_2EDTA$/BAL	$CaNa_2EDTA$ 40 mg/kg/ im q12h; BAL 4 mg/kg/im q8h; 5d	Day 23: Pb 57; day 32: Pb 29	Chronic	Apgar 7/9, birthweight 2,300g, 37 wks, neonatal seizures; poor language development @2 yrs.
Adamovich/ Hungary/1987	4 @ birth day; 76 @ 1 day post-exchange for Rh Incompatibility	Observation	None	Day 7 Pb 42	Acute	Not reported
Rothenberg et al. / Los Angeles/1992	Cord 70; 100 @ 6 wks	Clinic refused to chelate	None	Pb <40 @12 wks	Acute (<4 wks)	"Healthy newborn"; hypertonic @2, 15, 30 days; EEG normal @12 mos.; Psychometric tests "normal" to 3 yrs; short attention span @ all ages
Walsh et al./ California/1999 (abstract only)	Newborn Pb 84	Chelation DMSA	DMSA 10 mg/kg/dose q8 x 5d, then bid x 12d	Pb 34 @end chelation day 35	Acute	"Seemed developing normally @ 296 days"
Guzman/ Dallas, TX/2000 (abstract only)	37 @ 3 weeks	Chelation $CaNa_2EDTA$, DMSA	$CaNa_2EDTA$ 50 mg/kg/d x 5 days continuous iv	Pb 17 @end chelation; Pb 26 @7 wks and succimer begun (3 courses over 3 months)	Chronic	Not reported

Authors/Location/ Year Published	Blood Lead (µg/dL)	Prescribed Treatment	Drug Used Dose/Route	Biochemical Outcome	Chronic vs Acute	Clinical History/ Reported Outcomes
Olmeda et al./ New York/1999	Cord 78	Chelation $CaNa_2EDTA$/ BAL	BAL 300 mg/m2/d im x 1d; $CaNa_2EDTA$ 1,000 mg/m2/d iv x 7d	Pb 21 @postchelation	Acute	32 wks, 2.4 kg;
Olmeda et al./ New York/1999	Cord 78; 44 pre-chelation day 3	Chelation @3 days $CaNa_2EDTA$	$CaNa_2EDTA$ 1,500 mg/m2/ day iv x 5d	Unknown	Chronic	Not reported
Hamilton et al. Los Angeles/2001	Cord 114	Exchange transfusion (double volume) day 2; chelation $CaNa_2EDTA$	$CaNa_2EDTA$ iv; 5d	Pb 13 postexchange; <5 post chelation	Chronic	Apgar 9/9, birthweight 3,870g, 41 wks; hypotonic neonate; BAEP normal
Horowitz/ Portland, OR/2001	Cord 126 (mom 57); 75 @ 4 days	Chelation @4 days; $CaNa_2EDTA$/BAL; DMSA	$CaNa_2EDTA$ 1,000 mg/m2/d iv x 3d; BAL 50 mg/m2/q4h im x 3d; DMSA 350 mg/m2/ q8h x5d, q12h x 14d	Pb 31 @ 6wks; Pb 39 @11 wks and DMSA begun; Pb 21 @ 5 mos.	Chronic	Apgar 8/9, birthweight 3,040g, 37 wks; 6 mos f/u "normal appearing"
Tait et al./ Australia/2002	Cord 152	Chelation @2 days $CaNa_2EDTA$/BAL; DMSA @10 days	$CaNa_2EDTA$ 50 mg/kg/d iv;BAL 4 mg/kg/dose q4h im; DMSA 30mg/kg/day beginning day 10 x 3wks	Pb transient increase to 236 day 2 of chelation; required 5 courses $CaNa_2EDTA$, 2 of DMSA in first 2 mos. postpartum	Chronic	Apgar 4/6, birthweight 1,600g, 30 wks; flaccid nonresponsive neonate, hypoventilation diaphragmatic palsy; extubated day 42; neurodevelopment @ 5 mos. showed 2 mos. delay
Mycyk and Leiken/ Chicago/2004	Cord 100	Exchange transfusion (single volume) @day 1; BAL/$CaNa_2EDTA$ day 2, DMSA @7 days	$CaNa_2EDTA$ 50mg/kg/d continuous iv x 5d; BAL 20 mg/kg/day divided q4h im; DMSA 10 mg/kg/dose q8h x 5d, then q12h x 14d	Post exchange Pb 28, Pb post-parenteral chelation 38; post oral chelation 38 @1 mo. age	Chronic	Apgar 8/9, birthweight 3,700g, 40 wks; normal PE @birth, "normal development" @1 mo.
Powell et al./ Australia/2006	Cord 80	Chelation @11 days DMSA	DMSA 10 mg/kg/dose q8h x 5d, then q12h x14d	Pb ~30 post-chelation, no rebound @ 4 mos.	Chronic (years)	Apgar 9/9, birthweight 2,280g, 35 wks; poor suck, sleepiness as neonate; @ 12 months global delay of 5-6 mos.

Key Considerations for Breastfeeding

- Human breast milk is specific to the needs of the infant and is the most complete and ideal source for infant nourishment in the first year of life.

Key Recommendations for Initiation of Breastfeeding

- Measurement of levels of lead in breast milk is not recommended.
- Mothers with BLLs <40 µg/dL should breastfeed.
- Mothers with confirmed BLLs ≥40 µg/dL should begin breastfeeding when their blood lead levels drop below 40 µg/dL. Until then, they should pump and discard their breast milk.
- These reccomendations are not appropriate in countries where infant mortality from infectious diseases is high (World Health Organization Collaborative Study Team on the Role of Breastfeeding on the Prevention of Infant Mortality 2000).

Key Recommendations for Continuation of Breastfeeding

- Breastfeeding should continue for all infants with BLLs below 5 µg/dL.
- Infants born to mothers with BLL ≥5 µg/dL can continue to breastfeed unless there are indications that the breast milk is contributing to elevating BLLs. These infants should have blood lead tests at birth and be followed according to the schedule in Chapter 5.
- For infants whose blood lead levels are rising or failing to decline by 5 µg/dL or more, environmental and other sources of lead exposure should be evaluated. If no external source is identified, and maternal BLLs are >20 µg/dL and infant BLL ≥5 µg/dL, then breast milk should be suspected as the source, and temporary interruption of breastfeeding until maternal blood lead levels decline should be considered.

Key Recommendations for Use of Reconstituted Infant Formula

- Infant formula requiring reconstitution should be made only with water from the cold water tap. Flush the tap for at least 3 minutes before use and then heat the water or use bottled or filtered tap water known to be free of lead.

Breastfeeding is an optimal infant feeding practice compared with other infant feeding practices which carry risks. With regard to short-term risks, lack of breastfeeding is associated with increases in common childhood infections, such as diarrhea (Chien and Howie 2001) and ear infections (Ip et al. 2007), with potentially serious complications such as meningitis, dehydration, and hearing impairment. Lack of breastfeeding also increases the risk for some relatively rare but severe infections and diseases, such as severe lower respiratory infections (Bachrach et al. 2003; Ip et al. 2007), leukemia (Ip et al. 2007; Kwan et al. 2004), and—especially important for preterm infants—necrotizing enterocolitis (Ip et al. 2007). The risk of hospitalization for lower respiratory tract disease in the first year of life is more than 250% higher among babies who are formula fed compared with those who were exclusively breastfed at least 4 months (Bachrach et al. 2003). Furthermore, the risk for Sudden Infant Death Syndrome is 56% higher among formula-fed versus breastfed infants (Ip et al. 2007). The Agency

for Healthcare Research and Quality (2007) report also concludes that formula feeding has long-term health effects related to increased risks for certain chronic diseases and conditions, such as type 2 diabetes (Owen 2006) and childhood obesity (Arenz et al. 2004), both of which have increased among U.S. children over time.

Decisions made with regard to breastfeeding by a mother whose blood lead levels exceed background levels should be based on scientific evidence suggesting undue risk for the child. Scientific observations have consistently shown that biologically significant elevations in milk lead concentration do not occur in lactating women at the blood lead concentrations typical of women with long-term residence in developed countries. Only a small number of American women will meet the crieteria to defer breastfeeding, though more will be subject to additional follow up out of an abundance of caution. Transfer of lead can occur from maternal plasma to breast milk in roughly the same concentrations. This chapter describes recommendations for breastfeeding by women with blood lead levels above background levels and summarizes the scientific evidence supporting these recommendations.

INTRODUCTION

The overall goal in counseling a woman whether or not to breastfeed is to provide the best possible nutritional and nurturing environment for the infant. Any decision either not to initiate or to discontinue breastfeeding must be made only after careful consideration of all the factors involved. The basis of the initial decision-making process should include a thorough discussion between the mother and her health care provider of the factors to be considered. This discussion should ideally take place before the baby is born. Many factors have an impact on whether or not a woman with a blood lead level ≥5 µg/dL chooses to breastfeed her child. Many of these factors are poorly quantified and others are not readily quantifiable. Thus, a detailed and balanced discussion is essential.

THE IMPORTANCE OF BREASTFEEDING

Due to the unique nutritional characteristics of human milk, breastfeeding is understood to be the optimal mode of nutrient delivery to term infants. The U.S. Department of Health and Human Services' Blueprint for Action on Breastfeeding (U.S. Department of Health and Human Services 2000) emphasizes the value of breastfeeding, as does AAP (American Academy of Pediatrics 2005). Human breast milk is specific to the needs of the human infant. It provides the ideal nutrients for human growth and development in the first year of life, in a form that is readily transferred into the infant's bloodstream. Human milk also protects the breastfed infant against certain common infections and reduces the incidence of certain chronic diseases as well as symptoms of allergy (U.S. Department of Health and Human Services 2000). Women who breastfeed experience less postpartum bleeding, earlier return to prepregnancy weight and a reduced risk for ovarian cancer and premenopausal breast cancer (U.S. Department of Health and Human Services 2000). Breastfeeding also provides the added benefit of the mother-child bonding that takes place during nursing sessions.

The decision to breastfeed in the presence of a possible contraindication should be made on an individual basis, considering the risk of the complication to the infant and mother versus the tremendous benefits of breastfeeding (Lawrence 1997; Lawrence and Lawrence 2005).

The current AAP statement on breastfeeding does not address the issue of breastfeeding by mothers with lead exposure above background levels (American Academy of Pediatrics 2005). An earlier statement specifically addressing the transfer of toxic environmental agents through breast milk and the risk of infant exposure to environmental toxicants by this route suggests that before advising against breastfeeding, the practitioner should weigh the benefits of breastfeeding against the risks of not receiving human milk (American Academy of Pediatrics 2001).

Specifically with regard to lead, a technical information bulletin published by the Health Resources and Services Administration in 1997 held that breastfeeding is not contraindicated unless the concentration of lead in

maternal blood exceeds 40 µg/dL (Lawrence 1997). This recommendation was one small section of a larger review of the evidence then available on breastfeeding benefits and contraindications. It has not been updated since publication.

LEAD IN BREAST MILK

Since maternal blood is the medium from which lead is transferred to breast milk and ultimately to the nursing infant, the relationship of lead in maternal blood to lead in breast milk is of key importance. Early studies supported the belief that milk lead levels were one-tenth to one-fifth the levels of lead in maternal whole blood (for a review, see Abadin et al. 1997). These high values were due in part to contamination and analytical inaccuracies in the laboratory measurement of lead in breast milk. (See Chapter 3 for discussion of issues associated with laboratory analysis of lead in human milk.)

Recent carefully conducted studies of lead in breast milk consistently show breast milk lead to maternal blood lead ratios of approximately 3% or less; that is, a milk lead concentration of 3 µg/dL (or 30 µg/L) would be associated with a maternal blood lead concentration of 100 µg/dL, or a milk lead concentration of 0.3 µg/dL (3 µg/L) would be associated with a maternal blood lead concentration of 10 µg/dL. Gulson et al. (1998) found that the breast milk lead to blood lead ratio was less than 3% in 15 adult female immigrants to Australia with blood lead concentrations up to 34 µg/dL. Li et al. (2000) evaluated 119 nonoccupationally exposed women in Shanghai, reporting a mean maternal blood lead concentration of 14.3 µg/dL and a mean milk lead to blood lead ratio of 3.9%. Counter et al. (2004) reported ratios of milk lead concentration to maternal blood lead concentration in 13 nursing mothers from Ecuadorian Andean villages. The ratios ranged from 0.4% to 3.3% in 12 of the subjects, appearing to increase with increasing blood lead level. The thirteenth subject, with a blood lead concentration of 27.4 µg/dL, had a milk lead to blood lead ratio of 7.5%. Ettinger et al. (2004a) showed that breast milk lead was significantly correlated with maternal blood lead at one month postpartum in 310 lactating women in Mexico City. The ratio of the geometric mean milk lead concentration to the geometric mean maternal blood lead concentration was 0.013, or 1.3%, and the highest observed blood lead concentration was 29.9 µg/dL.

There is limited evidence that with closely spaced multiple pregnancies, baseline maternal blood lead concentrations are lower and the increases in maternal blood lead concentrations occurring during late pregnancy and lactation are reduced relative to those in the first pregnancy (Manton et al. 2003; Rothenberg et al. 1994). However, for most women in the United States, more than 98% of whom have blood lead levels <5 µg/dL, this has no practical implications.

INFANT LEAD EXPOSURE FROM BREAST MILK

Limited experimental observations suggest that breast milk lead has a relatively small impact on infant blood lead. It is generally agreed that biologically significant elevations in milk lead concentration do not occur in lactating women at the blood lead concentrations typical of women with long-term residence in developed countries (Gulson et al. 2003; Manton et al. 2003; Sowers et al. 2002). Other sources of lead also contribute to the nursing infant's blood lead level. Manton et al. (2000) concluded from lead isotope analyses that the principal source of lead exposure in very young children, irrespective of whether they are breast- or bottle-fed, is hand-to-mouth activity. However, the relative importance of early hand-to-mouth activity depends on the child's environment. Neonatal bone turnover is another potential source of lead in infant blood (Gulson et al. 2001) that should be factored into expectations about infant blood lead levels. Bone turnover is very high in the newborn because both bone accretion and bone loss during reshaping of the growing bone are high. The rapid turnover of bone lead is reflected in a short blood lead half-life in very young children compared to older children, with bone turnover varying by age, rather than to the length of the exposure (Manton et al. 2000; O'Flaherty 1995).

Although levels of lead in breast milk are generally low, they can influence infant blood lead levels over and above the influence of maternal blood to which the infant was exposed *in utero*. In a large-scale study of breast milk and infant blood lead levels, milk lead was found to account for 10% of the variance in 6-month blood lead and there was a linear dose–response relationship between breast milk lead and infant blood lead at age 6 months (Rabinowitz et al. 1985). In another study, breast milk lead accounted for 12% of the variance of infant blood lead levels at 1 month of age and levels of breast milk lead were significantly correlated with infant blood lead (Ettinger et al. 2004[b]).

It is possible to estimate milk lead concentrations associated with various maternal blood lead concentrations. As discussed above, the most probable value of the maternal milk lead to blood lead ratio is substantially less than 3%. Table 9-2 illustrates calculated milk lead concentrations at various maternal blood lead concentrations assuming breast milk lead concentration to be 3% of maternal blood lead concentration. Employing a tenfold larger percentage, this calculation might be thought of as providing an upper limit on the milk lead associated with a given maternal blood lead. It partly offsets the effect of binding of lead to milk casein at very low concentrations.

From the breast milk lead, that portion of the nursing infant's blood lead originating from maternal milk can be estimated. Ettinger et al. (2004b) reported that an increase of about 2 µg/L in breast milk lead was associated with a 0.82 µg/dL increase in the blood lead of breast-fed infants at 1 month of age, adjusting for cord blood lead, infant weight change, and reported breastfeeding status. Calculated based on this observed relationship, the increase in infant blood lead concentration associated with different maternal blood lead concentrations can be estimated (Table 9-3). Based on this calculation, the predicted contribution of breast milk lead to infant blood lead at 1 month of age would be about 3.7 µg/dL at a maternal blood lead concentration of 30 µg/dL, 2.5 µg/dL at a maternal blood lead concentration of 20 µg/dL, or 0.25-0.5 µg/dL at maternal blood lead concentrations of 2-4 µg/dL. This calculation is based on a data set whose values did not exceed 30 µg/dL. Its application outside this range represents an extrapolation and becomes progressively less certain as maternal blood lead increases above 30 µg/dL. These calculations are supported by observational data only in infants about 1 month old, but they do not suggest undue concern for lead exposure of nursing infants at maternal blood lead and breast milk lead concentrations typical of those found in the United States.

Evidence also suggests that the breast milk lead to maternal blood lead ratio may increase in a nonlinear fashion when maternal blood lead concentrations exceed about 40 µg/dL. This hypothesis is supported both by observational data on women with very high breast milk lead concentrations (Li et al. 2000; Namihara et al. 1993) and by studies on the components of the blood (e.g., plasma) and breast milk as they relate to maternal lead exposure (Hernandez-Avila et al. 1998; Manton and Cook 1984; Manton et al. 2001; O'Flaherty 1993; Schutz et al. 1996). A finding that breast milk contains proportionally more maternal lead at higher blood lead levels suggests possible risk associated with breastfeeding at maternal blood lead levels above 40 µg/dL. Epidemiological evidence is not entirely consistent about the extent to which maternal blood lead concentrations increase during lactation (Ettinger et al. 2006; Manton et al. 2003; Tellez-Rojo et al. 2002).

The breastfeeding recommendations developed herein are intended for women living in the United States. Insufficient data are available to guide clinical decisions regarding women with extremely high breast milk lead concentrations or in women living or working in lead-polluted areas outside the United States. Some evidence suggests different rates of transfer of lead into breast milk for maternal blood lead concentrations less than and greater than about 40 µg/dL (Li et al. 2000), but available human data are insufficient to make reliable estimates.

RECOMMENDATIONS FOR BREASTFEEDING

On the basis of the health and developmental benefits to infants of breastfeeding and consideration of the available research on the contribution of breast milk lead to infant blood lead, CDC has developed clinical

guidance for breastfeeding by women exposed to lead. Initial criteria for breastfeeding are maternal blood lead levels, but ongoing monitoring of infant blood lead levels (described in Chapter 5) provides the additional feedback loop needed for clinical decision making about continuing breastfeeding. Specifically, a rise in infant BLL of 5 µg/dL or more is regarded as clinically significant and affects breastfeeding recommendations. Testing recommendations for women with BLL ≥5 µg/dL identified during pregnancy or at delivery are presented in Table 9-1 and for infants in Tables 5-1 and 5-2. Measurement of breast milk lead is not recommended given current laboratory methods and the availability of maternal blood lead as a proxy.

An important practical challenge to clinicians in implementing these recommendations is ensuring that the recommended laboratory and other findings are entered into both the mother's and the infant's medical records in a timely fashion, as noted in Chapter 5. For instance, the mother's initial and sequential blood lead levels should be in the infant's chart. Without this data, clinicians lack the information needed to provide appropriate and real-time guidance about breastfeeding.

Initiating Breastfeeding

Initiation of breastfeeding should be encouraged for all mothers with blood lead levels <40 µg/dL, with follow-up recommendations varying by blood lead levels. Initial maternal BLLs <20 µg/dL are unlikely to be associated with a detectable increase in infant blood lead, even using a ratio of breast milk to maternal blood ten times the most likely value, as in the above calculations. In women with BLLs between 5-19 µg/dL, an initial infant blood lead level is warranted to establish a baseline.

At maternal blood lead levels between 20-39 µg/dL, data do not exist to weigh accurately the risks of lead exposure from breast milk against the benefits of breastfeeding. Thus, a prudent course of action is for these women to initiate breastfeeding accompanied by sequential mother and infant blood lead levels to monitor trends, so that adjustments can be made if indicated. Mothers with BLL between 20-39 µg/dL should be retested 2 weeks postpartum and then at 1- to 3-month intervals, depending on the direction and magnitude of trend in infant blood lead levels (Table 9-1).

CDC considered the adverse health and developmental effects associated with lead exposure compared to those associated with not breastfeeding and, based on the available information, determined that at maternal blood lead levels ≥40 µg/dL the adverse developmental effects of ≥5 µg/dL increase in an infant's blood lead level was of greater concern than the risks of not breastfeeding until maternal blood lead level dropped <40 µg/dL. Mothers with blood lead levels ≥40 µg/dL should not initiate breastfeeding immediately. They should be advised to pump and discard their breast milk until their blood lead levels drop below 40 µg/dL. In such cases, infants' blood lead levels should be monitored after the initiation of breastfeeding. This recommendation reaffirms the prevailing guidance about deferring breastfeeding at maternal BLL ≥40 µg/dL.

Continuing Breastfeeding

All infants born to mothers with BLL ≥5 µg/dL should have blood lead tests at birth and be followed according to the schedule in Chapter 5. Breastfeeding should continue for all infants with BLLs below 5 µg/dL or trending downward.

For breastfed infants whose blood lead levels are rising or failing to decline by 5 µg/dL or more, environmental and other sources of lead exposure should be evaluated. If no external source is identified, and maternal BLLs are >20 µg/dL and infant BLL ≥5 µg/dL, then breast milk should be suspected as the source, and temporary interruption of breastfeeding until maternal blood lead levels decline should be considered. There are insufficient data to estimate how many mother-child pairs would meet these criteria, but anecdotal evidence suggests that it would apply to a very small number in the United States.

Follow-up testing of women with BLL ≥5 µg/dL identified during pregnancy or at delivery should follow the schedule outline in Table 9-1. This should include women with known risk factors that are not controlled, regardless of the BLL of the women or their infants.

Lead in Infant Formula

Since breast milk may not be provided exclusively, for an extended period of time, or even at all, many infants are likely to be nourished, at least in part, by commercially available infant formula. Therefore, it is important to characterize the contribution of non-breast milk sources to total potential lead exposure from dietary intake in infants and young children.

Over the past several decades, the FDA and other federal agencies have worked to reduce dietary and other lead exposures of the general population, and in particular of vulnerable subpopulations such as infants, children, and pregnant women (Bolger et al. 1996). Lead-lined and lead-soldered cans are no longer used for commercial infant formula produced in the United States, and the most recent Total Diet Study confirms that currently marketed milk-based ready-to-feed infant formulas in the United States contain no appreciable amounts of lead. Only one sample (in the high-iron category) of 88 samples of high- and low-iron infant formula contained any measurable lead (trace lead detected in 1 sample = 0.007 mg/kg) (U.S. Food and Drug Administration 2007).

To the extent that lead can be found in infant formula, the relative bioavailability of such lead may be less than that of lead in breast milk. For example, it has been documented that iron is more readily absorbed from breast milk than from infant formula (Lonnerdal 1985). Rabinowitz et al. (1985) found breast milk to be the strongest correlate of 6-month blood lead levels while formula lead correlated poorly with infant blood lead levels. However, Gulson et al. (1998) showed that the contribution of formula to infant blood lead varied from 24% to 68% in exclusively formula-fed infants. They later estimated average daily intake of lead at age 6 months for infants in their Australian study group fed exclusively by breast milk to be 0.73 µg (subjects = 17; observations = 78), and for infants fed exclusively by infant formula to be 1.8 µg (subjects = 11; observations = 42) (Gulson et al. 2001). Ettinger et al. (2004b) also found that infants fed exclusively with breast milk had lower blood lead levels than those fed partially with breast milk, suggesting that formula or other dietary sources may contribute more lead to infant diets than breast milk does. In that study, an interquartile range increase in breast milk lead (~2 ppb) increased infant blood lead by 25%, or approximately 1 µg/dL.

There are published reports of lead entering formula through lead in tap water used to prepare infant formula (Shannon and Graef 1989) or the use of leaded storage containers (Shannon 1998). For instance, in a convenience sample of home-prepared reconstituted infant formula collected in a pediatrics department in metropolitan Boston, two of forty samples were found to have lead concentrations above 15 µg/L (Baum and Shannon 1997), which is the EPA lead action level for water. It is recommended that infant formula requiring reconstitution be made only with bottled or filtered tap water, or with cold water after flushing the tap for at least 3 minutes before use. Water authorities, in conjunction with state and local public health authorities, should consider issuing recommendations for the use of tap water in preparing infant formula based on lead levels in local tap water.

Table 9-1. Frequency of Maternal Blood Lead Follow-up Testing During Lactation[a] to Assess Risk for Infant Lead Exposure[b] from Maternal Breast Milk

Initial[c] Venous[d] Blood Lead Level (BLL, µg/dL)	Perform follow-up blood lead test(s)
5-19	Every 3 months, per guidelines for adult blood lead testing (Appendix VI), unless infant blood lead levels are rising or fail to decline.[e]
20-39	2 weeks postpartum and then at 1- to 3-month intervals depending on direction/ magnitude of trend in infant BLLs.
≥40	Within 24 hours postpartum and then at frequent intervals depending on clinical interventions and trend in BLLs. Consultation with a clinician experienced in the management of lead poisoning is advised.

[a]If a woman becomes pregnant while lactating, she should be followed according to the schedule for pregnancy [see Table 5-3].

[b]Need to coordinate care between mother and infant in the postpartum period.

[c]Last blood lead level measured in pregnancy or at delivery (maternal or cord BLL).

[d]Venous blood sample is recommended for maternal blood lead testing.

[e]Infant should be monitored according to schedules in Tables 5-1 and 5-2.

Table 9-2. Estimated Daily Intake of Lead from Breast Milk at Different Maternal Blood Lead Concentrations

Maternal Blood Lead Concentration, µg/dL	Maternal Plasma Lead Concentration, µg/dL[a]	Breast Milk Lead Concentration, µg/L[b]	Infant Lead Intake from Breast Milk at Age 9 Months, µg/day[c]	Infant Lead Intake from Breast Milk at Age 12 Months, µg/day[d]
1	0.03	0.3	0.3	0.27
2	0.06	0.6	0.6	0.54
3	0.09	0.9	0.9	0.81
4	0.12	1.2	1.2	1.1
5	0.15	1.5	1.5	1.4
8	0.24	2.4	2.4	2.2
10	0.3	3	3	2.7
20	0.6	6	6	5.4
30	0.9	9	9	8.1
40	1.2	12	12	11.0

[a]Calculated as 3% of maternal blood lead concentration.

[b]Numerically equal to maternal plasma lead concentration, but expressed per liter rather than per deciliter.

[c]Assuming the upper ingestion limit of 1,000 mL milk per day at these ages (U.S. Environmental Protection Agency 1997).

[d]Assuming the upper ingestion limit of 900 mL milk per day at this age (U.S. Environmental Protection Agency 1997).

Table 9-3. Estimated[a] Increase in Infant Blood Lead Concentration[b] Associated with Different Maternal Blood Lead Concentrations at 1 Month Postpartum

Maternal Blood Lead Concentration, µg/dL	Estimated Breast Milk Lead Concentration, µg/L[c]	Estimated Associated Increase in Infant Blood Lead at Age 1 Month, µg/dL[d]
1	0.3	0.12
2	0.6	0.25
3	0.9	0.37
4	1.2	0.49
5	1.5	0.62
8	2.4	0.98
10	3	1.2
20	6	2.5
30	9	3.7
40[e]	12	4.9

[a]This estimation integrates absorption, distribution, and excretion.

[b]These values are estimations based ICP-MS laboratory analysis and increments of less than 2 µg/dLwould not necessarily be detectable in clinical laboratories.

[c]See Table 9-2.

[d]Calculated based on the observation that a 2 µg/L increase in breast milk lead is associated with an increase of 0.82 µg/dL in the blood lead of the nursing infant (Ettinger et al. 2004b).

[e]Extrapolation beyond the range of observed data from Ettinger et al. 2004b (where maternal BLLs ranged from 1-30 µg/dL).

INTRODUCTION

The clinical and public health recommendations presented throughout these guidelines are based on current research findings where available; however, research has not been published to provide definitive guidance on all issues of interest. On other topics, the research base is clear, but existing policy is not consistent with research findings. For some topics, existing training and continuing education mechanisms are not working to deliver key findings to health professionals in critical fields, like obstetrics, pediatrics, family practice, and nursing. Together, these gaps in research, policy, and health education create an infrastructure that fails to reinforce optimal clinical and public health practice. This chapter presents specific research, policy, and health education needs identified by CDC to improve current service delivery and to inform development of future practice guidelines and policy with respect to lead exposure above background levels in pregnancy and lactation.

RESEARCH NEEDS

Biomedical Research

Long-term prospective studies of the effect of lead exposure during fetal development and disease risks later in life

Given the immaturity of the blood-brain barrier in the developing nervous system, children might be more susceptible to morphologic changes in the nervous system during the prenatal and early postnatal periods. Further research is needed on

- Lead kinetics across the placenta and in breast milk, and their relationship to development and disease risk across the lifespan for children exposed to lead *in utero* or as nurslings.
- Specific health outcomes of interest, other than neurodevelopmental effects, such as pregnancy outcome and cardiovascular disease in adulthood following *in utero* exposure.

Follow-up studies of pregnancy outcomes and infant development in women with a history of lead exposure above background levels during pregnancy

Research is needed to better characterize health outcomes for mothers and infants associated with maternal lead exposure during pregnancy—at low elevations of blood lead typical for the U.S. population of women of childbearing age, as well as in more heavily exposed subgroups. Research is needed on

- Specific health outcomes of interest, including pregnancy-related hypertension, low birth weight, and preterm birth.
- Possible association between maternal lead exposure and spontaneous abortion, particularly at BLLs <30 µg/dL.
- Epidemiology of lead exposure during pregnancy and health outcomes.
- Experimental investigation of the biological mechanisms.

Genetic susceptibility to adverse effects of lead exposure (gene-environment interactions)

Some studies have suggested that specific genes may render certain individuals more vulnerable to the adverse effects of lead exposure. Research is needed to

- Characterize whether and how the bioaccumulation and toxicokinetics of lead are associated with genetic variation, such as ALDA phenotype or the HFE gene variants.
- Investigate other potential gene-environment interactions.

Value of maternal biomarkers to predict later infant and childhood blood lead levels

While research has shown that maternal blood lead level is closely associated with infant/cord blood lead level at birth, the kinetics of lead in the newborn exposed *in utero* are not well understood. In addition, it is not clear whether tissue stores built up during gestation may be a significant source of lead as children age. Studies are needed to determine whether maternal biomarkers (maternal or umbilical blood lead levels) are useful to predict postnatal blood lead levels throughout infancy and childhood.

Biokinetics of lead in breastmilk

More information is needed on the biokinetics and cumulative dose of lead to the breastfeeding infant at various maternal flood lead levels. Research is needed to determine how breast milk lead levels change over the course of lactation, and whether there are factors in breast milk or maternal diet that would enhance or retard the absorption of lead from breast milk by the infant.

Biokinetics of lead with nutritional supplementation or super-supplementation during pregnancy

- Large randomized clinical trials are needed to determine if nutritional supplements, diet modification, or a combination of diet and supplements may be a means of secondary prevention of exposure to lead during pregnancy.
- Research is needed to determine whether the impact of nutritional factors differs for women prepregnancy, during pregnancy, or during lactation, or depending on the woman's lead burden or prior chelation therapy. Extrapolation from animal studies may be necessary.

Pharmacokinetics and effectiveness of chelating agents during pregnancy and lactation

Minimal clinical data are available to inform decisions regarding the use of chelating agents in pregnant women, such as data on toxicity, treatment regimen, and timing of treatment. Studies are needed on

- The effects of prenatal chelation on mothers and infants and on lead kinetics across the placenta; however, since this type of research is often not possible in humans due to ethical concerns about research on human subjects, extrapolation from animal studies may be necessary.
- The effectiveness of chelation therapy on mitigation of adverse health outcomes other than neurodevelopment.

Use of educational and developmental support and intellectual stimulation to improve academic/life performance of children exposed to lead *in utero*

Current research shows that lead exposure is associated with lifelong health and developmental effects in humans; however, questions have been raised from animal studies and clinical experience about whether and the extent to which certain cognitive effects can be mitigated by educational interventions during childhood. Long-term follow-up studies of children exposed to lead *in utero* are needed to evaluate whether specific educational or developmental interventions can improve cognitive outcomes. To be useful, such studies must carefully control for factors that may confound the relationship between educational strategies and cognitive outcomes.

Identification and development of new therapeutic agents or mechanisms to remove lead from breast milk and bone or tissue storage sites in women of childbearing age.

Since bone lead stores persist for decades, women and their infants may be at risk for exposure long after environmental sources have been abated. At present, no interventions are available to remove lead from breast milk or from bone or tissue storage sites in women of childbearing age. Identification and development of prepregnancy interventions that decrease bone lead stores, or render them less mobilizable, may prove beneficial.

Health Services Research

Develop estimates for the number and distribution of pregnant women in the United States who should have blood lead tests, and the costs and benefits associated with testing and follow-up care

Limited data are available on the numbers of pregnant women who meet the criteria for blood lead testing recommended in these guidelines. Research is needed to

- Estimate the number of pregnant women in the US who should be tested for lead exposure, the costs for such testing, and the costs for recommended follow-up care. This research should include an assessment of the ability of high-risk women to access blood lead testing and follow-up services, including environmental intervention, as well as determine who bears the burden of these costs.
- Estimate the societal benefits expected to be derived from testing and treating pregnant women for lead exposure as recommended herein.

Develop guidance for validation of risk questionnaires for pregnant women in specific clinical settings and subpopulations

Only a few communities have developed risk questionnaires to inform decisions about blood lead testing of pregnant women; however, these guidelines recommends their use. Practical methods for adapting and validating risk questionnaires at the local level should be developed and disseminated by CDC and state and local health departments. Such guidance would allow local health agencies and health care providers to develop reliable risk questionnaires that are responsive to local conditions.

Optimal timing for blood lead testing during pregnancy

Identification of lead-exposed pregnant women potentially offers the most benefit to women and their infants; however, there are no studies that identify when in pregnancy blood lead testing should be done. Given the curvilinear trajectory of blood lead levels over the course of pregnancy, blood lead testing done in different trimesters may either over- or underestimate the woman's true lead exposure.

Characterize risk factors for pica and clinical strategies to identify pica in pregnant and lactating women

While pica behavior is relatively uncommon in the general population, pica is observed in some populations of pregnant women in the United States, particularly those who have recently immigrated. Research is needed on how clinicians can more effectively identify pica, particularly those factors (age, race, country of origin, nutritional or health status, etc.) that may predispose a woman to pica.

Effectiveness of interventions to reduce pica among pregnant women

Only a few studies are available that evaluate the effectiveness of interventions designed to reduce or eliminate pica behavior; none of these include pregnant women. Studies are needed on the effectiveness of

behavior modification strategies for specific types of pica. Given the frequency of pica among some immigrant populations, culturally specific interventions should be a priority for investigation.

HEALTH POLICY NEEDS

Stronger Occupational Standards for Lead Exposure, Especially for Pregnant Women

Current OSHA policy requires medical evaluations at blood lead levels of 40 µg/dL, and removal from the workplace when blood lead levels exceed 50 µg/dL (for construction) or 60 µg/dL (for general industry). Some industries where workers may be exposed to high levels of lead are not protected by OSHA. Current occupational standards were developed over 30 years ago and have not been updated to reflect research findings that lead exposure during pregnancy is associated with adverse effects on fetal growth and neurodevelopment, maternal health, and an increased risk for spontaneous abortion. Updated standards consistent with the current knowledge about the health effects of lead exposure are needed to provide clear guidance to industry, policy makers, and workers, as well as because medical judgments may be influenced by existing regulations.

- The Occupational Safety and Health Administration Standard for lead exposure should be updated to require that occupationally exposed women who are pregnant be removed from lead exposure if their blood lead level is 10 µg/dL or higher.
- If the blood lead level is in the range of 5 to 9 µg/dL, efforts should be made to identify and reduce lead exposure on the job and review appropriate use of personal protective equipment.
- All lead-exposed workers who have the potential to be exposed by lead ingestion, even in the absence of documented elevations in air lead levels, should be under medical surveillance.
- Lead exposure should be regulated in categories of workers currently not covered by the OSHA standard.

Regulation of Alternative Medicines and Dietary Supplements to Ensure Product Safety and Accuracy in Labeling and Marketing

National policy is needed to establish regulatory mechanisms to control the safety and quality of alternative medicines and dietary supplements sold commercially in the United States.

- Health claims for alternative medicines and dietary supplements should meet the same rigorous criteria as claims by drugs used to prevent or treat disease.
- Regulatory standards for the content, labeling, and marketing of such products should be established and enforced.
- The Federal Trade Commission, in cooperation with FDA, should ensure that advertising for dietary supplements is accurate and not misleading.

Regulatory Authority to Require Lead Safety in Dwellings Occupied by Pregnant Women and Resources to Control Lead Hazards in These Units

State and local health or housing agencies should have the statutory authority to require and enforce lead paint hazard abatement in rental housing where pregnant women reside, to allow parents to bring their babies home to safe housing. Such statutes should also have provisions to protect pregnant tenants from retaliatory eviction by property owners unwilling to comply. Jurisdictions should also have public resources available to control lead hazards in those units where private resources are unattainable. [See Chapter 11 for information on lead safety resources.]

Mandatory Reporting of All Adult Blood Lead Levels

Public health agencies need to be informed of blood lead testing results on adults in order to identify and investigate new community exposure sources, monitor epidemiological trends, and assure appropriate interventions for identified cases, including environmental inspection and case management services. Laboratories should be required to report all blood lead level test results on adults to the health department, preferably in standard electronic form. Such reporting could enable health departments to identify pregnant women with lead exposure above background levels for priority interventions.

Reimbursement for Blood Lead Testing and Follow-Up Care for Uninsured Pregnant and Lactating Women and Their Infants

Blood lead testing and follow up services (including case management, nutritional interventions, chelation therapy, and environmental investigation) are essential to appropriate medical management of pregnant and lactating women with lead exposure above background levels. However, a lack of insurance can be prohibitive to proper care for many women. In addition, such services may not be covered by insurance for documented immigrants during their first 5 years of residence in the United States or at all for undocumented immigrants. The State Children's Health Insurance Program allows the use of federal funds for prenatal services to women regardless of immigration status in order to ensure the health of the fetus. States should use these funds for services necessary to reduce or treat lead exposure above background levels during the woman's pregnancy and lactation.

Sharing of Clinical Data Via Electronic Health Records

Proper medical management of pregnant or lactating women with lead exposure above background levels and their infants requires that the medical records of both mother and child contain relevant data related to lead. For example, the infant's chart should contain information about the mother's blood lead level at birth and about identified environmental sources. Likewise, the mother's chart should contain information about the infant's blood lead level. However, such records are likely to be maintained by diferrent health care providers and complicated by differing records systems, the possibility of different maternal/child surnames, etc. The adoption of electronic medical records would permit an automated linkage of the two charts to ensure that appropriate data can be transmitted to the other chart.

HEALTH EDUCATION NEEDS

Continuing Medical Education on Lead and Pregnancy

Continuing Medical Education (CME) training on lead and pregnancy is needed to familiarize health care providers with this current research base and clinical recommendations. CDC, in consultation and cooperation with medical specialty associations (e.g., ACOG, AAP, American Academy of Family Physicians), nursing associations (e.g., American Nurses' Association, American College of Nurse Midwives), and environmental health associations should develop a training course module on lead and pregnancy or alternatively incorporate a discussion of lead exposure and pregnancy into preexisting educational materials, such as the Agency for Toxic Substances and Disease Registry's *Case Studies in Environmental Medicine*, which can be taken for continuing education credit. The training should include information on evaluating risk factors for lead exposure as part of an occupational, environmental, and lifestyle health risk assessment.

Environmental Health Requirement in Basic Practitioner's Curriculum

Pediatric medical and nursing education currently lacks sufficient environmental health content necessary to prepare pediatric health care professionals to prevent, recognize, manage, and treat environmental exposure related disease including lead exposure during pregnancy. Thus, educational opportunities for physicians, nurses, environmental engineers, and other practitioners during their training are needed. Such courses should also incorporate material on cultural competency and health literacy. The Pediatric Environ-

mental Health Specialty Units (PEHSUs) and CDC's provider education series are appropriate vehicles for these courses. CDC and the PEHSUs should coordinate publications and educational offerings with ACOG, AAP, the American Academy of Family Physicians, and the American College of Nurse Midwives.

Preconceptional Counseling on Lead Exposure for Adults of Childbearing Age

Primary and reproductive health care providers should provide counseling to patients of childbearing age about the effects of lead on fertility, pregnancy, and infant outcomes. They should educate their patients about possible lead exposure sources and how to reduce exposure in advance of conception. Such counseling should include referrals to appropriate sources for further assistance in assessing and reducing environmental or occupational lead expsosures. CDC should collaborate with the national professional health organizations, such as the American College of Obstetricians and Gynecologists, American Medical Association, and The American Academy of Family Physicians, and nonprofit organizations, such as the March of Dimes, to develop and disseminate educational materials to convey these messages.

Expand Resources for National Centralized Data Collection and Management Facility

A comprehensive online system is needed to improve dissemination of data on various sources of lead to medical and public health providers and the community. Such a system would provide real-time product identification information to alert providers and the communities at risk for exposure. It would also allow agencies that are testing products (e.g., CPSC, FDA, State of California) to enter information on tainted products into one easily accessible database.

Evaluate the Effectiveness of Currently Available Personal Protective Equipment

The capacity of available personal protective equipment to keep BLLs below 5 µg/dL is an area of needed research. Such studies should also inform the creation of more sophisticated equipment that can ensure that BLLs of workers remain below 5 µg/dL.

CHAPTER 11. RESOURCES AND REFERRAL INFORMATION

Contact information is provided here for key information sources for topics covered in this report. While not an exhaustive list, these resources provide a useful starting point for readers interested in updates, publications, referrals, or additional information.

For information on lead poisoning prevention, including screening, case management, and referrals to state and local lead poisoning prevention programs:

Centers for Disease Control and Prevention (CDC)
Healthy Homes and Lead Poisoning Prevention Branch
4770 Buford Highway NE, Mailstop F-60
Atlanta, GA 30341
(770) 488-3300
http://www.cdc.gov/nceh/lead/

See especially:

- Current statement on children, including literature review on low-level health effects in children
- Current recommendations for case management of children with elevated blood lead levels
- Reports on lead sources and epidemiology
- Links to state and local lead poisoning prevention programs
- Links to information about recalls of consumer products with lead (or see http://www.cpsc.gov or http://www.fda.gov)

For information on occupational and environmental health resources, expert contacts, and clinic locations nationwide:

American College of Medical Toxicology
10645 N. Tatum Blvd.
Suite 200-111
Phoenix, AZ 85028
Phone: (623) 533-6340
Fax: (623) 533-6340
E-mail: info@acmt.net
http://www.acmt.net

Association of Occupational and Environmental Clinics (AOEC)
1010 Vermont Ave., NW #513
Washington, DC 20005
(202) 347-4976 or Toll Free 888-347-2632
http://www.aoec.org

National Institute for Occupational Safety and Health (NIOSH)
http://www.cdc.gov/niosh/
Occupational Safety and Health Administration (OSHA), U.S. Department of Labor
http://www.osha.gov/SLTC/lead/

Pediatric Environmental Health Specialty Units (PEHSU)
c/o Association of Occupational and Environmental Clinics
1010 Vermont Ave. NW, #513
Washington, DC 20005
888-347-AOEC (888-347-2632)
http://aoec.org/PEHSU/index.html

For information on nutritional support for eligible women and infants, including state contact information:

The Special Supplemental Nutrition Program for Women, Infants and Children (WIC)
Food and Nutrition Service, U.S. Department of Agriculture
http://www.fns.usda.gov/wic/

For information about lead-safe housing, including lead-based paint, renovation, and repainting:

U.S. EPA brochure titled Reducing Lead Hazards When Remodeling Your Home, available at http://www.epa.gov/lead/pubs/rrpamph.pdf

U.S. Department of Housing and Urban Development publication titled Lead Paint Safety Field Guide, available at http://www.hud.gov/offices/lead/library/lead/LeadGuide_Eng.pdf

National Center for Healthy Housing (formerly the National Center for Lead-Safe Housing)
http://www.centerforhealthyhousing.org/html/resources_page.htm

Alliance for Healthy Homes
http://www.afhh.org/res/res_by_topic_lead.htm

For information on lead and drinking water:

Data on local drinking water

http://www.epa.gov/safewater/dwinfo/index.html

Laboratories certified to test for contaminants in drinking water
http://www.epa.gov/safewater/faq/sco.html

National Ground Water Association (for issues related to water quality from private wells)
http://www.wellowner.org

U.S. EPA fact sheets for lead in water http://www.epa.gov/safewater/lead/leadfactsheet.html
http://www.epa.gov/safewater/lead/pdfs/v2final.pdf

For general information about lead poisoning (for consumers or professionals):

National Lead Information Center (NLIC)
1-800-424-LEAD (5323).
Monday through Friday, 8:00 am to 6:00 pm eastern time (except federal holidays)
http://www.epa.gov/lead/pubs/nlic.htm

Office of Healthy Homes and Lead Hazard Control
U.S. Department of Housing and Urban Development
http://www.hud.gov/offices/lead/healthyhomes/lead.cfm

Office of Pollution Prevention and Toxics
U.S. Environmental Protection Agency
http://www.epa.gov/lead/

U.S. Consumer Product Safety Commission – product recalls and safety alerts
http://www.cpsc.gov/

U.S. Food and Drug Administration – product recalls, market withdrawals, and safety alerts
http:// http://www.fda.gov/opacom/7alerts.html

CHAPTER 1 – INTRODUCTION

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CHAPTER 3 – BIOKINETICS AND BIOMARKERS OF LEAD IN PREGNANCY AND LACTATION

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Appendices

Appendix I

Existing State Legislation Related to Lead and Pregnant Women

Existing State Legislation Related to Lead and Pregnant Women

SCREENING LAW(S):

New York Public Health Law §1370-a(2)
Summary: Requires dept to promulgate and enforce regulations for screening children and **pregnant women** for lead poisoning, and for follow-up treatment for those with positive results.

New York Public Health Law §1370-c
Summary: Authorizes dept to establish screening intervals and methods, which shall be followed by every physician or other provider of medical care to children or **pregnant women**.

Connecticut Gen. Stat. §19a-111
The commissioner shall establish, in conjunction with recognized professional medical groups, guidelines consistent with the CDC for assessment of the risk of lead poisoning, screening for lead poisoning and treatment and follow-up care of individuals including children with lead poisoning, women who are **pregnant** and women who are planning **pregnancy**.

RISK REDUCTION LAW(S):

Maryland Code §6-801- 6-852; Article 48A §734-737; Real Property § 8-208.2
Comply with specific Risk Reduction standards when notified of certain conditions such as chipping paint or the presence in the unit of a child or **pregnant woman** with an elevated blood lead level of 15 µg/dl or higher.

Minnesota Statute §144.9504
Lead risk assessment. (a) An assessing agency shall conduct a lead risk assessment of a residence according to the venous blood lead level and time frame set forth in clauses (1) to (4) for purposes of secondary prevention: within ten working days of a **pregnant female** in the residence being identified to the agency as having a venous blood lead level equal to or greater than ten micrograms of lead per deciliter of whole blood.
Subd. 5. Lead orders. (a) An assessing agency, after conducting a lead risk assessment, shall order a property owner to perform lead hazard reduction on all lead sources that exceed a standard adopted according to section 144.9508.

EDUCATION LAW(S):

Michigan Comp. Laws §333.5473a(2-3)
Summary: Requires department to establish and conduct educational programs to educate homeowners and remodelers of lead-safe practices and methods of lead-hazard reduction activities; (4): requires department to recommend appropriate maintenance practices for owners of residential property and day care facilities designed to prevent lead poisoning in children 6 years or younger and **pregnant women**.

PROPOSED LEGISLATION (NOT ENACTED):

California – Requires the Department to make available to all health care providers that administer **perinatal care** services informational materials on lead and require providers to make this information available to **pregnant women**.
New York – Bill aimed at eliminating lead hazards in housing which is or will be occupied by **pregnant women** or children 7 years of age or less.
Ohio - Requires the Director to produce an educational audio-video recording on lead poisoning prevention for at-risk **pregnant women**.

Appendix II

Charge Questions to the Lead and Pregnancy Work Group

Charge Questions to the Lead and Pregnancy Work Group

Subgroup 1. Prevalence, Risk and Screening

This group was asked to review literature including but not limited to:

- Distribution of BLLs and other measures of lead body burden in:
  - women of childbearing-age
  - pregnant women at various gestational ages
  - lactating women
  - newborns
- Risk factors/sources for elevated blood lead levels in pregnant and lactating women and the newborns
- Relationship between:
  - maternal blood/bone lead levels and newborn blood lead levels
  - pregnancy BLLs and postpartum BLLs?

Based on subgroup findings, address the following questions:

- When should pregnant women be screened for lead poisoning and when should screening occur? Are there questions that can predict which woman should be screened?
- What culturally sensitive interventions should be recommended to reduce exposure to potential sources?

Subgroup 2. Maternal, Pregnancy and Child Outcomes

This group was asked to review literature including but not limited to:

- Impact of elevated blood lead levels on:
  - fertility (spontaneous abortion, stillbirth)
  - maternal health (pregnancy induced hypertension)
  - pregnancy outcomes (preterm delivery, gestational age, birth weight, birth length, head circumference)
  - neurodevelopment outcomes due to prenatal exposure
  - behavioral outcomes due to prenatal exposure

Based on subgroup findings, address the following questions:

- When blood lead levels are elevated, what guidance should medical providers be providing to:
  - women of child-bearing age regarding delaying of pregnancy?
  - pregnant women about potential outcomes?

Subgroup 3. Management, Treatment and Other Interventions

This group was asked to review literature including but not limited to:

- Breast milk exposure including:
  - Amount transmitted to baby
  - Benefits vs. hazards of breast feeding when blood lead levels are elevated
- Effectiveness of nutritional supplementation during pregnancy and lactation
- Indications/Contraindications/Adverse effects of chelation on:
  - pregnant woman, fetus, and newborns

Based on subgroup findings, address the following questions:

- What is the follow-up testing schedule at various blood lead levels for pregnant and lactating women and for the newborns?
- At what blood lead level, if any, should women be advised against breastfeeding?
- What nutrition counseling or nutritional supplements should be recommended?
- What chelating agents should be employed?
- What interventions should be provided by public health agencies at various blood lead levels?

Appendix III

Commonly Ingested Substances in Pregnancy-related Pica, Reasons for Use, and Country/Race-Ethnicity or Origin

Commonly-ingested Substances in Pregnancy-related Pica, Reasons for Use, and Country/ Race-Ethnicity of Origin

Substance/ Name	Reason Used (If known or reported)	Country	Race/ Ethnicity or Regional Affiliation
Bean Stones		**Mexico**	
Clay		**Asia** India	Hindu
Clay		**Caribbean** Trinidad Jamaica	Hindu
Clay		**Africa**: Uganda, Kenya, Zambia Ghana South Africa	
Clay		**Middle East** Saudi Arabia	
Clay (Cipula, Kipula, Akipula, Askipula)		**Central America** Belize	
Clay, Clay Pottery (Tierra Santa, Benditos)		**Mexico**	
Clay		**North America** US	African-Americans (South, particularly rural areas) Immigrants
Corn Starch	Nausea/GI upset	US	African-Americans (South)
Dirt or soil		**Mexico**	
Ice/Refrigerator Frost	Relieve thirst, cool down	**North America** US Mexico	African-Americans (South)
Milk of Magnesia (Solid)		**Mexico**	

Appendix IV

List of Occupations and Hobbies That Involve Lead Exposure

List of Occupations and Hobbies that Involve Lead Exposure

Lead Related Occupations and Industries

Ammunition/explosives production
Automotive repair shops
Battery manufacturing and recycling
Brass, bronze, copper or lead foundries
Bridge, tunnel and elevated highway/subway construction
Cable/wire stripping, splicing or production
Ceramic manufacturing
Firing range work
Glass recycling, stained glass and glass manufacturing
Home renovation/restoration
Lead Abatement
Lead production or smelting
Machining or grinding lead alloys
Manufacturing and installation of plumbing components
Manufacturing of industrial machinery and equipment
Metal scrap yards and other recycling operations
Motor vehicle parts and accessories
Occupations using firearms
Plastics manufacturing
Pottery making
Production and use of chemical preparations
Rubber manufacturing
Sandblasting, sanding, scraping, burning or disturbing lead paint
Use of lead based paints
Welding or torch-cutting painted metal

Hobbies and Activities That May Cause Lead Exposure

Making stained glass and painting on stained glass
Copper Enameling
Bronze Casting
Making pottery and ceramic ware with lead glazes and paints
Casting ammunition, fishing weights or lead figurines
Collecting, painting or playing games with lead figurines
Jewelry making with lead solder
Electronics with lead solder
Furniture refinishing
Glassblowing with leaded glass
Print making and other fine arts
Liquor distillation
Hunting and target shooting
Remodeling/renovating homes built before 1978

Appendix V

Alternative Cosmetics, Food Additives, and Medicines That Contain Lead

Alternative Cosmetics, Food Additives, and Medicines that Contain Lead

Exposure Source	Description/ Exposure Pathway
Albayalde or *albayaidle*	Used by mainly by Mexicans and Central Americans to treat vomiting, colic, apathy and lethargy.
Al Kohl (Middle East, India, Pakistan, some parts of Africa)	A gray or black eye cosmetic applied to the conjunctival margins of the eyes for medicinal and cosmetic reasons. Can contain up to 83% lead. It is believed to strengthen and protect the eyes against disease and may be used as an umbilical stump remedy. Also known as simply as **kohl**.
Al Murrah	Used as a remedy for colic, stomach aches and diarrhea in Saudi Arabia.
Anzroot	A remedy from the Middle East used to treat gastroenteritis.
Azarcon	Also known as **alarcon**, **coral**, **luiga**, **maria luisa**, or **rueda**. Bright orange powder used to treat "empacho" (an illness believed to be caused by something stuck in the gastrointestinal tract, resulting in diarrhea and vomiting). Azarcon is 95% lead.
Ayurvedic medicine (Tibet)	Traditional medicines that may contain lead. Some examples include: **guglu, sundari kalp, jambrulin**
Ba-Baw-San or *Ba-Bow-Sen* (China)	Herbal medicine used to detoxify "fetal poisoning" and treat colic pain or to pacify young children.
Bali goli	A round, flat black bean which is dissolved in "gripe water" and used within Asian Indian cultures for stomach ache.
Bint Al Zahab (Iran)	Rock ground into a powder and mixed with honey and butter given to newborn babies for colic and early passage of meconium after birth.
Bint Dahab (Saudi Arabia; means "daughter of gold")	A yellow lead oxide used by local jewelers and as a home remedy for diarrhea, colic, constipation and general neonatal uses.
Bokhoor (Kuwait)	A traditional practice of burning wood and lead sulfide to produce pleasant fumes to calm infants.
Cebagin	Used in the Middle East as a teething powder.
Chuifong tokuwan	A pill imported from Hong Kong used to treat a wide variety of ailments.
Cordyceps	Used in China as a treatment for hypertension, diabetes and bleeding.
Deshi Dewa	A fertility pill used in Asia and India.
Farouk	A teething powder from Saudi Arabia.
Ghasard	Brown powder used in Asian Indian cultures as a tonic to aid in digestion.
Greta (Mexico)	Yellow powder used to treat "empacho" (see **azarcon**); can be obtained through pottery suppliers, as it is also used as a glaze for low-fired ceramics. Greta is 97% lead.
Hai Ge Fen (Concha cyclinae sinensis)	A Chinese herbal remedy derived from crushed clam shells.
Henna	Used as a hair dye and for temporary tattoos in the Middle East and India - may contain lead.

Jin Bu Huan (China)	An herbal medicine used to relieve pain.
Kandu	A red powder from Asia and India used to treat stomach ache.
Koo Sar	Red pills from China used to treat menstrual cramps.
Kushta	Used for diseases of the heart, brain, liver, and stomach and as an aphrodisiac and tonic in India and Pakistan.
Litargirio	A yellow or peach-colored powder used as a deodorant, a foot fungicide and a treatment for burns and wound healing particularly by people from the Dominican Republic.
Lozeena	An orange powder used to color rice and meat that contains 7.8%-8.9% lead.
Pay-loo-ah (Vietnam)	A red powder given to children to cure fever or rash.
Po Ying Tan (China)	An herbal medicine used to treat minor ailments in children.
Santrinj (Saudi Arabia)	An amorphous red powder containing 98% lead oxide used principally as a primer for paint for metallic surfaces, but also as a home remedy for "gum boils" and "teething."
Surma (India)	Black powder used as an eye cosmetic and as teething powder or umbilical stump remedy.
Tibetan herbal vitamin	Used to strengthen the brain.
Traditional Saudi medicine	Orange powder prescribed by a traditional medicine practitioner for teething; also has an antidiarrheal effect.

Appendix VI

Recommendations for Medical Management of Adult Lead Exposure

Recommendations for Medical Management of Adult Lead Exposure

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Research conducted in recent years has increased public health concern about the toxicity of lead at low dose and has supported a reappraisal of the levels of lead exposure that may be safely tolerated in the workplace. In this article, which appears as part of a mini-monograph on adult lead exposure, we summarize a body of published literature that establishes the potential for hypertension, effects on renal function, cognitive dysfunction, and adverse female reproductive outcome in adults with whole-blood lead concentrations < 40 μg/dL. Based on this literature, and our collective experience in evaluating lead-exposed adults, we recommend that individuals be removed from occupational lead exposure if a single blood lead concentration exceeds 30 μg/dL or if two successive blood lead concentrations measured over a 4-week interval are ≥ 20 μg/dL. Removal of individuals from lead exposure should be considered to avoid long-term risk to health if exposure control measures over an extended period do not decrease blood lead concentrations to < 10 μg/dL or if selected medical conditions exist that would increase the risk of continued exposure. Recommended medical surveillance for all lead-exposed workers should include quarterly blood lead measurements for individuals with blood lead concentrations between 10 and 19 μg/dL, and semiannual blood lead measurements when sustained blood lead concentrations are < 10 μg/dL. It is advisable for pregnant women to avoid occupational or avocational lead exposure that would result in blood lead concentrations > 5 μg/dL. Chelation may have an adjunctive role in the medical management of highly exposed adults with symptomatic lead intoxication but is not recommended for asymptomatic individuals with low blood lead concentrations. *Key words:* adult lead exposure, blood lead, chelation, medical management, medical surveillance, pregnancy. *Environ Health Perspect* 115:463–471 (2007). doi:10.1289/ehp.9784 available via *http://dx.doi.org/* [Online 22 December 2006]

As a likely consequence of its capacity to interfere with biochemical events present in cells throughout the body, inorganic lead exerts a wide spectrum of multisystemic adverse effects. These health impacts range from subtle, subclinical changes in function to symptomatic, life-threatening intoxication. In recent years, research conducted on lead-exposed adults has increased public health concern over the toxicity of lead at low dose. These findings support a reappraisal of the levels of lead exposure, sustained for either short or extended periods of time, that may be safely tolerated in the workplace. In this article we offer health-based recommendations on the management of lead-exposed adults aimed at primary and secondary prevention of lead-associated health problems. As noted in the introduction to this mini-monograph (Schwartz and Hu 2007) the authors of this article are an independent subgroup of an expert panel (8 of 13 members) originally convened by the Association of Occupational and Environmental Clinics (www.aoec.org) to address these management issues. In deriving the recommendations in this article, we took note of a body of literature that establishes the potential for adverse health effects at blood lead concentrations or exposure levels permissible under current workplace regulations established in the 1970s by the U.S. Occupational Safety and Health Administration (OSHA). These regulations generally require removal from lead exposure when whole-blood lead concentrations exceed 50 or 60 μg/dL. These values are considerably above blood lead concentrations of the general population of the United States, which had a geometric mean of 12.8 μg/dL in the late 1970s (National Center for Health Statistics 1984), and a recent value of 1.45 μg/dL [U.S. Centers for Disease Control and Prevention (CDC) 2005].

In setting forth our perspective on the recommended medical management of adult lead exposure, the narrative of this article focuses on four categories of health effects—hypertension, decrement in renal function, cognitive dysfunction, and adverse reproductive outcome—that have been the subject of much recent research. The discussion of these end points highlights those studies, that by virtue of their design and scope, were particularly influential in establishing the authors' concerns regarding the potential for adverse health effects at low to moderate levels of lead exposure in adults. Collectively, these effects support the preventive medical management strategies that are recommended in the tables. A review of the extensive literature on the health effects of lead is beyond the scope of this article, but the reader is referred to reviews on the cardiovascular and cognitive impacts of lead on adults that appear elsewhere in this mini-monograph (Navas-Acien et al. 2007; Shih et al. 2007), as well as a review on recent lead literature prepared by the U.S. Environmental Protection Agency (EPA) for its Air Quality Criteria for Lead (U.S. EPA 2006).

Table 1 is a summary of the adverse health risks associated with different blood lead concentrations and presents corresponding medical management recommendations that range from discussion of risks and

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reduction of lead exposure at low levels to removal from lead exposure accompanied by probable chelation therapy at the highest levels. The designation of risks as either "short-term" or "long-term," depending on whether the risks are associated with exposure lasting less than or more than 1 year, reflects a qualitative understanding of the duration of lead exposure that may be required to elicit certain adverse health effects of lead. For some of the long-term risks, such as hypertension, research employing noninvasive K-shell X-ray fluorescence measurement of lead in bone, a biomarker of long-term cumulative exposure, suggests that several years of sustained elevations in blood lead may be necessary for a significant risk to emerge. The use of 1 year as a cut-point in the table is not intended to represent a sharp division, in terms of cumulative dose, between what might constitute a short-term versus a long-term risk nor does it imply that a significant long-term risk begins to exist as soon as 1 year is surpassed. Blood lead, a measure of the amount of lead circulating in the tissues, reflects both recent exogenous exposure as well as endogenous redistribution of lead stored in bone.

The categorization of risks in Table 1 by discrete intervals of blood lead concentration is a qualitative assessment. In clinical practice, substantial interindividual variability in the susceptibility to symptomatic adverse effects of lead is commonly observed. Factors that might influence the risk of lead toxicity in adults include preexisting disease affecting relevant target organs (e.g., hypertension, renal disease, or neurologic dysfunction), nutritional deficiencies that modify the absorption or distribution of lead (e.g., low dietary calcium or iron deficiency), advanced age, and genetic susceptibility. Although recent studies suggest that polymorphisms in specific genes may modify the toxicokinetics and renal effects of lead (Theppeang et al. 2004; Weaver et al. 2006; Wu et al. 2003), research findings at present are insufficient to conclusively identify genotypes that confer increased risk.

Table 1. Health-based management recommendations for lead-exposed adults.

Blood lead level (μg/dL)	Short-term risks (lead exposure < 1 year)	Long-term risks (lead exposure ≥ 1 year)	Management
< 5	None documented	None documented	None indicated
5–9	Possible spontaneous abortion Possible postnatal developmental delay	Possible spontaneous abortion Possible postnatal developmental delay Possible hypertension and kidney dysfunction	Discuss health risks Reduce lead exposure for women who are or may become pregnant
10–19	Possible spontaneous abortion Possible postnatal developmental delay Reduced birth weight	Possible spontaneous abortion Reduced birth weight Possible postnatal developmental delay Hypertension and kidney dysfunction Possible subclinical neurocognitive deficits	As above for BLL 5–9 μg/dL, plus: Decrease lead exposure Increase biological monitoring Consider removal from lead exposure to avoid long-term risks if exposure control over an extended period does not decrease BLL < 10 μg/dL, or if medical condition present that increases risk with continued exposure[a]
20–29	Possible spontaneous abortion Possible postnatal developmental delay Reduced birth weight	Possible spontaneous abortion Possible postnatal developmental delay Reduced birth weight Hypertension and kidney dysfunction Possible subclinical neurocognitive deficits	Remove from lead exposure if repeat BLL measured in 4 weeks remains ≥ 20 μg/dL
30–39	Spontaneous abortion Possible postnatal developmental delay Reduced birth weight	Spontaneous abortion Reduced birth weight Possible postnatal developmental delay Hypertension and kidney dysfunction Possible neurocognitive deficits Possible nonspecific symptoms[b]	Remove from lead exposure
40–79	Spontaneous abortion Reduced birth weight Possible postnatal developmental delay Nonspecific symptoms[b] Neurocognitive deficits Sperm abnormalities	Spontaneous abortion Reduced birth weight Possible postnatal developmental delay Nonspecific symptoms[b] Hypertension Kidney dysfunction/nephropathy Subclinical peripheral neuropathy Neurocognitive deficits Sperm abnormalities Anemia Colic Possible gout	Remove from lead exposure Refer for prompt medical evaluation Consider chelation therapy for BLL > 50 μg/dL with significant symptoms or signs of lead toxicity
≥ 80	Spontaneous abortion Reduced birth weight Possible postnatal developmental delay Nonspecific symptoms[b] Neurocognitive deficits Encephalopathy Sperm abnormalities Anemia Colic	Spontaneous abortion Reduced birth weight Possible postnatal developmental delay Nonspecific symptoms[b] Hypertension Nephropathy Peripheral neuropathy Neurocognitive deficits Sperm abnormalities Anemia Colic Gout	Remove from lead exposure Refer for immediate/urgent medical evaluation Probable chelation therapy

BLL, blood lead level.
[a]Medical conditions that may increase the risk of continued exposure include chronic renal dysfunction (serum creatinine > 1.5 mg/dL for men and > 1.3 mg/dL for women, or proteinuria), hypertension, neurologic disorders, and cognitive dysfunction. [b]Nonspecific symptoms may include headache, fatigue, sleep disturbance, anorexia, constipation, arthralgia, myalgia, and decreased libido.

Health Effects at Low Dose

Hypertension. Animal investigations support a pressor effect of lead at low dose (Fine et al. 1988; Gonick et al. 1997; Vaziri 2002). Epidemiologic investigations conducted in large general population samples (e.g., Harlan 1988; Nash et al. 2003; Pocock et al. 1988; Schwartz 1988) suggest lead may elevate blood pressure in adults at blood lead concentrations < 20 μg/dL. In some human studies of the link between blood lead and blood pressure, the relationship appeared to be influenced by subjects' sex or race (e.g., Den Hond et al. 2002; Staessen et al. 1996; Vupputuri et al. 2003). Three meta-analyses of studies examining the relationship between blood lead and blood pressure found relatively consistent effects of blood lead on blood pressure. The studies showed statistically significant coefficients for a 2-fold increase in blood lead of 1.0 mmHg (Nawrot et al. 2002; Staessen et al. 1994) or 1.25 mmHg (Schwartz 1995) for systolic blood pressure, and 0.6 mmHg for diastolic blood pressure (Nawrot et al. 2002; Staessen et al. 1994). The study populations analyzed in these meta-analyses included many with blood lead concentrations < 20 μg/dL.

Further support for the impact of low-level lead exposure on blood pressure has emerged from studies employing K-shell X-ray fluorescence measurement of lead in bone, a biomarker of long-term cumulative lead exposure. In two major studies drawn from samples of the general population, bone lead concentration was a significant predictor of the risk of hypertension (Hu et al. 1996; Korrick et al. 1999). Findings from the study by Hu et al. (1996) illustrate the associated risk. In that general population sample of middle-aged to elderly men (n = 590), the average blood lead concentration was 6.3 μg/dL. On the basis of the subjects' ages (mean 67 ± 7.2 years), it may be expected that they lived most of their adult lives at a time when the blood lead concentration of the general population ranged from 10 to 25 μg/dL (Hofreuter et al. 1961; Mahaffey et al. 1982; Minot 1938). Comparing the lowest with the highest quintile of bone lead among that cohort, a tibia bone lead increment of 29 μg/g was associated with a 1.5 odds ratio (OR) for hypertension [95% confidence interval (CI), 1.1–1.8]. Given the slope of 0.05 that has described the linear relationship between tibia bone lead concentration and cumulative blood lead index in subjects with chronic lead exposure in many studies (Hu et al. 2007), this increment in bone lead is roughly equivalent to a cumulative blood lead index of 580 μg/dL • years (i.e., 29 ÷ 0.05 = 580). Considered in the context of a 40-year working lifetime, the risk of lead-associated hypertension may be significantly reduced by preventive measures that lower chronic workplace blood lead concentrations from the 20s and 30s μg/dL range to < 10 μg/dL. For example, a change in average workplace blood lead concentration from 25 to 10 μg/dL over a 40-year working lifetime would reduce a worker's cumulative blood lead index by 600 μg/dL • years, slightly more than the 580 μg/dL • years cited above.

Hypertension is a significant risk factor for cardiovascular and cerebrovascular mortality. As reviewed in an accompanying article in this mini-monograph (Navas-Acien et al. 2007), studies conducted in general population cohorts have consistently observed a positive association between lead exposure and cardiovascular disease. Because of their size and design, studies derived from the National Health and Nutrition Evaluation Surveys (NHANES) are particularly notable. A 16-year longitudinal analysis of the general population cohort studied between 1976 and 1980 as part of NHANES II found that blood lead concentrations of 20–29 μg/dL at baseline were associated with 39% increased mortality from circulatory system disease compared with subjects with blood lead < 10 μg/dL [relative risk (RR) 1.39; 95% CI, 1.01–1.91] (Lustberg and Silbergeld 2002). Two studies recently examined the longitudinal relationship between blood lead concentration and cardiovascular mortality among participants in NHANES III. In a 12-year longitudinal study of participants in NHANES III, ≥ 40 years of age (n = 9,757), the subgroup with blood lead concentration ≥ 10 μg/dL (median, 11.8) had a relative risk of cardiovascular mortality of 1.59 (95% CI, 1.28–1.98) compared with subjects with blood lead < 5 μg/dL (Schober et al. 2006). In a 12-year longitudinal analysis of subjects ≥ 17 years of age (n = 13,946), the relative risk for cardiovascular mortality was 1.53 (95% CI, 1.21–1.94), comparing a blood lead of 4.92 μg/dL (80th percentile of the distribution) with a blood lead of 1.46 μg/dL (20th percentile of the distribution) (Menke et al. 2006).

Renal effects. Renal injury that appears after acute high-dose lead exposure may include reversible deficits in proximal tubular reabsorption and prerenal azotemia induced by renal vasoconstriction and/or volume depletion (Coyle et al. 200; Wedeen et al. 1979). In a minority of exposed individuals, years of chronic, high-dose lead exposure may result in chronic lead nephropathy, a slowly progressive interstitial fibrosis characterized by scant proteinuria (Lilis et al. 1968). Epidemiologic investigations of renal function in workers with lower levels of chronic lead exposure have yielded variable findings. For example, in a cohort of approximately 800 current and former lead workers with mean blood lead of 32 ± 15 μg/dL, there was no significant linear relationship between blood lead concentration and two measures of renal function, serum creatinine and creatinine clearance (Weaver et al. 2003). There was an interaction between age and tibia lead concentration, a biomarker of cumulative lead exposure, on these same biomarkers, resulting in a trend toward worse renal function with increasing bone lead in the oldest tercile of workers (> 46 years of age) but improved renal function with increasing bone lead in the youngest workers (≤ 36 years of age). The authors suggested that lead-induced hyperfiltration, a finding noted in other studies, might presage the eventual development of lead-induced renal insufficiency. Both blood lead and tibia lead were correlated with increased urinary *N*-acetyl-β-D-glucosaminidase (NAG), a biomarker of early biological effect on the renal tubule, but in an analysis of a smaller subset of the lead workers (n = 190) that controlled for the relatively low levels of urinary cadmium (1.1 ± 0.78 μg/g creatinine), only the relationship with tibia lead and NAG remained significant (Weaver et al. 2003). Among a cohort of 70 active lead workers with a median blood lead concentration of 32 μg/dL (range, 5–47), there were modest correlations between blood lead and urinary β-2-microglobulin (r = 0.27; p = 0.02), and between cumulative blood lead index and NAG (r = 0.25; p = 0.04) (Gerhardsson et al. 1992).

Several studies conducted in general population samples have reported an association between blood lead concentration and common biomarkers of renal function (serum creatinine and creatinine clearance). In a cross-sectional investigation of a subcohort of middle-aged to elderly men enrolled in the Normative Aging Study (n = 744), there was a negative correlation between blood lead (mean, 8.1 ± 3.9 μg/dL; range, < 4.0–26.0 μg/dL) and measured creatinine clearance, after natural log transformation of both variables and adjustment for other covariates (Payton et al. 1994). Among an adult population that included subjects with environmental cadmium exposure [n = 965 men (geometric mean blood lead, 11.4 μg/dL; range, 2.3–72.5 μg/dL); n = 1,016 women (geometric mean blood lead, 7.5 μg/dL; range, 1.7–60.3 μg/dL)], log-transformed blood lead concentration was inversely correlated with measured creatinine clearance (Staessen et al. 1992). In a population-based study of Swedish women 50–59 years of age (n = 820), low levels of blood lead (mean 2.2 μg/dL; 5th–95th percentiles, 1.1–4.6 μg/dL) were inversely correlated with creatinine clearance and glomerular filtration rate, after adjusting for age, body mass index, urinary or blood cadmium, hypertension, diabetes, and regular use

of nonsteroidal anti-inflammatory drug (NSAID) medication (Akesson et al. 2005).

Individuals with other risk factors for renal disease, notably hypertension and diabetes, may be more susceptible to an adverse impact of low-level lead exposure on renal function. Among adults participating in NHANES III (n = 15,211), blood lead was a risk factor for elevated serum creatinine (defined as ≥ 99th percentile of the analyte's race and sex specific distributions, generally > 1.2–1.5 mg/dL) and "chronic kidney disease" (defined as an estimated glomerular filtration rate < 60 mL/min) only among subjects with hypertension (n = 4813) (Muntner et al. 2003). Compared with hypertensives in the lowest quartile of blood lead (range, 0.7–2.4 μg/dL), hypertensive subjects in the next highest quartile of blood lead (range, 2.5–3.8 μg/dL) had a covariate adjusted OR for elevated serum creatinine of 1.47 (95% CI, 1.03–2.10) and for chronic kidney disease of 1.44 (95% CI, 1.00–2.09). At the next highest quartile of blood lead (range, 3.9–5.9 μg/dL), the covariate-adjusted OR for elevated serum creatinine was 1.80 (95% CI, 1.34–2.42), and for chronic kidney disease it was 1.85 (95% CI, 1.32–2.59). In a subcohort of middle-aged to elderly men participating in the Normative Aging Study (n = 427, blood lead 4.5 ± 2.5 μg/dL), multiple regression analysis revealed that log-transformed blood lead was positively correlated with serum creatinine in hypertensive but not normotensive subjects (Tsaih et al. 2004). In a longitudinal study of this cohort over a mean of 6 years, an interaction between lead and diabetes yielded a positive association between baseline blood lead concentration and change in serum creatinine that was strongest in diabetic subjects (Tsaih et al. 2004). An interaction with diabetes was also present in the association of tibial lead concentration with longitudinal change in serum creatinine (Tsaih et al. 2004). Although these general population studies are consistent with an adverse effect of lead exposure on renal function at notably low levels, the extent to which diminished renal function may itself result in increased body lead burden has not been fully elucidated.

Cognitive dysfunction. A few studies examining relatively small numbers of workers (n ≤ 100) with blood lead concentrations ranging approximately 20–40 μg/dL have associated lead exposure with subclinical decrements in selective domains of neurocognitive function (Barth et al. 2002; Hänninen et al. 1998; Mantere et al. 1984; Stollery 1996). Among a large cohort of current and former inorganic lead workers studied in Korea, a cross-sectional analysis (n = 803 workers) (Schwartz et al. 2001) and a 3-year longitudinal analysis (n = 576 workers) (Schwartz et al. 2005) found that blood lead concentrations across the approximate range of 20–50 μg/dL were associated with subclinical neurocognitive deficits. Among a small population of former lead workers (n = 48) and age-matched controls with similar blood lead concentrations (approximately 5 μg/dL in both groups; range, 1.6–14.5 μg/dL; mean age, 39.8 years), increases in current blood lead concentration within the entire study population were correlated with poorer performance on several tests of neurocognitive function but on only one measure was cumulative lead exposure (measured in the workers) associated with poorer performance (Winker et al. 2005).

In the population-based sample of adults 20–59 years of age participating in the NHANES III study (n = 4937), there was no relationship between blood lead concentration (geometric mean, 2.51 μg/dL) and covariate-adjusted performance on neurocogntive function (Krieg et al. 2005). However, significant associations have emerged in some studies of older adults with slightly higher blood lead concentrations. In a rural subset of elderly women (mean age, 71.1 ± 4.7 years; n = 325) with background, community lead exposure (geometric mean blood lead concentration, 4.8 μg/dL; range, 1–21 μg/dL), certain measures of neuropsychologic function (Trailmaking part B and Digit Symbol test) were performed more poorly by women in the upper 15th percentile of blood lead (blood lead ≥ 8 μg/dL, n = 38; Muldoon et al. 1996). However, in the slightly younger subset of elderly women who resided in an urban area (mean age, 69.4 ± 3.8 years; n = 205), no relationship between blood lead (geometric mean, 5.4 μg/dL) and neuropsychologic performance was discernible (Muldoon et al. 1996). In a general population sample of middle-aged to elderly men (n = 141; mean age, 66.8 ± 6.8 years) with a mean blood lead concentration of 5.5 ± 3.5 μg/dL examined as part of the Normative Aging Study, increased blood lead concentration was associated with poorer performance on neuropsychologic assessment of memory, verbal ability, and mental processing speed (Payton et al. 1998). In a larger subset of men (n = 736; mean age, 68.2 ± 6.9 years) from the Normative Aging Study assessed with the Mini-Mental Status Examination (MMSE), the OR for having a test score associated with an increased risk of dementia was 3.4 (95% CI, 1.6–7.2) comparing the mean blood lead of the highest quartile (mean, 8.9 μg/dL) to that of the lowest quartile (mean, 2.5 μg/dL) (Wright et al. 2003). There was a positive interaction between age and blood lead, which is consistent with a lead-associated acceleration in age-related neurodegeneration.

As reviewed in an accompanying article in this mini-monograph (Shih et al. 2007), there is evidence that at low levels of lead exposure, biomarkers of cumulative lead exposure, such as lead in bone, may be associated with an adverse impact on neurocognitive function that is not reflected by measurement of lead in blood. Among subjects from the Normative Aging Study (n = 466; mean age, 67.4 ± 6.6 years) examined for longitudinal change in MMSE score over an average of 3.5 ± 1.1 years, higher patella bone lead concentrations, a biomarker of cumulative lead exposure, predicted a steeper decline in performance (Weisskopf et al. 2004). By comparison, baseline blood lead concentration (median, 4 μg/dL; interquartile range = 3, 5) did not predict change in MMSE score. In a longitudinal analysis of performance on a battery of cognitive tests in a subset of the Normative Aging Study, bone lead measurements were predictive of worsening performance over time on tests of visuospatilal/visuomotor ability (Weisskopf et al. 2007). In a cross-sectional analysis of 985 community dwelling residents 50–70 years of age, increasing tibia bone lead concentrations were significantly associated with decrements in cognitive function, whereas an impact of blood lead (mean, 3.46 ± 2.23 μg/dL) was not apparent (Shih et al. 2006).

Reproductive outcome in women. Adverse effects on reproductive outcome constitute a special risk of lead exposure to women of reproductive age. A nested case–control study examined the association of blood lead concentration with spontaneous abortion in a cohort of 668 pregnant women seeking prenatal care in Mexico City (Borja-Aburto et al. 1999). After matching for maternal age, education, gestational age at study entry, and other covariates, the OR for spontaneous abortion before 21 weeks gestation was 1.13 (95% CI, 1.01–1.30) for every 1 μg/dL increase in blood lead across the blood lead range of 1.4–29 μg/dL. Compared with the reference category of < 5 μg/dL of blood lead, women whose blood lead levels were 5–9, 10–14, and > 15 μg/dL had ORs for spontaneous abortion of 2.3, 5.4, and 12.2, respectively (test for trend, p = 0.03). Although several earlier studies failed to detect this substantial impact, they may have been subject to methodologic limitations not present in the Mexico City investigation (Hertz-Picciotto 2000).

Several studies have found that lead exposure during pregnancy affects child physical development measured during the neonatal period and early childhood. In an extensively studied cohort of 272 full-term, parturient women from Mexico City with environmental lead exposure common to the region (mean maternal blood lead, 8.9 ± 4.1 μg/dL; mean

tibia bone lead, 9.8 ± 8.9 μg/g; range, 12–38 μg/g), every increase of 10 μg/g in maternal tibia lead was associated with a 73-g (95% CI, 25–121) decrease in birth weight (Gonzalez-Cossio et al. 1997). The impact of tibia bone lead on birth weight was nonlinear and was most pronounced in mothers with the highest quartile of bone lead (> 15–38 μg/g) where the decrement relative to the lowest quartile was estimated to be 156 g. Primarily in the same cohort, a maternal patella lead concentration > 24.7 μg/g was associated with an OR of 2.35 (95% CI, 1.26–4.40) for a neonate with one category smaller head circumference at birth, assessed as a five-category–ordered variable (Hernandez-Avila et al. 2002). In a different Mexico City cohort, each doubling of maternal blood lead at 36 weeks of pregnancy (geometric mean, 8.1 μg/dL; 25th–75th percentile, 5–12 μg/dL) was associated with a decrease of 0.37 cm (95% CI, 0.57–0.17) in the head circumference of a 6-month-old infant (Rothenberg et al. 1999b).

Prenatal lead exposure assessed by umbilical cord blood lead concentration has been inconsistently associated with an adverse effect on neurobehavioral development in childhood. However, recent studies suggest that mobilization of maternal bone lead during pregnancy may contribute to fetal lead exposure in ways that may be incompletely reflected by the single measurement of umbilical cord whole-blood lead (Chuang et al. 2001; Tellez-Rojo et al. 2004). In a prospective study conducted in Mexico City of 197 mother–infant pairs, a statistically significant adverse effect of umbilical cord blood lead (mean, 6.7 ± 3.4 μg/dL; range, 1.2–21.6 μg/dL) was also accompanied by an independent adverse effect of maternal bone lead burden on the 24-month Mental Development Index (MDI) of the Bayley Scales of Infant Development, which decreased 1.6 points (95% CI, 0.2–3.0) for every 10-μg/g increase in maternal patellar lead (mean, 17.9 ± 15.2 μg/g; range, < 1–76.6 μg/g) (Gomaa et al. 2002).

A prospective study that measured maternal plasma lead and maternal whole-blood lead during pregnancy found that maternal plasma lead during the first trimester was the stronger predictor of infant mental development at 24 months of age (Hu et al. 2006). In this cohort, first trimester maternal plasma lead was 0.016 ± 0.014 μg/dL and first trimester maternal whole-blood lead was 7.07 ± 5.10 μg/dL (n = 119). Adjusting for covariates that included maternal age, maternal IQ, child sex, childhood weight and height for age, and childhood whole-blood lead at 24 months, an increase of one SD in $\log_e$ (natural log)–transformed plasma lead in the first trimester was associated with a 3.5-point decrease in score on the 24-month MDI of the Bayley Scales of Infant Development. The corresponding impact of one SD increase in $\log_e$ maternal whole blood during the first trimester was a 2.4-point decrease in the 24-month MDI. The logarithmic relationship between maternal plasma and blood lead concentrations and infant MDI indicated that the strongest effects occurred among mothers with the lowest plasma and blood lead concentrations.

Two long-term prospective studies that conducted multiple measurements of maternal blood lead during pregnancy and childhood have identified an adverse impact of low-level prenatal lead exposure on postnatal neurobehavioral development extending beyond infancy. Applying a repeated measures linear regression technique to analysis of age-appropriate IQ test data obtained in 390 children 3–7 years of age, the Yugoslavia Prospective Lead Study found independent adverse effects of both prenatal and postnatal blood lead. After controlling for the pattern of change in postnatal blood lead and other covariates, IQ decreased 1.8 points (95% CI, 1.0–2.6) for every doubling of prenatal blood lead, which was assessed as the average of maternal blood lead at midpregnancy and delivery (mean, 10.2 ± 14.4 μg/dL; n = 390) (Wasserman et al. 2000). The Mexico City Prospective Lead Study used generalized linear mixed models with random intercept and slope to assess the impact on IQ measured at 6–10 years of age of blood lead measurements systematically obtained during weeks 12, 20, 24, and 36 of pregnancy, at delivery, and at multiple points throughout childhood (Schnaas et al. 2006). Geometric mean blood lead during pregnancy was 8.0 μg/dL (range, 1–33 μg/dL; n = 150); from 1 through 5 years it was 9.8 μg/dL (2.8–36.4 μg/dL), and from 6 through 10 years it was 6.2 μg/dL (range, 2.2–18.6 μg/dL). IQ at 6 to 10 years of age, assessed by the Wechsler Intelligence Scale for Children—Revised, decreased significantly only with increasing natural-log third-trimester blood lead, controlling for other blood lead measurements and covariates. Every doubling of third trimester blood lead (geometric mean of maternal blood lead at weeks 28 and 36 = 7.8 μg/dL, 5th–95th percentile: range, 2.5–24.6 μg/dL) was associated with an IQ decrement of 2.7 points (95% CI, 0.9–4.4). Notably, the nonlinear (i.e., log-linear) relationships detected in the Yugoslavia and Mexico City studies indicate that across a maternal blood lead range of 1–30 μg/dL, an increase in blood lead from 1 to 10 μg/dL will account for more than half the IQ decrement.

Two independent cohorts have provided evidence that maternal lead burden during pregnancy may be associated with increased risk of pregnancy hypertension and/or elevated blood pressure during pregnancy. In a retrospective study of 3,210 women during labor and delivery, increasing umbilical cord blood lead levels (mean, 6.9 ± 3.3 μg/dL; range, 0–35 μg/dL) were associated with increased systolic blood pressure during labor (1.0 mmHg for every doubling of blood lead) and increased odds of hypertension (not further defined) recorded any time during pregnancy (OR = 1.3; 95% CI, 1.1–1.5) for every doubling of blood lead (Rabinowitz et al. 1987). A prospective study of third trimester blood lead (geometric mean, 2.3 ± 1.4 μg/dL; range, 0.5–36.5 μg/dL) in 1,188 predominantly Latina immigrants showed that, in the immigrants, every doubling in blood lead was associated with increased third-trimester systolic blood pressure (1.2 mmHg; 95% CI, 0.5–1.9) and diastolic blood pressure (1.0 mmHg; 95% CI, 0.4–1.5) (Rothenberg et al. 1999a). A study of a subset of the same cohort (n = 637) without regard to immigration status found that every 10-μg/g increase in calcaneus (heel) bone lead increased the OR of third trimester pregnancy hypertension (systolic > 90 and/or diastolic > 140 mmHg) by 1.86 (95% CI, 1.04–3.32) (Rothenberg et al. 2002).

Medical Surveillance for Lead-Exposed Workers

The OSHA workplace standard for lead exposure in general industry (adopted in 1978) and a corresponding standard for lead exposure in construction trades (adopted in 1993) set forth medical surveillance requirements that include baseline and periodic medical examinations and laboratory testing. Details of the two standards, which establish distinct criteria for the implementation of surveillance, can be found on the OSHA website (OSHA 2002). Because of the concern regarding adverse health effects of lead associated with the lower levels of exposure discussed in this article, we recommend a revised schedule of medical surveillance activities (Table 2). Unlike the OSHA medical surveillance requirements, which apply only to workers exposed to airborne lead levels ≥ 30 μg/m^3 as an 8-hr time-weighted average, the recommendations in Table 2 are intended to apply to all lead-exposed workers who have the potential to be exposed by lead ingestion, even in the absence of documented elevations in air lead levels (Sen et al. 2002). As shown in Table 2, the level of a worker's current blood lead measurement, as well as possible changes in lead-related exposure, influences the recommended time interval for subsequent blood lead measurements. Blood lead measurements should be obtained from a clinical laboratory that has been designated by OSHA as meeting the specific proficiency requirements of the OSHA lead standards. OSHA maintains a list of these laboratories

on its website (OSHA 2005). Venous blood should be used for biological monitoring of adult lead exposures, except where prohibited by medical or other reasons. Routine measurement of zinc protoporphyrin, a requirement of the OSHA lead standards, is not recommended in Table 2 because it is an insensitive biomarker of lead exposures in individuals with blood lead concentrations < 25 μg/dL (Parsons et al. 1991).

The content of the baseline or preplacement history and physical examination for lead-exposed workers should continue to follow the comprehensive scope set forth in the OSHA lead standard for general industry. Measurement of serum creatinine will identify individuals with chronic renal dysfunction who may be subject to increased health risks from lead exposure. With the potential exception of an annual blood pressure measurement and a brief questionnaire regarding the presence of medical conditions (such as renal insufficiency) that might increase the risk of adverse health effects of lead exposure, medical evaluations for lead-exposed workers should be unnecessary as long as blood lead concentrations are maintained < 20 μg/dL. Annual education of lead workers regarding the nature and control of lead hazards, and ongoing access to health counseling regarding lead-related health risks are recommended as preventive measures.

Lead Exposure during Pregnancy and Lactation

As summarized earlier in this article, the recent findings concerning lead-related adverse reproductive outcomes render it advisable for pregnant women to avoid occupational or avocational lead exposure that would result in blood lead concentrations > 5 μg/dL. Calcium supplementation during pregnancy may be especially important for women with past exposure to lead. Calcium decreases bone resorption during pregnancy (Janakiraman et al. 2003) and may minimize release of lead from bone stores and subsequent fetal lead exposure (Gomaa et al. 2002).

Maternal body lead burden and external lead exposure influence the lead concentration of breast milk (Ettinger et al. 2006; Gulson et al. 1998). The few studies that used ultraclean techniques and mass spectrometry analyses report human breast milk concentrations ranging from 0.6 to 3% of maternal blood lead (Ettinger et al. 2004b; Gulson et al. 1998; Manton et al. 2000; Sowers et al. 2002). Using 1% as a guide, it can be estimated that nursing mothers with a blood lead concentration < 20 μg/dL will have breast milk with a concentration < 2 μg/L, a value that approximates the amount of lead in infant formula (Gulson et al. 2001). A recent randomized clinical trial among Mexican women with mean blood lead concentrations of approximately 9 μg/dL found that calcium supplementation during lactation may reduce the lead concentration of breast milk by 5–10% (Ettinger et al. 2006). Breast feeding should be encouraged for almost all women (Ettinger et al. 2004a; Sanin et al. 2001; Sinks and Jackson 1999), with decisions concerning women with very high lead exposure addressed on an individual basis.

Medical Treatment of Elevated Blood Lead Concentration and Overt Lead Intoxication

Removal from all sources of hazardous lead exposure, whether occupational or nonoccupational, constitutes the first and most fundamental step in the treatment of an individual with an elevated blood lead concentration. A careful history that inquires about a broad spectrum of potential lead sources is recommended (Occupational Lead Poisoning Prevention Program 2006). Removal from occupational lead exposure will usually require transfer of the individual out of any environment or task that might be expected to raise the blood lead concentration of a person not using personal protective equipment above background levels (i.e., 5 μg/dL). If there has been a history of an affected individual bringing lead-contaminated shoes, work clothes, or equipment home from the workplace, evaluation of vehicles and the home environment for significant levels of lead-containing dust might be considered (Piacitelli et al. 1995). Although such "take-home" exposure might contribute to further lead exposure of the worker, it ordinarily poses more of a potential risk to young children and pregnant or nursing women who share the worker's home environment (Hipkins et al. 2004; Roscoe et al. 1999).

Medical treatment of individuals with overt lead intoxication involves decontamination, supportive care, and judicious use of chelating agents. Comprehensive discussion of such treatment is beyond the scope of this article but has been reviewed in recent medical toxicology texts (Kosnett 2001, 2005). A variety of chelating agents has been demonstrated to decrease blood lead concentrations and increase urinary lead excretion. A recent double-blind randomized clinical trial of oral chelation in young children with blood lead concentrations ranging from 22 to 44 μg/dL found that the drug succimer lowered blood concentrations transiently but did not improve cognitive function (Dietrich et al. 2004; Rogan et al. 2001). Although anecdotal evidence suggests that chelation has been associated with improvement in symptoms and decreased mortality in patients with lead encephalopathy, controlled clinical trials demonstrating efficacy are lacking. Treatment recommendations are therefore mostly empiric, and decisions regarding the initiation of chelation therapy for lead intoxication have occasionally engendered controversy.

In our experience, adults with blood lead concentrations ≥ 100 μg/dL almost always warrant chelation, as levels of this magnitude are often associated with significant symptoms and may be associated with an incipient risk of encephalopathy or seizures. Occasionally, patients with very high blood lead concentrations may have no overt symptoms. Patients with blood lead concentrations of 80–99 μg/dL, with or without symptoms, can be considered for chelation treatment, as may some symptomatic individuals with blood lead concentrations of 50–79 μg/dL. These demarcations are imprecise, however, and decisions on chelation should be made on a case-by-case basis after consultation with an

Table 2. Health-based medical surveillance recommendations for lead-exposed workers.

Category of exposure	Recommendations
All lead-exposed workers[a]	Baseline or preplacement medical history and physical examination, baseline BLL, serum creatinine
BLL (μg/dL)	
	See Table 1 for pregnancy concerns
10–19	As above for BLL < 10 μg/dL, plus: BLL every 3 months Evaluate exposure, engineering controls, and work practices Consider removal (see Table 1) Revert to BLL every 6 months after 3 BLLs < 10 μg/dL
	monitor as above

BLL, blood lead level.
[a]Lead-exposed means handling or disturbing materials with a significant lead content in a manner that could reasonably be expected to cause potentially harmful exposure through inhalation or ingestion.

experienced specialist in occupational medicine or medical toxicology.

Hair lead analysis or measurement of urine lead concentration seldom provide exposure information of clinical value beyond that provided by the history and the measurement of blood lead concentration. Chelation initiated exclusively on the basis of hair or urine lead levels or chelation of asymptomatic individuals with low blood lead concentrations is not recommended.

Adults with overt lead intoxication will generally experience improvement in symptoms after removal from lead exposure and decline in blood lead concentration. This clinical observation on improvement in overt symptoms finds some support from the relatively limited number of studies that have examined the impact of naturally declining blood lead concentrations on cognitive function in occupationally exposed subjects (Chuang et al. 2005; Lindgren et al. 2003; Winker et al. 2006). Improvement or resolution of neurocognitive or neurobehavioral symptoms may sometimes lag the decline in blood lead concentration, possibly because of the relatively slower removal of lead from the central nervous system (Cremin et al. 1999; Goldstein et al. 1974). The pace of improvement can be highly variable, and may range from weeks to a year or more depending on the magnitude of intoxication. Anecdotal experience and analogy to other forms of brain injury suggest a potential role for rehabilitative services (e.g., physical therapy, cognitive rehabilitation) in enhancing the prospect for recovery, and in demonstrating the capacity for safe return to work. Short-term improvement in neurocognitive function associated with a decline in blood lead concentration does not obviate concern that long-term cumulative lead exposure may nonetheless have a deleterious effect on cognitive reserve, and may accelerate age-related decline in cognitive function (Schwartz et al. 2005; Weisskopf et al. 2004).

Additional Management Considerations

With appropriate engineering controls, safe work practices, and personal protective equipment, workers without a previous history of substantial lead exposure should be able to work with lead in a manner that minimizes the potential for hazardous levels of exposure. For such workers, elevations in blood lead concentration that result from unforeseen transient increases in exposure will often decline promptly once the exposure is controlled. However, in a worker with a long history of high exposure, redistribution of lead from a large internal skeletal burden may result in a prolonged elevation of blood lead concentration despite marked reductions in external lead dose.

The recommendations for management of adult lead exposure contained in this article are derived from consideration of risks to health, and have not been the subject of a cost-benefit analysis examining economic feasibility or social impacts. Nonmedical, socioeconomic factors will likely influence how workers, employers, and clinicians respond to the recommendations. In particular, the blood lead concentrations for which some major interventions, such as removal from lead exposure, are recommended are considerably lower than those explicitly specified in the current OSHA lead standards (OSHA 2002). The OSHA standards do require an employer to implement reductions in exposure recommended by a physician who determines an employee has a "detected medical condition" that places him or her at increased risk of "material impairment to health." This nonspecific provision could form the basis for implementation of protective workplace action at the lower blood concentrations recommended by the authors. Nonetheless, clinicians should inform patients that such recommendations may be contested by an employer or an insurer, and could potentially jeopardize their job benefits or work status. Prudent case management that considers the worker's perspective on their unique health risks and employment situation will usually be advisable.

Interpretative Guidance for Clinical Laboratory Report Forms

Clinical laboratories routinely offer brief interpretative guidance on the forms that report the result of blood lead concentrations. There is considerable variability among laboratories regarding the content of such guidance, and laboratories exercise their own discretion regarding the source and detail of the information they provide. Unlike the management guidance chart for childhood blood lead concentrations published by the CDC (2002), which is often reproduced by clinical laboratories, no corresponding CDC guidance exists for blood lead concentrations measured in adults. Notwithstanding the limitations inherent in an abbreviated tabular format, Table 3 represents a guidance chart for adult blood lead measurements that is proposed for use by clinical laboratories.

Table 3. Recommended interpretive guidance for clinical laboratories reporting adult blood lead concentrations.

Blood lead level (μg/dL)	Management recommendations and requirements[a] for adults
< 5	No action needed
5–9	Discuss health risks Reduce exposure for pregnancy
10–19	Discuss health risks. Decrease exposure. Monitor BLL Remove from exposure for pregnancy, certain medical conditions, long-term risks
20–29	Remove from exposure if repeat BLL in 4 weeks remains ≥ 20 μg/dL
30–79	Remove from exposure. Prompt medical evaluation and consultation advised for BLL > 40 μg/dL OSHA requirements may apply Chelation not indicated unless BLL > 50 μg/dL with significant symptoms

BLL, blood lead level. Primary management of lead poisoning is source identification and removal from exposure. A single BLL does not reflect cumulative body burden or predict long-term effects.
[a]Refer to OSHA general industry and construction lead standards for occupational exposure.

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Appendix VII

Medical Management Guidelines for Lead-Exposed Adults
Association of Occupational and Environmental Clinics

Medical Management Guidelines for Lead-Exposed Adults
Revised 04/24/2007

Summary:

Overexposure to inorganic lead continues to be an important problem worldwide. The reduction of lead in the U.S. environment, largely accomplished through effective EPA regulatory efforts, has resulted in lowering the overall geometric mean whole blood lead level (BLL) for the general population in the United States from approximately 13 μg/dL (0.63 μmol/L) in the 1970s to less than 2 μg/dL (0.10 μmol/L) (CDC 2005; NCHS 1984). Lead exposure remains a significant public health and medical concern for thousands of children and adults exposed primarily through remaining lead-based paint in older housing stock as well as to workplace exposures, although other sources occur. For children and adults, the role of environmental investigation, identification and reduction or elimination of sources of exposure remains of primary importance. While the clinical care of lead-exposed children has been well established in the pediatric and public health communities, similar clinical recommendations for adults have not been widely available.

The purpose of this document is to provide useful advice to clinicians caring for adult patients who have been exposed to lead, whether at work, at home, through hobbies, in the community, through consumer products, retained bullets, or other sources. This document is derived, in part, from the input of an expert panel convened by the Association of Occupational and Environmental Clinics (AOEC). However, three clinical scholars then considered the medical evidence submitted by the expert panel and incorporated many of the conclusions reached by this panel. This paper, therefore, reflects a general consensus of the clinical views of AOEC members, not necessarily the expert panel, particularly in areas where the expert panel had been unable to come to consensus. The following points are emphasized:

1) Medical care serves as an adjunct to public health and industrial hygiene exposure control. Clinicians who evaluate patients with potential lead exposure should have appropriate referral mechanisms in place for prevention of further exposure to lead. Although one goal of health care is to remove the patient from exposure, the social consequences of potential disruption of housing or of income may be important and must be considered by the clinician.

2) Current occupational standards are not sufficiently protective and should be strengthened. Although the federal Occupational Safety and Health Administration's (OSHA) lead standards have provided guidance that has been beneficial for lead-exposed workers, these regulations have not been substantially changed since the late 1970s and thus are primarily based on health effects studies that are well over three decades old. There is an urgent need to revise them.

3) The clinical guidelines presented here are appropriate for adults, recognizing that younger adults, particularly those in workplace settings, may share developmental risks that place them closer to pediatric populations, and that maternal exposure, whether in the workplace or in the general environment, places the developing fetus at risk for exposure.

4) Clinicians should feel free to contact any of the member AOEC clinics for additional telephone advice, and are encouraged to refer patients when appropriate.

Background

Lead is used in over 100 industries. Job activities known to involve the use or disturbance of lead include: handling of lead-containing powders, liquids, or pastes; production of dust or fumes by melting, burning, cutting, drilling, machining, sanding, scraping, grinding, polishing, etching, blasting, torching, or welding lead-containing solids; and dry sweeping of lead-containing dust and debris. Adults also encounter lead in environmental settings and through activities such as home remodeling, particularly in homes built before 1978 that contain lead-based paint, lead-contaminated consumer products, traditional remedies, moonshine whiskey, hobbies, such as melting lead sinkers or use of target ranges, from retained bullets, and through other sources.

Lead is not an essential element and serves no useful purpose in the body. A substantial body of recent research demonstrates that multiple health effects can occur at levels once considered safe. The routes of exposure for inorganic lead are inhalation and ingestion. Once absorbed, lead is found in all tissues, but eventually 90% or more of the body burden is accumulated (or redistributed) into bone with a biological half-life of years to decades. Lead is excreted primarily in the urine. Lead does not remain in the bone permanently but is slowly released back into the blood.

The "dose" or quantity of lead that a person receives will be determined by the concentration of lead in the air and/or the amount ingested as well as the duration of such exposure. The BLL remains the predominant biological marker used in clinical assessment, workplace monitoring, public health surveillance, and regulatory decisions regarding removal from exposure under the OSHA lead standards.

Research tools capable of measuring cumulative lead exposure, such as the use of in-vivo K-shell X-ray fluorescence (K-XRF) instruments for the rapid, non-invasive measurement of lead in bone, have expanded recent understanding of long-term consequences from lead exposure on a population basis. These studies have demonstrated adverse effects of lead exposure across populations, including on neurologic, reproductive and renal function and on blood pressure, that occur at extremely low levels of exposure and appear not to have a threshold. However, because inter-individual differences are greater than population differences at lower lead levels, these effects are less important for clinical evaluation than they are for public health policy. The preponderance of the evidence for adverse effects at levels of exposure far below those currently permitted by OSHA speaks forcefully for an immediate reduction in permissible exposure levels in the workplace and for enhanced public health attention to those sources, including among self employed individuals, not currently subject to OSHA regulation.

Because lead interferes with biochemical processes occurring in cells throughout the body, adverse effects occur in multiple organ systems. The non-uniformity of symptoms that appear in exposed individuals, as well as a growing body of epidemiologic studies, suggest that wide variation exists in individual susceptibility to lead poisoning. Early overt symptoms in adults are often subtle and nonspecific, involving the nervous, gastrointestinal, or musculoskeletal systems. High levels of exposure can result in delirium, seizures, stupor, coma, or lead colic. Other overt signs and symptoms include hypertension, peripheral neuropathy, ataxia, tremor, gout, nephropathy, and anemia. In general, symptoms increase with increasing BLLs.

In addition to exposure that occurs from external sources, carefully performed lead isotope studies demonstrated that pregnancy and lactation are both associated with large increases in the release of lead from the maternal skeleton (Gulson et al. 2003). High levels of lead in women's bones at the time of childbirth corresponded to lower birth weight (Gonzalez-Cossio et al. 1997), lower weight gain from birth to one month of age (Sanin et al. 2001), and reduced head circumference and birth length (Hernandez-Avila et al. 2002).

In males, abnormal sperm morphology and decreased sperm count have been observed at BLLs of approximately 40 µg/dL (1.93 µmol/L) or less (Telisman et al. 2000). In the absence of effects on sperm count or concentration, the impact of paternal lead exposure on reproductive outcome is uncertain.

Recent research has examined several genetic polymorphisms that may influence lead uptake, distribution, and target organ toxicity. However, at this point in time, research findings are insufficient to conclusively identify subpopulations that may have increased susceptibility to lead toxicity based on specific genotypes. Other factors that might modify the risk of lead toxicity include pre-existing disease affecting relevant target organs (such as diabetic nephropathy or borderline hypertension), nutritional deficiencies (particularly of dietary cations such as iron and calcium), ethnicity, and aging.

CLINICAL ASSESSMENT OF LEAD EXPOSURE

Taking a detailed medical and occupational/environmental history is a fundamental step in the assessment of a person with lead exposure. It is important to ask about exposure to lead in current and previous jobs (Table 1), protections used, biological and air monitoring data, hygiene practices, knowledge and training, hobbies, traditional medications, moonshine use and other non-occupational sources (Table 2). A medical and reproductive history is essential in identifying individuals at increased risk of adverse health effects from lead exposure. Table 3 summarizes symptoms and target organ toxicity of lead at progressive BLLs. Physical exam findings in lead poisoning are frequently lacking. Gingival lead lines and wrist or foot drop are rarely seen.

Blood Lead Level and Zinc Protoporphyrin

The BLL is the most convenient and readily interpretable of the available lead biomarkers. It is mainly an estimate of recent external exposure to lead, but it is also in equilibrium with bone lead stores. The BLL alone is not a reliable indicator of prior or cumulative dose or total body burden; nor can a single BLL be used to confirm or deny the presence of chronic health effects thought due to lead exposure. The "normal" or "reference range" BLL is less than 5 µg/dL (0.24 µmol/L) for more than 90% (CDC 2005) of the adult population. When interpreting the BLL, key questions are whether the exposure has been 1) of short-term or long-term duration; 2) recent or in the remote past; and 3) of high or low intensity.

Erythrocyte protoporphyrin IX (EP), which can be measured as free EP (FEP) or zinc protoporphyrin (ZPP), is a measurement of biological effect and is an indirect reflection of lead exposure. Lead affects the heme synthesis pathway. Increases in EP or ZPP are not detectable until BLLs reach 20 to 25 µg/dL, (0.97-1.21 µmol/L) followed by an exponential rise relative to increasing BLLs. An increase in EP or ZPP usually lags behind an increase in BLL by two to six weeks.

Periodic testing of BLL and ZPP, called biological monitoring, is required by the OSHA lead standards for workers exposed to significant levels of airborne lead.

Other Laboratory Tests

Depending on the magnitude of lead exposure, a complete blood count, serum creatinine, blood urea nitrogen, and complete urinalysis may be indicated. Evaluation of reproductive status may be pertinent for some lead-exposed adults.

It is important to check BLLs of family members, particularly children, of lead-exposed individuals. Lead workers may unwittingly expose their families to lead dust brought home on clothes, shoes and in cars.

Except for rare circumstances, there is little or no value in measuring lead in urine or hair. Because of the pharmacokinetics of lead clearance, urine lead changes more rapidly and may vary independently of BLL. Urine lead is less validated than BLL as a biomarker of external exposure, or as a predictor of health effects. Lead in hair may be a reflection of external contamination rather than internal lead dose; laboratory analysis is not standardized.

EXPOSURE INVESTIGATION

The occupational and environmental exposure history is the first step in identifying the source of the lead exposure. Both because the cornerstone of intervention is source removal or reduction and because others may be at risk from exposure, the first step is to identify the source. A list of US Environmental Protection Agency accredited laboratories is available at http://www.epa.gov/lead/nllaplist.pdf. Assistance, especially for non-occupational problems such as herbal remedies, candy, moonshine etc. is available from the local and/or state health departments at http://www.apha.org/public_health/state.htm.

The clinician, with the patient's permission, should also contact the employer for further exposure information, such as air level monitoring, biologic monitoring and Material Safety Data Sheets (MSDSs). Work related exposure measurements should be readily available to the clinician. The federal OSHA standards are available at http://www.osha.gov/SLTC/lead/standards.html. Small businesses can obtain information at http://www.osha.gov/dcsp/smallbusiness/index.html

HEATH-BASED MEDICAL MANAGEMENT

The single most important aspect of treating lead poisoning is removal from exposure, yet there may be important socioeconomic constraints for a given individual that limit this approach. For this reason, the panel and the AOEC petition OSHA to update the requirements of the current lead standards and urge clinicians to engage public health and industrial hygiene professionals whenever lead exposure is suspected.

Documented health risks and medical management recommendations are summarized in Table 4. The table presents recommendations for a broad range of BLLs. Although the BLL range is categorized in discrete steps, the outcomes will not neatly conform to these arbitrary divisions, and expectation of health effects in the BLL categories will also be influenced by cumulation of dose. For example, clinical peripheral neuropathy can be present at the high end of the BLL 40 to 79 µg/dL (1.93-3.81 µmol/L) range, while it would not be expected to occur from lead exposure at the low end of the same range. The table is intended to assist clinicians in discussing the short-term and long-term health risks of lead exposure with their patients.

There are other instances where removal from lead exposure is warranted that are consistent with the OSHA lead standards. In addition to specific "trigger" BLLs for medical removal protection (MRP), under the OSHA lead standards (e.g. BLL 50 µg/dL (2.41 µmol/L) or greater) the physician can remove an individual from lead work due to a medical condition which places the employee "at increased risk of material impairment to health from exposure to lead", chronic renal dysfunction (serum creatinine > 1.5 mg/dL (133 µmol/L) for men, > 1.3 mg/dL (115 µmol/L) for women, or proteinuria), hypertension, neurological disorders, cognitive dysfunction, and pregnancy.

Central nervous system effects may have a delayed onset and may sometimes persist well after the BLL has dropped below the BLLs at which the OSHA lead standards permit return to work. These persistent effects could negatively impact work performance and safety in certain jobs. Anecdotal evidence, and analogy to other neurotoxic injury, suggests that individuals who develop overt neurological signs and symptoms from lead exposure above that permissible under current OSHA regulations may benefit from rehabilitative measures (e.g., physical therapy, cognitive rehabilitation) that have been used effectively in patients with other brain injuries, such as traumatic brain injury or stroke. Participation in a rehabilitation

program may enhance the prospect for recovery, and may demonstrate the worker's capacity to safely return to work. [1]

Medical Surveillance

Medical surveillance is an essential part of an employer's lead safety program and includes biological monitoring with periodic BLL testing, medical evaluation, and treatment if needed, and intervention to prevent or control identified exposure. The BLL is the best available measure of total exposure from both inhalation and ingestion. Biological monitoring provides feedback to the employer and worker about the efficacy of workplace controls, helps avoid surprises, and saves costs such as medical removal.

Currently, under the OSHA standards, a worker must be included in a lead medical surveillance program if his/her airborne lead exposure is 30 $\mu g/m^3$ (eight-hour time-weighted average) or higher for more than 30 days per year. The panel believes that the trigger for medical surveillance should not rely solely on air monitoring results; instead, workers should be included in a medical surveillance program whenever they are handling or disturbing materials with a significant lead content in a manner that could reasonably be expected to cause potentially harmful exposure through inhalation or ingestion.

A medical surveillance program with increased frequency of BLL testing and early intervention for all lead-exposed workers is recommended to reduce health risks. The panel does not recommend routine ZPP testing as an early biomarker of lead toxicity; however, ZPP measurement is required by OSHA for certain levels of lead exposure. New employees and those newly assigned to lead work should have a preplacement lead medical examination and BLL test, followed by periodic BLL testing, blood pressure measurement, and health status review. Monthly BLL testing is recommended for the first three months of employment for an initial assessment of the adequacy of exposure control measures. Subsequently, testing frequency can be reduced to every six months as long as BLLs remain below 10 µg/dL (0.48 µmol/L). Any increase in BLL of 5 µg/dL (0.24 µmol/L) or greater should be addressed by re-examining control measures in place to see where improvements should be made and by increasing BLL monitoring if needed. If the task assignment changes to work with significantly higher exposures, the initial BLL testing schedule of monthly tests for the first three months at this task should be repeated.

The above schedule for BLL testing may be inadequate for certain situations where the exposures are very high and/or highly variable. In these situations, the BLL testing schedule should be tailored to address the special risks of different types of work and exposures. For example, a construction worker may have very high, intermittent exposures in contrast to someone working in a battery plant or other general industry setting with significant exposures but less day-to-day variability. Employees assigned to tasks where exposures are extremely high (e.g., abrasive blasting) should be tested more frequently than as recommended above,

i.e., at least monthly. In general, it is a good idea to do BLL testing at peak exposures to assess controls and, specifically for the construction trades, to test pre-, mid-, and post-job.

Because of the significant reduction of lead in the general environment, new workers enter lead jobs with very low BLLs while others who have worked with lead often have much higher BLLs and body burdens. With increased biological monitoring frequency to ensure that low BLLs are maintained, it is possible that some workers with lead-related health risks may be able to work safely in a lead-exposed environment. All lead-exposed workers should receive education about the health effects of lead and prevention information from the clinician and the employer, and they should be provided necessary protections including protective clothing, clean eating areas, and hygiene measures such as wash-up facilities and/or showers to prevent both ingestion of lead and take-home exposures.

Chelation Therapy

Primary management for adult lead poisoning is identification of the lead source and cessation of exposure. In adults, chelation therapy generally should be reserved for individuals with high BLLs and/or significant symptoms or signs of toxicity. There is no evidence-based guidance in this regard because of lack of appropriate studies.

Based upon the clinical experience and judgment of panel members, the following general recommendations concerning chelation are offered: chelation therapy is *recommended* for adults with BLLs 100 µg/dL (4.83 µmol/L) or greater, can be *strongly considered* for BLLs 80 to 99 µg/dL (3.86-4.78 µmol/L), and *possibly considered* for BLLs between 50 and 79 µg/dL (2.41-3.81 µmol/L) in the presence of lead-related symptoms. BLLs greater than 100 µg/dL (4.83 µmol/L) almost always warrant chelation as they are usually associated with significant symptoms and may be associated with an incipient risk of encephalopathy or seizures. These are general recommendations and clinicians may vary appropriately from these recommendations depending upon circumstances. Adults with a very high BLL (e.g., 90 µg/dL (4.34 µmol/L)) may remain asymptomatic. Oral chelation has largely supplanted parenteral agents. Chelation therapy relies on enhancing renal excretion, and remobilization of lead from other body stores may occur. Guidance on administration of chelating agents is available in several publications (e.g. Kosnett 2004). Clinicians unfamiliar with chelation protocols are encouraged to contact AOEC clinics (http://www.aoec.org/directory.htm or 1-888-347-2632) or with other physicians experienced in treating adults with lead poisoning for additional advice prior to instituting treatment.

On a population basis it is important to reduce fetal exposure to lead, and maternal lead levels less than 5 µg/dL are optimal. However, laboratory measures are not absolutely precise, and clinical judgment is needed in every patient encounter. Chelation should be used during pregnancy ONLY to protect the life and health of the mother and ONLY if the potential benefit to the mother justifies the potential risk to the fetus. This decision will need to be made on a case by case basis by the attending physician. Because of the increase in lead mobilized from maternal bone during pregnancy, clinicians should be aware that maternal blood lead levels may exhibit an upward trend in the second and third trimesters even in the absence of further

exposure. Women with a history of long-term lead exposure or prior elevated BLL's should be monitored regularly during pregnancy for BLL elevation. If the occupational history or clinical evaluation suggests elevated bone lead stores, clinicians may wish to counsel patients on delaying conception until the risk of mobilization of lead from bone depots has been reduced.

Prophylactic chelation therapy of lead-exposed workers, to prevent elevated BLLs or to routinely lower BLLs to pre-designated concentrations believed to be "safe," is prohibited by OSHA. Non-traditional uses of chelation therapy are not advised. There is no established basis to initiate chelation based on results of hair analysis or, in most cases, urine lead levels nor for chelation of asymptomatic individuals with low blood lead concentrations. Chelation should be used during pregnancy only if the potential benefit justifies the potential risk to the fetus. Breast feeding during chelation therapy is not recommended. The effect of chelating agents on the fetus and newborn is unknown.

Pregnancy and Breast Feeding Concerns

Prevention of fetal and postnatal lead exposure of breastfed infants requires identification and control of sources of environmental and occupational lead exposures (both endogenous and exogenous) for pregnant and lactating women. The CDC has established 10 µg/dL (0.48 µmol/L) as a BLL of concern in children (CDC 2002).

Because fetal blood contains approximately 80% of the blood lead concentration of the mother, and because of the risk of spontaneous abortion, the panel's recommendation is that the mother's BLL should be kept below 5 µg/dL (0.24 µmol/L) from the time of conception through pregnancy. For women with a history of lead exposure, calcium supplementation during pregnancy may be especially important and may thus minimize release of lead from bone stores and subsequent fetal lead exposure.

In a recent prospective study, umbilical cord BLL and maternal bone lead measured shortly postpartum were independent risk factors for impaired mental development of the infants assessed at 24 months of age, even after controlling for contemporaneous BLL (Gomaa et al. 2002). Long-term prospective studies suggest that the adverse neurodevelopmental effects of prenatal lead exposure may not persist into adolescence if early postnatal exposure falls to background levels (Bellinger et al. 1990, 1992; Tong et al. 1996). However, maternal BLL measured during pregnancy has been associated with alterations in brainstem auditory response at in the offspring at age five (Rothenberg et al. 2000), and in retinal response at age 10 (Rothenberg et al. 2002b).

Lead does not concentrate in breast milk because it does not bind to nor dissolve in fat; thus, levels of lead are generally higher in a mother's blood than in her milk. Lead in human breast milk appears to be well-absorbed by breast fed infants. Nevertheless, breast feeding should be encouraged in most situations since the benefits generally outweigh the negatives. Decisions relating to lactating women with evidence of very high lead exposure should be made on an individual basis.

If elevated maternal blood lead is suspected or demonstrated, the source(s) of lead exposure in the mother's diet, home, and work environment should be identified and mitigated. Also, the clinician should monitor infant BLLs during the early weeks of breast feeding. Only upon detection and elimination of all other suspected lead sources without corresponding reduction of infant BLL should cessation of breast feeding be advised.

Retained Bullet

Gunshot injuries to the head, face, and neck may be associated with swallowed bullets, fragments, or pellets, which result in a rapid increase in blood lead in the first days following injury. After detection of bullet fragments in the gut with X-rays, efforts to promote gastrointestinal decontamination may result in a gradual reduction of blood lead over the following weeks. Retained bullets or fragments, particularly those in joint spaces, are risk factors for elevated BLL after injury. Decisions to remove bullet fragments imbedded in tissue should be made in consultation between the treating physician and the surgeon. Individuals with retained bullets should receive baseline and periodic blood lead testing to monitor their lead status. Follow-up blood lead levels may not be needed if the bullets are in muscle tissue and physicians are sure the lead fragments have not migrated from muscle into tissues more likely to allow lead uptake.

CONCLUSIONS

AOEC offers these Guidelines as a resource for health care providers, public health professionals, employers, and others to utilize in providing medical management of lead-exposed adults. In this document, the panel has summarized the current scientific evidence concerning the non-carcinogenic adverse health effects in adults from exposure to inorganic lead.

The toxic effects of lead can occur without overt symptoms. A substantial body of recent research demonstrates a high probability that lead exposure at levels previously thought to be of little concern can result in an increased risk of adverse chronic health effects if the exposure is maintained for many years, thereby resulting in a progressively larger cumulative dose. Such effects may include elevations in blood pressure and increased risk of hypertension, kidney disease, cognitive dysfunction and/or accelerated declines in cognitive function, and reproductive risks.

Prevention of lead exposure should remain the primary goal of health care providers, public health professionals, and employers. Biological monitoring, mainly by periodic measurement of blood lead levels (BLLs) for adults engaged in activity with potential exposure to lead, should be conducted routinely to assess the efficacy of primary prevention and to guide the clinician in determining whether exposure has become excessive. Clinicians are encouraged to advise patients of the risks associated with any elevation of lead level and to advocate strongly for environmental controls that would maintain BLLs below 10 μg/dL (0.48 μmol/L) wherever feasible.

TABLE 1

Jobs and Industries with Potential Lead Exposure

General Industry	
Lead production or smelting	Battery manufacturing or recycling
Brass, bronze, copper, or lead foundries	Automotive radiator repair
Ammunition/explosives production	Lead soldering
Scrap metal handling	Ceramic manufacturing
Firing ranges	Cable/wire stripping, splicing or production
Machining or grinding lead alloys	Rubber manufacturing
Manufacture of radiation shielding	Plastics manufacturing
Repair/replacement of refractory material in furnaces	Leaded glass manufacturing
Ship building/repairing/breaking	Paint/pigment manufacturing
Mining	
Construction	
Renovation, repair or demolition of structures with lead paint	Use or disturbance of lead solder, sheeting, flashing, or old electrical conduit
Welding or torch-cutting painted metal	Plumbing, particularly in older buildings
Sandblasting, sanding, scraping, burning, or disturbing lead paint	

TABLE 2

Non-occupational and Environmental Sources of Lead Exposure

Remodeling or painting pre-1978 housing	Lead solder in stained-glass artwork
Peeling paint	Lead-soldered cans
Ethnic medicines or folk remedies (e.g., azarcon, greta, pay-loo-ah, kandu, some Ayurvedics)	Lead-contaminated candies
Pica (ingestion of lead-containing nonfood items, e.g., soil or ceramics, plaster, or paint chips)	Backyard scrap metal recycling
Retained lead bullet or fragments	Moonshine (liquor from a homemade still)
Melting lead for fishing weights, bullets, or toys	Antique pewter plates, mugs, utensils, toys
Imported vinyl miniblinds	Imported brass or bronze kettles, cookware
Recreational target shooting	Lead-glazed tableware or cooking vessels
Lead-contaminated drinking water supply	Leaded crystal tableware
Using lead glazes for ceramics	Mine tailings
Painting/stripping cars, boats, bicycles	Beauty products such as kohl eye make-up, certain hair dyes

TABLE 3

Health Effects to Lead Exposed Adults by Blood Lead Level

Blood Lead Level (µg/dL) (µmol/L)				
5-9(0.24-0.43)	**10-19**(0.48-0.92)	**20-39**(0.97-1.88)	**40-79**(1.93-3.81)	**≥ 80**(≥ 3.86)
‣ Possible adverse population effects suggested by epidemiologic al studies	‣ Possible spontaneous abortion ‣ Reduced newborn birth weight ‣ Possible blood pressure changes ‣ Possible renal dysfunction	‣ Spontaneous abortion ‣ Reduced newborn birth weight ‣ Possible blood pressure changes ‣ Possible renal dysfunction ‣ Possible non-specific symptoms -Headache -Fatigue -Sleep disturbance -Anorexia -Constipation -Diarrhea -Arthralgia -Myalgia -Decreased Libido -Mood Swings, personality changes ‣ Possible CNS effects -Memory and attention deficits	‣ Spontaneous abortion ‣ Reduced newborn birth weight ‣ Non-specific symptoms ‣ CNS effects ‣ Sperm effects -lowered counts -abnormal sperm ‣ Subclinical peripheral neuropathy ‣ Possible hypertension ‣ Possible anemia ‣ Possible renal damage ‣ Possible gout	‣ Spontaneous abortion ‣ Reduced newborn birth weight ‣ Non-specific symptoms ‣ CNS effects ‣ Sperm effects ‣ Peripheral Neuropathy ‣ Hypertension ‣ Anemia ‣ Abdominal Colic ‣ Nephropathy ‣ Gout

TABLE 4

Health Based Management Guidelines

Blood Lead Level (µg/dL) (µmol/L)			
5-9(0.24-0.43)	**10-29**(0.48-1.40)	**30-79****(1.45-3.81)**	**≥ 80**(≥ 3.86)
‣ Lead education -Occupational -Environmental -Reproductive ‣ Follow-up blood lead levels (BLLs)	‣ Consider clinical assessment -History: occupational environmental medical -Exam, labs -Identify risk factors -Family BLLs ‣ Exposure investigation -MSDSs -Air testing -Workplace communication ‣ Consider consultations -Occupational Medicine -Industrial Hygienist -Public Health department ‣ Lead hazard reduction ‣ Consider removal from lead exposure if warranted ‣ Lead education ‣ Follow-up BLLs (See Medical Surveillance recommendations)	‣ Lead education ‣ Clinical assessment -History -Exam, labs (BUN, Cr, CBC) -Identify risk factors -Family BLLs ‣ Exposure Assessment ‣ Consultations as appropriate ‣ Lead Hazard Reduction ‣ Removal from lead exposure** ‣ Possible chelation for BLL>50 with signs or symptoms of toxicity ‣ Medical Surveillance -Follow-up BLLs -Follow-up clinical assessments ***Note this is the recommendation by AOEC. Consult the OSHA Standard for the levels currently defined in regulation which provides workers' protections.*	‣ Immediate removal from lead exposure ‣ Refer for immediate/ urgent medical evaluation and consideration of chelation therapy ‣ Clinical assessment ‣ Lead education ‣ Exposure investigation ‣ Consultations ‣ Lead hazard reduction ‣ Medical surveillance

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Appendix VIII

Pregnancy Risk Assessment Form

New York City Department of Health and Mental Hygiene

EDC:_____ ID:_____

PREGNANCY RISK ASSESSMENT FORM

Instructions: Fill out the information on the first page using the Activity Report. The information on this page will be double-checked beginning on Page 2.

Case Name:_____
Last Middle First

Expected Date of Confinement (EDC): _____/_____/_____
Month Day Year

BLL at case assignment (µg/dL): _____ **Test date:** _____/_____/_____

Report date: _____/_____/_____ **DOB:** _____/_____/_____
Month Day Year Month Day Year

Address

Street:		Apt#:
City/Borough:	State:	Zip:

Home telephone number	(_____) _____ - _____
Work telephone number	(_____) _____ - _____ ☐ Not provided
Cell telephone number	(_____) _____ - _____ ☐ Not provided

Prior LPPP Pregnant Woman Case: ☐ No ☐ Yes

Prior or Current LeadQuest Child Case: ☐ No ☐ Yes>> LI #_____
(18 years or younger)

Interview Language Information

Instructions: In the office, the primary language of the pregnant woman should be determined. If necessary, an interpreter from the family, the LPPP office, or telephone interpreting services can be used to assist in gathering information.

Please check off the language used by the pregnant woman during the interview and whether an interpreter was used:

Interview language:

☐ English ☐ Spanish ☐ Russian ☐ Bengali ☐ Hindi ☐ Haitian-Creole ☐ Urdu

☐ Other:_____

Interpreter Used:

☐ No ☐ Yes

If yes>> **Type of interpreter used:**

☐ Family member ☐ Friend ☐ Telephone interpreting services

☐ LPPP staff ☐ Other:_____

Staff member conducting interview:_____

Interview Date: _____/_____/_____ Time Started: _____

ID:_____

A. CONTACT INFORMATION

I would like to make sure the information we have in our records is correct.

1. What is the exact spelling of <u>your</u> name?
Instructions: Ask for the spelling of the name.

☐ Confirmed	Last Name	
☐ Confirmed	First Name	
☐ Confirmed	Middle Name	☐ NA

2. What is your date of birth? _____/_____/_____
Month Day Year

3. Please confirm the address where you currently live.
Instructions: Confirm the address from Page 1. Check off the confirmed box if information is correct. Otherwise write in correct information.

☐ Confirmed	Street:		Apt#:
☐ Confirmed	City/Borough:	State:	Zip:

3a. How long have you been living at this address?

_____ year(s) _____ month(s) _____ day(s)

4. Please tell me your <u>current</u> home telephone number.
Instructions: Confirm the home phone number from Page 1. Check off the confirmed box if information is correct. Otherwise write in correct information.

☐ Confirmed Home telephone number: (_____) _____ - _____

4a. If you work, please tell me your work number:	(_____) _____ - _____ ☐ NA
4b. If you have a cell phone, please tell me your cell number:	(_____) _____ - _____ ☐ NA
4c. Which phone number is the best to reach you?	☐ Home ☐ Cell ☐ Work
4d. Which days of the week are the easiest to reach you? ☐ Mon ☐ Tues ☐ Wed ☐ Thurs ☐ Fri ☐ Sat ☐ Sun ☐ Any day	
4e. When is the best time to reach you? _____	☐ a.m. ☐ p.m. ☐ Any time

ID:_____

B. HOUSEHOLD INFORMATION

Now I'd like to find out about the other people in your household because they may have been exposed to lead.

5. How many children under age 18 live with you? _____

Instructions: If no child(ren), go to Section C.

Please give me the name and date of birth of the child(ren). Let's start with the youngest child.

Instructions: Write in information. If more than 3 children, write on back of form.

	#1	#2	#3
Full Name *(ask for spelling)*	Last:_____ First:_____	Last:_____ First:_____	Last:_____ First:_____
Date of Birth	_____/_____/_____ Mo Day Year	_____/_____/_____ Mo Day Year	_____/_____/_____ Mo Day Year
Relationship to You	Daughter / Son Other:_____	Daughter / Son Other:_____	Daughter / Son Other:_____
BLL (µg/dL)	_____	_____	_____
Date of BLL	_____/_____/_____ Mo Day Year	_____/_____/_____ Mo Day Year	_____/_____/_____ Mo Day Year

Instructions: Provide education about blood lead testing for children.

C. MEDICAL INFORMATION

I need to write down contact information for your doctor and health insurance. If you have a card, letter or bill from the doctor or health insurance, I can copy down the information.

Instructions: Ask to see card and write down information. If no information shown, ask for spelling of name and address.

6. What is the contact information for your doctor?

Clinic Name:		
Doctor's Last Name:	First:	
Street:	City/Borough:	
State:	Zip:	
Telephone number: (_____) _____ - _____		☐ Documents shown ☐ No documents shown

ID:_____

7. Do you currently have any type of health insurance such as PCAP or Medicaid?

☐ No >> *go to Q. 8* ☐ Yes >> ☐ Don't know >> *go to Q. 8*

7a. *If yes>> Instructions: Ask to see insurance card and write down information. If no card provided, ask for any information available.*

Plan Name		
ID #		
Additional Information		☐ Card shown ☐ No card shown

8. When was your <u>first</u> doctor or prenatal care visit during this pregnancy?	_____/_____/_____ Month Day Year	☐ Don't know
8a. When is your <u>next</u> doctor or prenatal care appointment?	_____/_____/_____ Month Day Year	☐ Not scheduled/ Don't have one
8b. How far along are you in your pregnancy right now?	_____(weeks)	☐ Don't know
8c. What is your expected due date?	_____/_____/_____ Month Day Year	☐ Don't know

8d. Are you currently taking a prenatal vitamin with calcium?

☐ No	☐ Yes

9. At which hospital do you plan to have your baby?

Hospital Name:	
City/Borough:	State:
Comment:	☐ Don't know

10. In the past, were you ever told you had a high blood lead level or were you diagnosed with lead poisoning?

☐ No >> *go to Section D*	☐ Yes >>	☐ Don't know >> *go to Section D*

If yes >>

10a. What was the blood lead level?	_____µg/dL ☐ Don't know
10b. When was the blood test taken?	_____/_____/_____ Mo Day Year ☐ Don't know
10c. In what city and state was the blood test performed?	City: _____ State:_____ Country:_____
10d. Were you pregnant at that time?	☐ No ☐ Yes

D. DEMOGRAPHIC INFORMATION

Now, I'd like to learn more about your background.

11. What is the highest grade or year of school you have completed?
Instructions: Read out the categories. Do not read out Declined to answer.

☐ Never attended school or only attended kindergarten
☐ Some elementary or primary school
☐ Completed elementary or primary school
☐ Some high school
☐ Completed high school/ high school graduate
☐ Some college or technical school
☐ College graduate
☐ Declined to answer

12. Which of the following groups best describes your race or ethnicity? I'm going to first read out all the categories. You can tell me more than one category.
Instructions: Read out all categories first. Check as many as reported.

☐ African American or Black
☐ American Indian or Alaska Native
☐ Asian
☐ Hispanic or Latino
☐ Native Hawaiian or Other Pacific Islander
☐ White or Caucasian
Instructions: Do not read aloud.
☐ Other group not listed, *Instructions: If mentioned, write in response.* _____
☐ Declined to answer

ID:_____

E. COUNTRY OF BIRTH/ FOREIGN TRAVEL

Now I have a few questions about where you were born and any trips you may have taken outside of the US. This information can help us identify possible ways you may have been exposed to lead. I am not interested in your immigration status.

13. In what country were <u>you</u> born?	☐ U.S. >> *go to Q.14* ☐ Mexico ☐ Bangladesh ☐ Ecuador ☐ India ☐ Pakistan ☐ Other country: _____ ☐ Declined to answer

*Instructions: If woman was born in **Bangladesh, Ecuador, India, Mexico,** or **Pakistan** show list at the end of the form (Appendix A).*

13a. Where in *[Bangladesh, Ecuador, India, Mexico, or Pakistan]* **were you born?**

Bangladesh:_____

Ecuador:_____

India:_____

Mexico:_____

Pakistan:_____

☐ Don't know >> *go to Q. 13b*

Instructions: For ALL women born <u>outside of the US.</u>

13b. How long did you live there?	_____ day(s) _____ month(s) _____ year(s)
13c. When (what month and year) did you come to the US?	Month: _____ Year: _____

Instructions: For all women, including US-born women.

For foreign-born women – read first part of sentence. For US-born, start from 2nd line:

14. <u>Since leaving</u> *<u>[birth country]</u>***,**
Have you ever spent any time outside of the US? This includes any traveling, visiting family or friends, or living in another country.

☐ No >> *go to Section F*	☐ Yes >>

14a. *If yes >> Instructions: Write down all information about time spent outside of US. Ask for all visits. If more than 3 times, write below.*

	#1	#2	#3
Country			
When did you stay there? (start w/ most recent)	____/_____ Mo/Year	___/_____ Mo/Year	___/_____ Mo/Year
How long did you stay?	☐ Less than 1 month ☐ More than 1 month ☐ Don't know	☐ Less than 1 month ☐ More than 1 month ☐ Don't know	☐ Less than 1 month ☐ More than 1 month ☐ Don't know
How often do you travel there?	☐ 1x a year ☐ every 2 years ☐ every 5 years	☐ 1x a year ☐ every 2 years ☐ every 5 year	☐ 1x a year ☐ every 2 years ☐ every 5 years
Comments			

F. IMPORTED REMEDIES, FOODS, SPICES, COSMETICS AND POTTERY

Now I am going to ask you about some product(s) you may have used or come in contact with, such as medications and health remedies, foods and spices. Some of these products may be made in other countries and may contain lead. They could be products or items:

- **sent by friends and family**
- **brought back from trips you may have taken**
- **bought in local stores**
- **or given to you by friends or family**

I want to find out if you used any of these products during the past 12 months.

Instructions: Ask woman to show you products in the kitchen and medicine cabinets. Take note of any product(s) that may contain lead. If Yes to Questions 15 – 18, ask to see product(s). See sampling guidelines. Complete Non-Dust Chain of Custody Form.

15. [Imported Medicines] Have you used any imported…

Product	**No**	**Yes >>**	Sample Taken (Yes/No)	**Comments/Observations**
Medicines? (e.g. Products to help become pregnant or remedies for stomach problems)			Yes / No	
Ayurvedics? (e.g. Remedies based on traditional Indian medical system)			Yes / No	
Vitamins?			Yes / No	
Powder or pills?			Yes / No	
Herbs?			Yes / No	
Teas?			Yes / No	
Any other imported remedies?:_____			Yes / No	

ID:_____

16. [Imported Cosmetics] Have you used any imported…

Product	**No**	**Yes >>**	Sample Taken (Yes/No)	**Comments/Observations**
Cosmetics? (e.g. Eye makeup, hair dye)			Yes / No	
Deodorant?			Yes / No	
Any other imported cosmetics?:_____			Yes / No	

17. [Imported Food] Have you eaten any imported…

Product	**No**	**Yes >>**	Sample Taken (Yes/No)	**Comments/Observations**
Spices? (e.g. Orange or red spices)			Yes / No	
Foods?			Yes / No	
Snacks or candies? (e.g. Candy spiced with chili or sold in clay pots)			Yes / No	
Any other imported food?:_____			Yes / No	

18. [Imported Pottery] Have you been served food in or eaten from imported, antique or painted…

Product	**No**	**Yes >>**	Sample Taken (Yes/No)	**Comments/Observations**
Clay pots?			Yes / No	
Ceramic dishes, bowls, pitchers, or cups?			Yes / No	
Any other imported containers?:_____			Yes / No	

ID:_____

G. NON-FOOD ITEMS

Now I'd like to ask you about your eating habits during your pregnancy. Women often crave or have an urge to eat many different things when pregnant. Some women eat new foods when they are pregnant; some eat things that are recommended during pregnancy by family and friends; and some women also eat things that are not considered food.

19. At any time during your pregnancy, have you eaten, chewed on or mouthed anything that is not food? Some examples are paint chips, soil, clay, crushed pottery or other items.

☐ No >> *go to Section H* ☐ Yes >>

19a. *If yes >> Instructions: Write in information in table.*

	#1	#2	#3
Item Name/Description			
Where did you get it?			
For how long have you been eating it?	_____ wks/mo/yrs	_____ wks/mo/yrs	_____ wks/mo/yrs
How often do/did you eat, on average? (daily, weekly, monthly)			
How much do you eat, on average?			
Why did you eat it?			
Sample Taken	No / Yes	No / Yes	No / Yes
Comments/Observations			

Instructions: See sampling guidelines and complete Non-Dust Chain of Custody Form.

H. OCCUPATION AND HOBBIES

Now I'd like to ask you about the jobs, hobbies or activities of people in the household.

20. Are you currently working?

☐ Yes >>	**20a. Please describe the work you do.**	
☐ No >>	**20b. Have you worked in the past?** ☐ No ☐ Yes >> **20c. Please describe your past work**: _____	

ID:_____

21. Have you or anyone in your household done any of the following jobs, hobbies or activities?

Job/hobby/activity	**No Yes**	**Relationship to PW**	**Time Period/ How long?** (mo/yrs)	**Comment Section/ Current Status**
Bridge painting or repair work	☐ No ☐ Yes	☐ Self ☐ Other: _____	_____ month(s) _____ year(s)	
Commercial building renovation or demolition	☐ No ☐ Yes	☐ Self ☐ Other: _____	_____ month(s) _____ year(s)	
Home renovation, repair or repainting	☐ No ☐ Yes	☐ Self ☐ Other: _____	_____ month(s) _____ year(s)	
Torch cutting or burning steel, welding	☐ No ☐ Yes	☐ Self ☐ Other: _____	_____ month(s) _____ year(s)	
Cable splicing, soldering, electronics repair	☐ No ☐ Yes	☐ Self ☐ Other: _____	_____ month(s) _____ year(s)	
Metal or car battery recycling; working in a scrap yard; radiator repair	☐ No ☐ Yes	☐ Self ☐ Other: _____	_____ month(s) _____ year(s)	
Working in a firing range; target shooting	☐ No ☐ Yes	☐ Self ☐ Other: _____	_____ month(s) _____ year(s)	
Jobs/Crafts like furniture refinishing, jewelry making, stained glass, pottery, ceramics, glass blowing; making fishing weights, bullets, or lead figures	☐ No ☐ Yes	☐ Self ☐ Other: _____	_____ month(s) _____ year(s)	
Other: _____	☐ No ☐ Yes	☐ Self ☐ Other: _____	_____ month(s) _____ year(s)	

I. PAINT HAZARDS

22. In the past 12 months, has there been water damage, deteriorated plaster or paint <u>in this home</u>?

☐ No >> *go to Q.23* ☐ Yes >> ☐ Don't know >> *go to Q.23*

22a. *If yes* **>> Can you please show me and describe the damage?**

Location/Room	
Describe Damage	
When did this occur? (mo/yr)	____/_____ Mo/Year
Current Status	

23. In the past 12 months, has there been any renovation or repair work at your current address, at an address where you lived previously or another address where you have spent time?

☐ No >> *go to Q.24* ☐ Yes >> ☐ Don't know >> *go to Q.24*

23a. *If yes*>> **Please tell me what type of work and when the work was done.**

	#1	**#2**
Location/Room		
Work Description		
Address		
When was the work done? (mo/yr)	____/_____ Mo/Year	____/_____ Mo/Year
Current Status		

24. Do you plan to stay at this current address after your baby is born?

☐ No ☐ Yes ☐ Don't know

ID:_____

J. ALTERNATE CONTACT

Finally, I would like to ask for a contact person in case we cannot reach you.

25. Is there another person, like a family member or friend, who lives at a different address, whom we could contact?

☐ No >> *go to Q. 26* ☐ Yes >>

25a. What is this person's relationship to you?

☐ Husband ☐ Boyfriend ☐ Mother ☐ Father ☐ Brother ☐ Sister ☐ Aunt
☐ Uncle ☐ Grandmother ☐ Grandfather ☐ Other: _____

25b. Please tell me his/her name and telephone number?

Alternate contact's last name		
Alternate contact's first name		
Home number	(_____) _____ -_____	☐ Not provided
Work number	(_____) _____ -_____	☐ Not provided
Cell number	(_____) _____ -_____	☐ Not provided

Instructions: Inform woman that she should notify alternate contact that we may contact him/her but only if we cannot get in touch with her.

26. Is there anything else you would like to tell me?
Instructions: Ask if there are any questions.

☐ No	☐ Yes >>_____

Time Ended: _____

Visual Inspection

Now I need to look around your home for possible sources of lead exposure. I may need to take some samples. The results of the tests will be provided to you as soon as they are available.

Instructions: Conduct visual inspection.

ID:_____

SUMMARY

Instructions: Check all those that apply. Then, ask if there are any questions.

Potential Lead Exposure

Yes	No	
☐	☐	Emigrated from or traveled to a foreign country with significant lead contamination
☐	☐	Used imported health remedies, food or spices
☐	☐	Used imported pottery or cosmetics
☐	☐	Ate, chewed or mouthed non-food items
☐	☐	Participated in an activity that may involve lead exposure
☐	☐	Present during repair work that disturbed paint

Samples

Yes	No	
☐	☐	Imported health remedy/food/spice sample taken
☐	☐	Imported pottery or cosmetic sample taken
☐	☐	Nonfood sample(s) taken

Missing Information

Yes	No	
☐	☐	Doctor's contact information needed
☐	☐	Health insurance information needed

ID:_____

Counseling and Education

Follow up with your doctor

- How often you will need a blood lead test is based on the results of your previous blood tests as well as your risk for further exposure.
- Discuss breastfeeding with your doctor. Breastfeeding is generally considered safe in most cases.

Eat a healthy diet during pregnancy

- It is important to eat foods with enough calcium, iron and vitamin C.
- Talk to your doctor to make sure you are getting enough of these nutrients. Your doctor may suggest changes to your diet or may prescribe a supplement to help you get enough of these nutrients.

Reduce your exposure to lead

- Avoid using medicines, spices, foods or cosmetics from other countries. They are more likely to contain lead than products made in the United States.
- Avoid using clay pots and dishes from other countries to cook, store or serve food. Do not use pottery that is chipped or cracked.
- Never eat non-food items such as clay, soil, pottery or paint chips.
- Stay away from any repair work being done in your home.
- Avoid jobs and hobbies that may involve contact with lead.

Get other household members tested for lead

- This is especially important for children younger than 6 years of age, children with developmental problems and pregnant women.
- Older children and adults should be tested if they may have had contact with lead.

For more information about lead poisoning

- Speak with your doctor.
- You can contact me at 212-676-6379.
- Call 311 and ask for the BAN-LEAD information line.
- Go to www.nyc.gov/lead.

Ask if there are any questions.

ID:_____

APPENDIX A: Question 13a.

Instructions: Please show this list to the woman and ask her to tell you/point to the area where she was born. Then return to Q.13a on page 6 and write in name of area. If the area is not on the list, please write in the area and ask for the spelling.

Mexico

☐ Aguascalientes	☐ Guerrero	☐ Quintana Roo
☐ Baja California	☐ Hidalgo	☐ San Luis Potosí
☐ Baja California Sur	☐ Jalisco	☐ Sinaloa
☐ Campeche	☐ México	☐ Sonora
☐ Chiapas	☐ Michoacán (de Ocampo)	☐ Tabasco
☐ Chihuahua	☐ Morelos	☐ Tamaulipas
☐ Coahuila (de Zaragoza)	☐ Nayarit	☐ Tlaxcala
☐ Colima	☐ Nuevo Léon	☐ Veracruz (-Llave)
☐ Distrito Federal	☐ Oaxaca	☐ Yucatán
☐ Durango	☐ Puebla	☐ Zacatecas
☐ Guanajuato	☐ Querétaro (de Arteaga)	☐ Other (specify):_____

Ecuador

☐ Azuay	☐ Los Ríos
☐ Bolívar	☐ Manabí
☐ Cañar	☐ Morona-Santiago
☐ Carchi	☐ Napo
☐ Chimborazo	☐ Orellana
☐ Cotopaxi	☐ Pastaza
☐ El Oro	☐ Pichincha
☐ Esmeraldas	☐ Sucumbíos
☐ Galápagos	☐ Tungurahua
☐ Guayas	☐ Zamora-Chinchipe
☐ Imbabura	☐ Other (specify):_____
☐ Loja	

Pakistan

☐ Bahawalpur	☐ Lahore	☐ Sahiwal
☐ Faisalabad	☐ Larkana	☐ Sargodha
☐ Gujranwala	☐ Mardan	☐ Shekhupura
☐ Gujrat	☐ Multan	☐ Sialkot
☐ Hyderabad	☐ Okara	☐ Sukkur
☐ Islamabad	☐ Peshawar	☐ Sahiwal
☐ Jhang Maghiana	☐ Quetta	☐ Sargodha
☐ Karachi	☐ Rahimyar Khan	☐ Shekhupura
☐ Kasur	☐ Rawalpindi	☐ Sialkot
		☐ Sukkur
		☐ Other (specify): _____

ID:_____

Bangladesh

☐ Bandarban	☐ Narsingdi	☐ Lalmonir Hat
☐ Barguna	☐ Jamalpur	☐ Satkhira
☐ Barisal	☐ Gopalganj	☐ Narail
☐ Bhola	☐ Kishorganj	☐ Rajshahi
☐ Brahmanbaria	☐ Madaripur	☐ Bogra
☐ Chandpur	☐ Netrakona	☐ Naogaon
☐ Chittagong	☐ Rajbari	☐ Nator
☐ Comilla	☐ Narayanganj	☐ Kurigram
☐ Cox's Bazar	☐ Shariatpur	☐ Nawabganj
☐ Dhaka	☐ Sherpur	☐ Nilphamari
☐ Dhaka	☐ Tangail	☐ Pabna
☐ Faridpur	☐ Khulna	☐ Sylhet
☐ Feni	☐ Kushtia	☐ Habiganj
☐ Gazipur	☐ Magura	☐ Maulvi Bazar
☐ Jhalakhati	☐ Khulna	☐ Panchagarh
☐ Khagrachari	☐ Meherpur	☐ Sunamganj
☐ Lakshmipur	☐ Manikganj	☐ Dinajpur
☐ Noakhali	☐ Bagerhat	☐ Rajshahi
☐ Patuakhali	☐ Chuadanga	☐ Rangpur
☐ Pirojpur	☐ Jessore	☐ Sirajganj
☐ Rangamati	☐ Munshiganj	☐ Gaibanda
	☐ Mymensingh	☐ Jaipur Hat
	☐ Jhenida	☐ Thakurgaon
		☐ Sylhet
		☐Other (specify):_____

India

☐ Assam	☐ Mahārāshtra
☐ Bihār	☐ Manipur
☐ Chandīgarh	☐ Meghālaya
☐ Chhatisgarh	☐ Mizorām
☐ Dādra & Nagar Haveli	☐ Nāgāland
☐ Damān & Diu	☐ Orissa
☐ Delhi	☐ Pondicherry
☐ Goa	☐ Punjab
☐ Gujarāt	☐ Rājasthān
☐ Haryāna	☐ Sikkim
☐ Himāchal Pradesh	☐ Tamil Nādu
☐ Jammu & Kashmīr	☐ Tripura
☐ Jharkhand	☐ Uttaranchal
☐ Karnātaka	☐ Uttar Pradesh
☐ Kerala	☐ West Bengal (Bangla)
☐ Lakshadweep	☐ Other (specify):_____
☐ Madhya Pradesh	

Appendix IX

Assessment Interview Form

Minnesota Department of Health

RISK ASSESSMENT INTERVIEW FORM

Date:_____ Case #: _____

Child's Name:_____ Date of Birth:_____

Parent's Name(s):_____ Person interviewed:_____

Address: _____

Phone # (include area code):_____

1. Are there any other children under the age of six? Yes_____ No_____

   Names: _____ _____

   _____ _____

   Have they been tested for lead? Yes_____ No_____

2. How long have you lived at this address?_____ Own_____ Rent_____

   Year built:_____

   If rented, landlord's name, address and phone number:_____
   _____

   If less than 12 months, list previous address for past 12 months:_____
   _____

3. Has any renovation of the residence taken place within the past year? Any furniture renovation? Please specify:
   _____
   _____

4. Does child spend several hours each week in another location such as a day care facility, grandparent's home, babysitter's home, playgrounds, neighbor's home, other neighborhood areas? If so, what are those addresses?:

   1. _____ Average time each week:_____hrs.
   2._____ Average time each week:_____hrs.

5. Occupations of adults in household:_____

6. Are there pets living at the residence that are allowed outdoors? Yes_____ No _____

7. Are there areas of bare soil near the residence? Yes ____ No ____

   Is there a sand box or play area near a street or alley, or next to the house or garage? Yes _____ No _____

8. Is car repair done at the residence? Where? _____

9. Note the condition of the surrounding neighborhood. Are there areas of potential lead exposure?
   _____
   _____

10. Where does the child play inside and outside the residence? _____
    _____

Where does the child like to hide? _____

11. Has the child been given folk medicines such as:

    Greta (Hispanic) ____ Azarcon (Hispanic) ____ Surman (Asian) _____ Pay-loo-ah(Hmong) _____

12. Does the child have contact with or access to:

car batteries[1] _____	pesticides[4] _____	bullets, gunshot or reloads[8] _____
solder[2] _____	painted, antique or foreign toys[5] _____	pewter items[9] _____
lead sinkers or other fishing supplies _____	pool cue chalk[6] _____	ceramic dishes or food containers[11] _____
stained glass[3] _____	colored newsprint[7] _____	paint, varnish or supplies[10] _____

13. Does the child:

suck the thumb _____	eat soil/mud pies _____	chew/suck on miniblinds _____
put fingers in mouth _____	eat crayons _____	spend time at windows _____
eat paint chips _____	chew/suck on matches _____	chew/suck on windowsills or sashes _____
pick at paint _____	chew/suck on furniture _____	

14. Where do parents think lead exposure is occurring? _____
    _____

Foot Note:
1. Car batteries are made of lead.
2. Solder used for electrical or plumbing work may contain lead.
3. Leaded solder is typically used to hold the stained glass together at the seams.
4. Some older pesticides may contain lead arsenate, usually in powder form.
5. Antique toys or those produced in another country may have lead paint.
6. Some brands of green pool cue chalk may contain lead.
7. Colored newsprint, more likely glossy print, may be printed with ink containing lead.
8. Bullets and shot used for reloading are made of lead and the dust from reloading may also be a hazard.
9. Pewter contains lead.
10. Old paint and varnish may contain lead.
11. Paint and glaze used on ceramics and pottery may contain lead.

Appendix X

Lead Based Paint Risk Assessment Form

Minnesota Department of Health

Lead-Based Paint Risk Assessment Report

for the Property located at

[ADDRESS]
[CITY, Minnesota, ZIP]

Conducted by

[RA signature on line (*delete this*)]

_____

[RISK ASSESSOR'S NAME], [LICENSE NUMBER (LR####)]

Minnesota Department of Health
[ADDRESS]
[CITY, Minnesota, ZIP]
[PHONE]

[REPORT DATE]

LEAD RISK ASSESSMENT REPORT

[ADDRESS]
[CITY, MINNESOTA, ZIP]

Case: [CASE NUMBER]

I. AUTHORITY

Minnesota Statutes 144.9504, subdivision 2, sub-subdivision (a) requires the Minnesota Department of Health (MDH) to conduct a lead risk assessment on a property according to the venous blood lead level of a child or pregnant female residing at the property.

II. BACKGROUND

(Pick one of the following paragraphs, delete the rest)

MDH conducted a lead risk assessment at the property located at [ADDRESS] in [CITY], Minnesota, on [DATE OF RISK ASSESSMENT]. The property was constructed in [YEAR] and is owned by [PROPERTY OWNER NAME, PROPERTY OWNER ADDRESS, PROPERTY OWNER CITY, STATE, ZIP, PHONE NUMBER].

(If unable to determine the year of construction)
MDH conducted a lead risk assessment at the property located at [ADDRESS] in [CITY], Minnesota, on [DATE OF RISK ASSESSMENT]. MDH was unable to determine the year of construction. The property is owned by [PROPERTY OWNER NAME, PROPERTY OWNER ADDRESS, PROPERTY OWNER CITY, STATE, ZIP, PHONE NUMBER].

(If unable to determine the year of construction or the phone number of the property owner)
MDH conducted a lead risk assessment at the property located at [ADDRESS] in [CITY], Minnesota, on [DATE OF RISK ASSESSMENT]. MDH was unable to determine the year of construction. The property is owned by [PROPERTY OWNER NAME, PROPERTY OWNER ADDRESS, PROPERTY OWNER CITY, STATE, ZIP. MDH was unable to determine the phone number of the property owner.]

III. FINDINGS

MDH observed deteriorated lead-based paint in these areas: [LIST OUT ROOMS OR AREAS].

- Kitchen
- Child's bedroom
- Parent's bedroom
- Bare soil on west side of house

(*Use one of the following sentences:* MDH did not observe any dust or debris in the property. *OR* MDH observed dust and debris in the following areas [THEN LIST OUT ROOMS OR AREAS]:

- Child's bedroom
- Parent's bedroom

IV. METHODS

The lead risk assessment was conducted with an x-ray fluorescence (XRF) analyzer, dust wipe sampling [and soil sampling]. MDH used a [BRAND AND MODEL] XRF (Serial #####) to analyze painted surfaces. The specific testing locations are located in Appendix A. Analytical results from the XRF testing are located in Appendix B. Dust wipe samples [and soil samples] were collected and sent to [LAB NAME, LAB ADDRESS, LAB CITY, LAB STATE, LAB PHONE NUMBER, (EPA ID#)] for analysis. The analytical results of the dust wipe samples [and soil samples] are located in Appendix C. *(If snow cover prevents soil sampling, delete soil sampling from the paragraph and add this sentence:* Due to snow cover, soil sampling was unable to be completed at this time, but will be done as soon as conditions allow. An amended report will be issued with the soil sampling results.*)*

V. DISCLOSURE REQUIREMENT

Code of Federal Regulations, title 24, section 35.88, and title 40, section 745.107, requires that a copy or a summary of the lead risk assessment report be provided to current lessees and future tenants if renting the property; or to the purchaser of the property at the time of sale of this property.

VI. RECOMMENDATIONS

The following table identifies the location, type and severity of lead hazards observed at the property. They are prioritized with the items at the top of the table having the most immediate health impact while those near the bottom of the table will impact health to a lesser extent.

Lead Hazards			
Location	**Component**	**Color**	**Severity**
Child's Bedroom	All Windows	Blue	Poor
Parent's Bedroom	Closet Door	Brown	Poor
Living Room	All Windows	White	Poor
Kitchen	Door Casing	Green	Poor
Front Porch	Floor	Red	Poor
Front Porch	Railing	Red	Poor
Rear Porch	Railing	Red	Poor
Back Yard	Bare Soil	N/A	Poor
Parent's Bedroom	All Windows	White	Intact

Kitchen	Window Sash by Sink	White	Intact
Rear Porch	Car Batteries	N/A	Intact

(Expand or contract the table as necessary. Keep the severity at intact or poor.)

Areas where lead hazards are identified should be washed with a household detergent and rinsed with clean rinse water.

Paint identified in poor condition is a lead hazard. Options to reduce lead hazards on sound or non-rotting components include, but are not limited to:

- Wet scraping and repainting
- On- or off-site paint stripping
- On- or off-site component planing
- Covering with an impermeable material, such as vinyl or aluminum coil stock
- Component replacement

Options to reduce lead hazards on unsound or rotting components include, but are not limited to:

- Component repair
- Component replacement

(If bare soil is a lead hazard, use the following sentence. If no bare soil was observed, delete it)
Bare soil may be covered with sod, wood chips, sand or other non-living material after all visible paint chips are removed from the bare soil area.

[LIST OUT ANY OTHER UNUSUAL COMPONENTS AND RECOMMENDATIONS FOR THEM i.e. The car batteries on the rear porch should be removed to an area where they are inaccessible to the child.]

Appendix A

Testing Locations

Appendix B

XRF Testing Results

Paint Standard
≥ 1.0 milligram per square centimeter (≥ 1.0 mg/cm^2)

If a paint sample equals or exceeds the standard, it is considered a lead hazard.

Explanation of Column Headings
(The following items will have to be edited depending on what the XRF print-out looks like)
XRF# - Machine generated sequence number
Insp/XRF – Initials of the inspector and the serial number of the machine
Floor – Floor level
Wall – Wall side of the room starting with A on the street side and going clockwise
Room – Room being tested
Structure (and Feature) – What is being tested
Substrate – The composition of the tested component
Condition – Condition of the paint
Color – Color of the paint
DI – Depth Index – the larger the number the deeper the lead-based paint layer
Result – The result of the test
PbC – The total combined lead in the layers of paint
PbC Error – The error of the total combined lead level

Appendix C

Dust Wipe and Soil Sample Results

Dust Wipe Standards
Floor Wipe – 40 micrograms per square foot ($\mu g/ft^2$)
Window Sill – 250 $\mu g/ft^2$
Window Well – 400 $\mu g/ft^2$

If a dust wipe sample equals or exceeds the standard, it is considered a lead hazard.

See the attached City of Minneapolis Public Health Laboratory Chain of Custody Form for sampling results.

(If soil samples were not collected, delete this)
Soil Standard
100 parts per million (ppm)

If a soil sample equals or exceeds the standard, it is considered a lead hazard.

See the attached City of Minneapolis Public Health Lab Chain of Custody Form for sampling results.

Appendix XI

Primary Prevention Information Form

New York Department of Health and Mental Hygiene

LI #: _____

NEW YORK CITY DEPARTMENT OF HEALTH AND MENTAL HYGIENE
LEAD POISONING PREVENTION PROGRAM

Primary Prevention Information Form (PPI)

Instructions: Fill out the information on the first page using the Referral Form. The information on this page will be double-checked beginning on Page 2.

Child Name: _____ _____ _____
Last *Middle* *First*

BLL (if known) at assignment (µg/dL): _____ **Test Date:** ____/____/____

Mother's BLL (if known) at delivery: _____ **Test Date:** ____/____/____

Child DOB: ____/____/____ **Child Age:** _____
(Days/wks/mos/yrs)

Instructions: Prior to conducting the inspection, the primary language for the visit should be determined. If necessary, an interpreter from the family, the LPPP office, or the Language Line can be used to assist in gathering information.

Language scheduled: *(Instructions: Check the scheduled interview language.)*

☐ English ☐ Spanish ☐ Russian ☐ Bengali ☐ Hindi
☐ Haitian-Creole ☐ Urdu ☐ Other: _____

Interpreter Scheduled: ☐ No ☐ Yes>>

If yes >> **Type of interpreter scheduled:**

☐ Family member (specify): _____ ☐ Friend
☐ Language line ☐ LPPP staff ☐ Other: _____

NAME OF INSPECTOR: _____

INTERVIEW DATE: _____ TIME STARTED: _____

A. CONTACT AND DEMOGRAPHIC INFORMATION

1. Is this the address where [child's name] currently lives?

☐ Yes >> *Continue* ☐ No >> *Stop* >> *Determine current address*

I would like to find out your name and make sure the information we have in our records is correct.

2. What is the exact spelling of <u>your</u> name?

LAST NAME	FIRST NAME

2a. What is your relationship to [child's name]?

☐ Mother ☐ Father ☐ Grandparent ☐ Legal Guardian ☐ Foster Parent>> ☐ Other: _____

LI #: _____

3. What is the exact spelling of the child's full name? *Instructions: Ask for exact spelling of name.*

LAST NAME	FIRST NAME	MIDDLE NAME	☐ NA

3a. *Instructions: Enter child's sex if known. If sex unknown, ask>>*
Is [child's name] a boy or a girl? ☐ Male ☐ Female

3b. How old is [child's name]? Age: _____ (days/wks/mos/yrs)

3c. When is [child's name]'s date of birth? _____/_____/_____
Month Day Year

4. Please confirm this address. *Instructions: Ask for spelling of street and specific apartment #.*

STREET		APT. #
BOROUGH	**STATE**	**ZIP**

4a. How long has he/she lived at this address?
_____ mo(s) and _____ day(s) ☐ Since birth

5. Please tell me the telephone number of this address:
Telephone number: (_____) _____ – _____

5a. If you have a cell phone, please tell me your cell phone number: (_____) _____ – _____ ☐ Not Provided

5b. If you work, please tell me your work phone number: (_____) _____ – _____ ☐ Not Provided

5c. Which phone number is the best to reach you? ☐ Home ☐ Cell ☐ Work

5d. Which days of the week are the easiest to reach you?
☐ Mon ☐ Tues ☐ Wed ☐ Thurs ☐ Fri ☐ Sat ☐ Sun ☐ Any day

5e. When is the best time of day to reach you? _____ ☐ AM ☐ PM ☐ Any time

6. Which of the following best describes your child's race or ethnicity? I'm going to first read out all the categories. You can tell me more than one category.
Instructions: Read out all categories first. Check as many as reported. Do not read Refused response out loud.

☐ African American or Black
☐ American Indian or Alaska Native
☐ Asian
☐ Hispanic or Latino
☐ Native Hawaiian or Other Pacific Islander
☐ White or Caucasian
☐ Other group not listed, *Instructions: Ask to describe and write in response*
_____
☐ Refused

7. In what country was [child's name]'s birth <u>mother</u> born? _____
☐ Don't know ☐ Refused

7a. **In what country was [child's name]'s birth <u>father</u> born?** _____
☐ Don't know ☐ Refused

B. ALTERNATE CONTACT INFORMATION

I would like to ask for a contact person in case we cannot reach you by telephone.

8. Is there another adult <u>living at this address</u> whom we can contact, in case we cannot reach you?
☐ No ☐ Yes>>

8a. *If yes* >> **Please tell me his/her name.** *Instructions: Ask person to spell name.*

ALTERNATE CONTACT LAST NAME	ALTERNATE CONTACT FIRST NAME	☐ REFUSED

8b. **What is this person's relationship ot the child?**

☐ Mother/Father ☐ Sibling ☐ Aunt/Uncle ☐ None
☐ Legal Guardian ☐ Foster Parent ☐ Grandparent ☐ Other: _____

8c. **Is there another person, like a family member or friend, who lives at a different address, whom we could contact?**

☐ No ☐ Yes>>

8d. *If yes* >> **Please tell me his/her name and telephone number.**

ALTERNATE CONTACT LAST NAME	ALTERNATE CONTACT FIRST NAME

HOME NUMBER	WORK NUMBER	CELL NUMBER
( )	( )	( )

8e. **What is this person's relationship ot the child?**

☐ Mother/Father ☐ Sibling ☐ Aunt/Uncle
☐ Grandparent ☐ Other: _____

Instructions: Inform interviewee that she/he should notify alternate contacts that we may contact them if we cannot get in touch with the interviewee.

9. Please give me the name and contact information for the landlord or owner?

Instructions: Ask interviewee to spell landlord's name and address.

MANAGEMENT COMPANY			
LAST NAME	FIRST NAME		
STREET		APT #	
BOROUGH	STATE	ZIP	TELEPHONE NUMBER ( )

C. PAINT INSPECTION AND DUST SAMPLING

10. In which rooms in the house does [child's name] sleep, play or spend time?

Instructions: Check off all that apply.

☐ Child's bedroom ☐ Parent's bedroom ☐ Other bedroom(s) (specify) _____
☐ Living room ☐ Kitchen ☐ Other room(s) (specify) _____

Instructions: Make a visual inspection of the unit. Perform inspection as per protocol. Show person area(s) that need remediation.

D. INTERVIEW LANGUAGE

Interview Language:

☐ English ☐ Russian ☐ Hindi ☐ Urdu
☐ Spanish ☐ Bengali ☐ Haitian-Creole ☐ Other: _____

Interpreter used: ☐ No ☐ Yes>>

If yes >> **Type of interpreter used:**

☐ Family member (specify): _____
☐ Friend ☐ Language line ☐ LPPP staff ☐ Other: _____

LI #: _____

G. COUNSELING AND EDUCATION

Follow up with your child's doctor

- ☐ Blood lead tests are necessary to monitor your child's exposure to lead. How often these tests need to be done depends on your child's lead level, length of exposure and risk for further exposure.
- ☐ Generally, the higher the blood lead level and the longer the exposure, the more time it will take for the lead to leave your child's body, and the longer your child will need to be monitored by your doctor.

Reduce your child's exposure to lead

- ☐ Keep your child away from the lead paint hazards noted in your home. Consider having your child stay somewhere else while hazards are being corrected.
- ☐ Wash floors and windowsills often using a damp mop or damp cloth.
- ☐ Wash your child's hands, toys, pacifiers and bottles often to remove lead dust, especially before your child eats or sleeps.
- ☐ If someone in your home has a job or hobby that involves contact with lead, have them remove their shoes before entering your home. Wash their work clothes separately from family laundry.
- ☐ Avoid using medicines, spices, foods, cosmetics, jewelry, and painted toys from other countries. They are more likely to contain lead than products made in the U.S.A.
- ☐ Avoid using clay pots and dishes from other countries to cook, store or serve food. Do not use pottery that is chipped or cracked.
- ☐ Do not let your child eat or mouth non-food items that may contain lead or lead dust.
- ☐ Use cold tap water only for making baby formula or baby cereal, and for drinking or cooking. Let water run for a few minutes before you use it. Lead can get into water through old plumbing.

Help your child to eat healthy

- ☐ It is important for your child to eat a healthy diet with enough calcium, iron and vitamin C.
- ☐ Talk to your doctor to make sure your child is eating foods with enough calcium, iron, and vitamin C in them.

Get other household members tested for lead

- ☐ This is especially important for children younger than 6 years of age, children with developmental problems and pregnant women.
- ☐ Older children and adults should be tested if they may have had contact with lead.

For more information about lead poisoning

- ☐ Speak with your doctor
  Contact your case coordinator at 212-676-6379
- ☐ Call 311 and ask for the BAN-LEAD information line
- ☐ Go to www.nyc.gov/lead

Provide information packet. Ask if there are any questions.

TIME ENDED: _____ **DATE:** _____

SUPERVISOR NAME: _____

Appendix XII

Child Risk Assessment Form

New York City Department of Health and Mental Hygiene

NEW YORK CITY DEPARTMENT OF HEALTH AND MENTAL HYGIENE
LEAD POISONING PREVENTION PROGRAM

P

Child Risk Assessment Form (CRA)

P

PRIMARY ADDRESS

Child Name: _____ _____ _____
Last *Middle* *First*

BLL at case assignment (µg/dL): _____ **Drawn Date:** ____/____/____

Child DOB: ____/____/____

Information will be confirmed at the inspection.

Instructions: In the office, the primary language for the visit should be determined. If necessary, an interpreter from the family, the LPPP office, or telephone interpreting services can be used to assist in gathering information.

Interview language scheduled: *(Instructions: Check off the primary language for the visit.)*

☐ English ☐ Spanish ☐ Russian ☐ Bengali ☐ Hindi
☐ Haitian-Creole ☐ Urdu ☐ Other: _____

Interpreter scheduled: ☐ No ☐ Yes >>

If yes >> **Type of interpreter scheduled:**

☐ Family member (specify): _____ ☐ Friend
☐ Telephone interpreting services ☐ LPPP staff ☐ Other: _____

Name of PHS: _____ **Time Started:** _____

A. ENVIRONMENTAL ADDRESS

Is this the address where [child's name] currently lives?

☐ Yes >> *Continue* ☐ No >> *Go to supplement form*

B. CONTACT INFORMATION

I would like to find out the child's name and make sure the information we have in our records is correct.

1. **What is the exact spelling of the child's full name?** *Instructions: Ask for middle name.*

LAST NAME	FIRST NAME	MIDDLE NAME ☐ NA

1a. *Instructions: Enter child's gender if known. If gender unknown, ask* >>

Is [child's name] a boy or a girl? ☐ Male ☐ Female

1b. What is [child's name]'s date of birth? ____/____/____
Month Day Year

2. **Please confirm the child's address.** *Instructions: Ask for spelling of street and specific apartment #.*

STREET		APT. #
CITY/BOROUGH	STATE	ZIP

3. What is the exact spelling of <u>your</u> name?

LAST NAME	FIRST NAME

3a. What is **<u>your</u>** relationship to [child's name]?

☐ Mother ☐ Father ☐ Aunt ☐ Uncle ☐ Grandmother ☐ Grandfather ☐ Foster Parent>>

☐ Other: _____

3b. *Instructions: If foster parent, ask for the following information:*
Please tell me the name and telephone number of the foster agency:

FOSTER AGENCY	PHONE NUMBER ☐ NOT PROVIDED

4. Please tell me the telephone number of this address:

Environmental address telephone number: ( ) _____ – _____ ☐ Not Provided

4a. If you have a cell phone, please tell me your cell number: ( ) _____ – _____ ☐ Not Provided

4b. If you work, please tell me your work number: ( ) _____ – _____ ☐ Not Provided

4c. Which phone number is the best to reach you? ☐ Home ☐ Cell ☐ Work

4d. Which days of the week are the easiest to reach you?
☐ Mon ☐ Tues ☐ Wed ☐ Thurs ☐ Fri ☐ Sat ☐ Sun ☐ Any day

4e. When is the best time to reach you? _____ ☐ A.M. ☐ P.M. ☐ Any time

4f. Do **<u>you</u>** reside at this address ☐ No ☐ Yes

4g. How long has [child's name] lived at this address? _____ yr(s) _____ mo(s) _____ day(s) ☐ Since birth >> *go to Q. 5*

If more than 3 months at current address >> go to Q. 5
If less than 3 months at current address >> go to Q. 4h

4h. In the past 3 months, where else has the child lived?

STREET	APT. #

CITY/BOROUGH	STATE	ZIP	PHONE NUMBER ☐ NOT PROVIDED

If prior address is in NYC >> Plan to inspect previous address as supplement.

C. CHILD'S MEDICAL INFORMATION

I need to write down contact information for [child's name]'s doctor and for his/her current health insurance. If you have a card, letter or bill from the doctor or health insurance, I can copy down the information.

Instructions: Ask to see card and write down information. If no information shown, ask for spelling of name and address.

5. What is the contact information for your child's doctor?

CLINIC NAME			
DOCTOR'S LAST NAME	FIRST NAME		
STREET	CITY/BOROUGH	STATE	ZIP
TELEPHONE NUMBER	☐ DOCUMENTS SHOWN ☐ NO DOCUMENTS SHOWN		

Inspection Date: ____/____/____

6. Does [child's name] currently have <u>any type</u> of health insurance such as Medicaid or Child Health Plus (CHP)?

☐ No >> *go to Q. 7* ☐ Yes >> ☐ Don't know >> *go to Q. 7*

If yes >> Instructions: Ask to see insurance card and write down information. If no card provided, ask for any information available.

MEDICAID #	OTHER PLAN NAME	ID #	☐ CARD SHOWN ☐ CARD NOT SHOWN
___-___-___-___-___-___-___-___-___-___			

7. In the past, were you ever told that your child had a high blood lead level or had your child been diagnosed with lead poisoning?

☐ No >> *go to Q. 8* ☐ Yes >> ☐ Don't know >> *go to Q. 8*

If yes >>

7a. What was the blood lead level? _____ µg/dL ☐ Don't know

7b. In what city and state was the blood test performed? City: _____ State: _____

8. Has a doctor or other health care provider ever told you that [child's name] has a learning or behavior problem?

☐ No ☐ Yes >> **Please describe:** _____

☐ Don't know

Early Intervention

If child < 36 months of age, offer Early Intervention Program Referral and Information. ☐ Accepted ☐ Rejected

CHILD 12 MONTHS OR YOUNGER [*If child is older than 12 months, go to Section D.*]

9. Is [child's name] regularly fed infant formula mixed with tap water? ☐ No ☐ Yes

10. Are you [child's name]'s birth mother? ☐ No >> *go to Section D* ☐ Yes >>

10a. *If yes* >> Did you have a blood test for lead when you were pregnant with [child's name]? ☐ No >> *go to Section D* ☐ Yes >> ☐ Don't know >> *go to Section D*

10b. *If yes* >> What was the blood lead level? _____ µg/dL ☐ Told it was high ☐ Don't know

D. COUNTRY OF BIRTH/FOREIGN TRAVEL

Now I have a few questions about where [child's name] was born, lived and any trips s/he may have taken outside of the U.S. This information can help us identify possible ways your child may have been exposed to lead. I am not interested in [child's name] or your family's immigration status.

11. In what country was [child's name] born? _____

☐ Don't know >> *go to Q. 12* ☐ Decline to answer >> *go to Q. 12*

*Instructions: If child was born in **Bangladesh, Dominican Republic, Haiti, Mexico,** or **Pakistan** show list at the end of the form (Appendix A).*

11a. **Where in [*Bangladesh, Dominican Republic, Haiti, Mexico, or Pakistan*] was [child's name] born?**

Bangladesh: _____ Dominican Republic: _____

Haiti: _____ Mexico: _____

Pakistan: _____

☐ Don't know >> *go to Q. 11b*

Instructions: For ALL children born <u>outside of the U.S.</u>

11b. **How long did s/he live in that country?** _____ (in years)

11c. **When (what month and year) did [child's name] come to the U.S.?** Month: _____ Year: _____

Instructions: For ALL children, including US-born children.

12. In the last 12 months, has [child's name] spent any time outside of the U.S.? This includes any traveling, visiting family or friends or living in another country.

☐ No >> *go to Q. 13* ☐ Yes >>

If yes >> Instructions: Write down all information about time spent outside the U.S. Ask for all visits. If more than 3 times, write below.

	#1	#2	#3
Country			
When did s/he stay there? (start with most recent)	____/____ Month Year	____/____ Month Year	____/____ Month Year
How long did s/he stay?	____ Week(s) ____ Month(s)	____ Week(s) ____ Month(s)	____ Week(s) ____ Month(s)
Comments: (e.g. How often does s/he travel there?)			

13. Which of the following groups best describes your child's race or ethnicity? First, I'm going to read out all the categories. You can tell me more than one category.

Instructions: Read out all categories first. Check as many as reported.

☐ African American or Black
☐ American Indian or Alaska Native
☐ Asian
☐ Hispanic or Latino
☐ Native Hawaiian or Other Pacific Islander
☐ White or Caucasian

Instructions: Do not read aloud.

☐ Other group not listed – If mentioned, write in response: _____
☐ Declined to answer

14. In what country was [child's name]'s birth mother born? _____
☐ Don't know ☐ Declined to answer

14a. **In what country was [child's name]'s birth father born?** _____
☐ Don't know ☐ Declined to answer

E. PAINT HAZARDS

15. In which rooms in the house does [child's name] sleep, play or spend time?

Instructions: Check off all that apply.

☐ Child's bedroom ☐ Parent's bedroom ☐ Other bedroom(s) (specify) _____
☐ Living room ☐ Kitchen ☐ Other room(s) (specify) _____
☐ Bathroom ☐ All rooms

16. Does [child's name] play or spend time in the building basement, hallways, foyers, stairways, or other areas in the building? ☐ No >> *go to Q. 17* ☐ Yes >>

16a. *If yes* >> **Please tell me the area(s) inside the building where your child spends time.**

_____

Instructions: Find out floor and specific area(s) inside the building.

17. Does [child's name] play outside in locations where there is bare soil, such as the front or backyard, a neighborhood playground, or park?

☐ No >> *go to Q. 18* ☐ Yes >>

17a. *If yes* >> **Please describe.**

	#1	#2
Description		
Address/Location		
Plays in bare soil?	☐ Yes ☐ No	☐ Yes ☐ No
Sample Taken	☐ Yes ☐ No	☐ Yes ☐ No

Instructions: See sampling guidelines. Complete Non-Dust Chain of Custody Form.

18. In the past 12 months, has there been water damage, deteriorated plaster or paint <u>in this home</u>? neighborhood playground, or park?

☐ No >> *go to Q. 19* ☐ Yes >> ☐ Don't know >> *go to Q. 19*

18a. *If yes* >> **Can you please show me and describe the damage?**

Location/Room	Describe damage	When did this occur? (month/year)	Current status
		_____/_____ Month Year	

19. In the past 12 months, has there been any renovation or repair work <u>in this home</u>?

☐ No >> *go to Q. 20* ☐ Yes >> ☐ Don't know >> *go to Q. 20*

19a. *If yes* >> **Please tell me what type of work and when the work was done.**

	#1	#2
Location/Room		
Work Description		
When was the work done? (month/year)	_____ Month _____ Year	_____ Month _____ Year
Current status		

20. In the past 12 months, has there been any renovation or repair work in <u>other areas of the building or in the neighborhood</u> where [child's name] spends time?

☐ No >> *go to Q. 21* ☐ Yes >> ☐ Don't know >> *go to Q. 21*

20a. *If yes* >> **Please tell me what type of work and when the work was done.**

	#1	#2
Location		
Work Description		
Address		
When was the work done? (month/year)	_____ Month _____ Year	_____ Month _____ Year
Current status		

21. Does [child's name] currently spend more than five hours a week anywhere other than this home? For example, spending time at a day care center, school, babysitter, or another home.

☐ No >> *go to Q. 22* ☐ Yes >> ☐ Don't know >> *go to Q. 22*

21a. *If yes* >> **Please tell me the locations.**

	#1	#2	#3
Location/Description			
Children less than 6 yrs reside in location?	☐ No (SNC) ☐ Yes (SC) ☐ Don't know	☐ No (SNC) ☐ Yes (SC) ☐ Don't know	☐ No (SNC) ☐ Yes (SC) ☐ Don't know
# hrs/week			
Address			
Contact Name *(Ask for spelling)*			
Phone Number			
Work Number			
Cell Number			

F. IMPORTED PRODUCTS

Now I am going to ask you about some product(s) [child's name] may have used or come in contact with, such as medications and health remedies, foods or spices. Some of these products may be made in other countries and may contain lead. They could be products:

- sent by friends and family
- brought back from trips you may have taken
- bought in local stores
- or given to you by friends or family

I want to find out if [child's name] used or was given any of these products during the past 12 months.

Instructions: Ask parent/guardian to show you products in the kitchen and medicine cabinets, Take note of any product(s) that may contain lead. If yes to Questions 22-25, ask to see product(s). See sampling guidelines. Complete Non-Dust Chain of Custody Form.

22. [Imported Medicines] Has your child been given imported...

Product	No	Yes >>	Sample Taken	Comments/Observations
Medicines? (e.g. Remedies for teething, colic, fever, stomachaches or diarhea)			☐ Yes ☐ No	
Ayurvedics? (e.g. Remedies based on traditional Indian medical system)			☐ Yes ☐ No	
Vitamins?			☐ Yes ☐ No	
Powder or pills?			☐ Yes ☐ No	
Herbs?			☐ Yes ☐ No	
Tea?			☐ Yes ☐ No	
Any other imported remedies?_____			☐ Yes ☐ No	

23. [Imported Cosmetics] Has your child used any imported...

Product		Sample Taken	Comments/Observations
Cosmetics? (e.g. Eye makeup)	☐ Yes ☐ No	☐ Yes ☐ No	
Deodorant? (e,g, Litargirio)	☐ Yes ☐ No	☐ Yes ☐ No	
Any other imported cosmetics?_____	☐ Yes ☐ No	☐ Yes ☐ No	

Inspection Date: ____/____/____

24. [Imported Food] Has your child eaten any imported...

Product	Sample Taken	Comments/Observations
Spices? (e.g. orange or red spices) ☐ Yes ☐ No	☐ Yes ☐ No	
Foods? ☐ Yes ☐ No	☐ Yes ☐ No	
Snacks or candies? (e.g. candy spiced with chili or sold in clay pots) ☐ Yes ☐ No	☐ Yes ☐ No	
Any other imported foods?_____ ☐ Yes ☐ No	☐ Yes ☐ No	

25. [Imported Pottery] Has your child been served food in or eaten from imported, antique or painted...

Product	Sample Taken	Comments/Observations
Clay pots? ☐ Yes ☐ No	☐ Yes ☐ No	
Ceramic dishes, bowls, pitchers, or cups? ☐ Yes ☐ No	☐ Yes ☐ No	
Any other imported containers? _____ ☐ Yes ☐ No	☐ Yes ☐ No	

G. NON-FOOD ITEMS

Some products that children play with or wear, such as toys, crayons, jewelry, or candy wrappers, may contain lead. If the child puts these items in his/her mouth, she/he can get lead into his/her body.

Instructions: Be specific when entering responses to 'How often?' (e.g. # times per day, week, or month)

26. Does [child's name] eat, chew on, or put items in his/her mouth, such as toys, mini-blinds, crayons, candy wrappers, jewelry charms or other jewelry?

☐ No >> *go to Q. 27* ☐ Yes >> ☐ Don't know >> *go to Q. 27*

26a. *If yes* >> **Please show me.**

	Item Name/Description	Country of Manufacturer	How Often? (Be specific)	Sample Taken	Comments/Observations
#1			____times per _____	☐ Yes ☐ No	
#2			____times per _____	☐ Yes ☐ No	
#3			____times per _____	☐ Yes ☐ No	
#4			____times per _____	☐ Yes ☐ No	

Instructions: See sampling guidelines. Complete Non-Dust Chain of Custody Form.

27. Does your child mouth or chew on any surfaces or furniture? For example, windowsills, walls, chairs, or cribs.

☐ No >> *go to Q. 28* ☐ Yes >> ☐ Don't know >> *go to Q. 28*

27a. *If yes* >> **Please show me.**

	Item Name/Description	How Often? (Be specific)	Sample Taken	Comments/Observations
#1		____times per _____	☐ Yes ☐ No	
#2		____times per _____	☐ Yes ☐ No	
#3		____times per _____	☐ Yes ☐ No	
#4		____times per _____	☐ Yes ☐ No	

Instructions: See sampling guidelines. Complete Non-Dust Chain of Custody Form.

28. Does [child's name] eat, chew on, or put paint chips, plaster, soil, or clay in his/her mouth?

☐ No >> *go to Section H* ☐ Yes >> ☐ Don't know >> *go to Section H*

28a. *If yes* >> **Please show me.**

	Item Name/Description	Location/Room	How Often? (Be specific)	Sample Taken	Comments/Observations
#1			____times per _____	☐ Yes ☐ No	
#2			____times per _____	☐ Yes ☐ No	
#3			____times per _____	☐ Yes ☐ No	
#4			____times per _____	☐ Yes ☐ No	

Instructions: See sampling guidelines. Complete Non-Dust Chain of Custody Form.

H. OCCUPATIONS AND HOBBIES

Now I'd like to ask you about the jobs, hobbies or activities of people in the houusehold.

29. In the past 12 months, has anyone in this household done any of the following jobs, hobbies or activities?

Job/Hobby/Activity	Person's Relationship to Child	Time/Period/ How Long? (wks/months)	Comments Section/ Current Status
Bridge painting or repair work ☐ Yes ☐ No		_____ weeks _____ months	
Commercial building renovation or demolition ☐ Yes ☐ No		_____ weeks _____ months	

Home renovation, repair or repainting in buildings built before 1960 ☐ Yes ☐ No		_____ weeks _____ months	
Torch cutting or burning steel, welding ☐ Yes ☐ No		_____ weeks _____ months	
Cable splicing, soldering, electronics repair ☐ Yes ☐ No		_____ weeks _____ months	
Metal or car battery recycling; working in a scrap yard; radiator repair ☐ Yes ☐ No		_____ weeks _____ months	
Working in a firing range; target shooting ☐ Yes ☐ No		_____ weeks _____ months	
Jobs/Crafts like furniture refinishing, jewelry making, stained glass, pottery, ceramics, glass blowing; making fishing weights, bullets, or lead figures ☐ Yes ☐ No		_____ weeks _____ months	
Other: _____ ☐ Yes ☐ No		_____ weeks _____ months	

I. HOUSEHOLD INFORMATION

I'd like to find out about other children in your household because they may also be exposed to lead.

30. Other than [child's name], how many children under age 18 live here? _____
Instructions: If no other children, go to Section J.

Please give me the name(s) and age(s) of the other child(ren). Let's start with the youngest child.
Instructions: Write in information. If more than 5 children, write below.

	Full Name (ask for spelling)		Date of Birth	Relationship to child?	Date & BLL if available
#1	LAST:	FIRST:	___/___/___ Mo Day Year	☐ Brother ☐ Sister ☐ Cousin ☐ Twins ☐ Other: _____	_____ µg/dL ___/___/___ Mo Day Year
#2	LAST:	FIRST:	___/___/___ Mo Day Year	☐ Brother ☐ Sister ☐ Cousin ☐ Twins ☐ Other: _____	_____ µg/dL ___/___/___ Mo Day Year
#3	LAST:	FIRST:	___/___/___ Mo Day Year	☐ Brother ☐ Sister ☐ Cousin ☐ Twins ☐ Other: _____	_____ µg/dL ___/___/___ Mo Day Year
#4	LAST:	FIRST:	___/___/___ Mo Day Year	☐ Brother ☐ Sister ☐ Cousin ☐ Twins ☐ Other: _____	_____ µg/dL ___/___/___ Mo Day Year
#5	LAST:	FIRST:	___/___/___ Mo Day Year	☐ Brother ☐ Sister ☐ Cousin ☐ Twins ☐ Other: _____	_____ µg/dL ___/___/___ Mo Day Year

Instructions: Tell parent/guardian that all children should have blood lead tests.

J. ALTERNATE CONTACT INFORMATION

Finally, I would like to ask for a contact person in case we cannot reach you by telephone.

31. Is there another adult living at this address whom we can contact, in case we cannot reach you?

☐ No >> *go to Q. 32* ☐ Yes >>

31a. *If yes* >> **Please tell me his/her name and telephone number.**
Instructions: Ask person to spell name.

ALTERNATE CONTACT LAST NAME	ALTERNATE CONTACT FIRST NAME ☐ NOT PROVIDED
WORK NUMBER ☐ NOT PROVIDED	CELL NUMBER ☐ NOT PROVIDED

31b. **What is this person's relationship ot the child?**
☐ Mother ☐ Father ☐ Grandmother ☐ Grandfather ☐ Brother ☐ Sister ☐ Aunt
☐ Uncle ☐ Family Friend ☐ Foster Parent ☐ Other: _____

32. Is there another person, like a family member or friend, who lives at a different address, whom we could contact?

☐ No >> *go to Q. 33* ☐ Yes >>

32a. *If yes* >> **Please tell me his/her name and telephone number.**

ALTERNATE CONTACT LAST NAME	ALTERNATE CONTACT FIRST NAME ☐ NOT PROVIDED

HOME NUMBER ☐ NOT PROVIDED	WORK NUMBER ☐ NOT PROVIDED	CELL NUMBER ☐ NOT PROVIDED

32b. **What is this person's relationship ot the child?**
☐ Mother ☐ Father ☐ Grandmother ☐ Grandfather ☐ Brother ☐ Sister ☐ Aunt
☐ Uncle ☐ Family Friend ☐ Foster Parent ☐ Other: _____

Instructions: Inform person that s/he should notify alternate contacts that we may contact them only if we cannot get in touch with him/her.

K. LANDLORD INFORMATION

33. Can you please give me the name and contact information for the landlord or owner?
Instructions: Ask to see rent bill or lease. Ask person to spell landlord's name and address.

MANAGEMENT COMPANY	☐ NOT PROVIDED
LAST NAME	FIRST NAME

STREET	APT #

CITY/BOROUGH	STATE	ZIP

TELEPHONE NUMBER ☐ NOT PROVIDED	CELL NUMBER ☐ NOT PROVIDED
Record where landlord information was obtained from:	

TIME ENDED: _____

L. PAINT INSPECTION AND DUST SAMPLING

INSTRUCTIONS: First conduct a visual inspection of the apartment. After visual inspection, perform an XRF inspection, if required, as per protocol. Show the person the area(s) with lead paint violations.

If lead paint violations are identified, consider obtaining temporary address information AND consider obtaining "Request for Safe House Placement" information.

Provide the following information:

34. Lead paint hazards were found in your home. We recommend that [child's name] not stay at this address during repair work. Staying at a temporary address, such as with a friend or with relatives, is advised. Please call us to request a visual inspection for lead paint hazards before your child moves to a temporary address.

If [child's name] does not have another place to stay and you would like information about staying at a Lead Safe House, please call us. The phone number is in the packet with the other materials that I will review with you.

(The phone number is 212-676-6379).

Release Supplement/Temporary Address Information

LAST NAME	FIRST NAME	
STREET		APT #
CITY/BOROUGH	STATE	ZIP
TEMPORARY ADDRESS PHONE NUMBER		☐ NOT PROVIDED
CONTACT WORK NUMBER ☐ NOT PROVIDED	CONTACT CELL NUMBER	☐ NOT PROVIDED

☐ Safe House Offered ☐ Safe House Accepted ☐ Safe House Rejected

35. Is there anything else you would like to tell me about how your child may have been exposed to lead?
Instructions: Ask if there are any questions.

_____

_____

_____

M. INTERVIEW LANGUAGE

Interview Language: *(Instructions: Check off the primary language for the visit.)*

☐ English ☐ Russian ☐ Hindi ☐ Urdu
☐ Spanish ☐ Bengali ☐ Haitian-Creole ☐ Other: _____

Interpreter used: ☐ No ☐ Yes>>

If yes >> **Type of interpreter used:**

☐ Family member (specify): _____ ☐ Friend
☐ Telephone interpreting services ☐ LPPP staff ☐ Other: _____

N. COUNSELING AND EDUCATION

Follow up with your child's doctor

☐ Blood lead tests are necessary to monitor your child's exposure to lead. How often these tests need to be done depends on your child's lead level, length of exposure and risk for further exposure.
☐ Generally, the higher the blood lead level and the longer the exposure, the more time it will take for the lead to leave your child's body, and the longer your child will need to be monitored by your doctor.

Reduce your child's exposure to lead

☐ Keep your child away from the lead paint hazards noted in your home. Consider having your child stay somewhere else while hazards are being corrected.
☐ Wash floors and windowsills often using a damp mop or damp cloth.
☐ Wash your child's hands, toys, pacifiers and bottles often to remove lead dust, especially before your child eats or sleeps.
☐ If someone in your home has a job or hobby that involves contact with lead, have them remove their shoes before entering your home. Wash their work clothes separately from family laundry.
☐ Avoid using medicines, spices, foods, cosmetics, jewelry, and painted toys from other countries. They are more likely to contain lead than products made in the U.S.A.
☐ Avoid using clay pots and dishes from other countries to cook, store or serve food. Do not use pottery that is chipped or cracked.
☐ Do not let your child eat or mouth non-food items that may contain lead or lead dust.
☐ Use cold tap water only for making baby formula or baby cereal, and for drinking or cooking. Let water run for a few minutes before you use it. Lead can get into water through old plumbing.

Help your child to eat healthy

☐ It is important for your child to eat a healthy diet with enough calcium, iron and vitamin C.
☐ Talk to your doctor to make sure your child is eating foods with enough calcium, iron, and vitamin C in them.

Get your household members tested for lead

☐ This is especially important for children younger than 6 years of age, children with developmental problems and pregnant women.
☐ Older children and adults should be tested if they may have had contact with lead.

For more information about lead poisoning

☐ Speak with your doctor
☐ Call 311 and ask for the BAN-LEAD information line
☐ Contact your case manager at 212-676-6379
☐ Go to www.nyc.gov/lead

Ask if there are any questions.

APPENDIX A: Questions 11a. Instructions: Please show this list to parent/guardian and ask him/her to tell you/point to the area where the child was born. If the area is not on the list, please write in the area and ask for the spelling.

Mexico

- ☐ Aguascalientes
- ☐ Baja California
- ☐ Baja California Sur
- ☐ Campeche
- ☐ Chiapas
- ☐ Chihuahua
- ☐ Coahuila (de Zaragoza)
- ☐ Colima
- ☐ Distrito Federal
- ☐ Durango
- ☐ Guanajuato
- ☐ Guerrero
- ☐ Hidalgo
- ☐ Jalisco
- ☐ México
- ☐ Michoacán (de Ocampo)
- ☐ Morelos
- ☐ Nayarit
- ☐ Nuevo Léon
- ☐ Oaxaca
- ☐ Puebla
- ☐ Querétaro (de Arteaga)
- ☐ Quintana Roo
- ☐ San Luis Potosí
- ☐ Sinaloa
- ☐ Sonora
- ☐ Tabasco
- ☐ Tamaulipas
- ☐ Tlaxcala
- ☐ Verazruz (-Llave)
- ☐ Yucatán
- ☐ Zacateca
- ☐ Other (specify): _____

Haiti

- ☐ Aribonite (Gonaïves)
- ☐ Centre (Hinche)
- ☐ Grand'Anse (Jérémie)
- ☐ Nord (Cap-Haïtien)
- ☐ Nord-Est (Fort Liberté)
- ☐ Nort-Quest (Port-de-Paix)
- ☐ Quest (Port-au-Prince)
- ☐ Sud (Les Cayes)
- ☐ Sud-Est (Jacmel)
- ☐ Other (specify) _____

Pakistan

- ☐ Bahawalpur
- ☐ Faisalabad
- ☐ Gujranwala
- ☐ Gujrat
- ☐ Hyderabad
- ☐ Islamabad
- ☐ Jhang Maghiana
- ☐ Karachi
- ☐ Kasur
- ☐ Lahore
- ☐ Larkana
- ☐ Mardan
- ☐ Multan
- ☐ Okara
- ☐ Peshawar
- ☐ Quetta
- ☐ Rahimyar Khan
- ☐ Rawalpindi
- ☐ Sahiwal
- ☐ Sargodha
- ☐ Shekhupura
- ☐ Sialkot
- ☐ Sukkur
- ☐ Other (specify) _____

Dominican Republic

- ☐ Azua
- ☐ ABahoruco
- ☐ Barahona
- ☐ Dajobón
- ☐ Distrito Nacional (incl. Santo Domingo)
- ☐ Duarte
- ☐ El Seibo
- ☐ Elias Piña
- ☐ Espaillat
- ☐ Hato Mayor
- ☐ Independencia
- ☐ La Altagracia
- ☐ La Romana
- ☐ La Vega
- ☐ María Trinidad Sánchez
- ☐ Monseñor Nouel
- ☐ Monte Cristi
- ☐ Monte Plata
- ☐ Pedernales
- ☐ Peravia (incl. San José de Ocoa)
- ☐ Puerto Plata
- ☐ Salcedo
- ☐ Samaná
- ☐ San Cristóbal
- ☐ San Jose
- ☐ San Pedro de Macorís
- ☐ Sánchez Ramírez
- ☐ Santiago
- ☐ Santiago Rodriguez
- ☐ Valverde
- ☐ Other (specify): _____

Bangladesh

- ☐ Bandarban
- ☐ Barguna
- ☐ Barisal
- ☐ Begerhat
- ☐ Bhola
- ☐ Bogra
- ☐ Brahmanbaria
- ☐ Chandpur
- ☐ Chuadanga
- ☐ Chittagong
- ☐ Comilla
- ☐ Cox's Bazar
- ☐ Dinajpur
- ☐ Dhaka
- ☐ Faridpur
- ☐ Feni
- ☐ Gaibanda
- ☐ Gazipur
- ☐ Gopalganj
- ☐ Habiganj
- ☐ Jamalpur
- ☐ Jaipur Hat
- ☐ Jessore
- ☐ Jhalakhati
- ☐ Jhenida
- ☐ Kishorganj
- ☐ Khagrachari
- ☐ Khulna
- ☐ Kurigram
- ☐ Kushtia
- ☐ Lalmonir Hat
- ☐ Lakshmipur
- ☐ Maulvi Bazar
- ☐ Madaripur
- ☐ Magura
- ☐ Meherpur
- ☐ Manikganj
- ☐ Munshiganj
- ☐ Mymensingh
- ☐ Narayanganj
- ☐ Naogaon
- ☐ Nator
- ☐ Narsingdi
- ☐ Narail
- ☐ Nawabganj
- ☐ Nilphamari
- ☐ Noakhali
- ☐ Netrakona
- ☐ Pabna
- ☐ Patuakhali
- ☐ Panchagarh
- ☐ Pirojpur
- ☐ Rangamati
- ☐ Rajshahi
- ☐ Rajbari
- ☐ Rajshahi
- ☐ Rangpur
- ☐ Shariatpur
- ☐ Sherpur
- ☐ Satkhira
- ☐ Sylhet
- ☐ Sanamganj
- ☐ Sirajganj
- ☐ Tangail
- ☐ Thakurgaon
- ☐ Other (specify) _____

NOTES

Question #	Comments/Observations
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Inspection Date: _____/_____/_____

Appendix XIII
Nutritional Reference Information

RECOMMENDED INTAKE AND COMMON FOOD SOURCES

The Dietary Reference Intakes are nutrient reference values established by the Food and Nutrition Board of the National Academy of Sciences' Institute of Medicine (IOM 1997, 2000, 2001). Reference values are population specific and vary by sex and life cycle group and during pregnancy or lactation. The type of reference values established differ based on the quantity and quality of the research used to establish recommendations. The Recommended Dietary Allowance (RDA) is the nutrient intake level that is used as a goal for an individual and represents an intake level which is sufficient to meet the nutrient requirements of nearly all healthy individuals in the population (IOM 1997, 2000, 2001). If insufficient clinical data is available to establish an RDA, an Adequate Intake (AI) is established. The AI is a level that is felt to meet the needs of all individuals in the group (IOM 1997, 2000, 2001). Pregnant and lactating women should aim to meet established RDA or AI levels for through dietary intake. Vitamin or mineral supplementation is recommended for those women who are unable to meet nutrient requirements through dietary sources.

Calcium

The Adequate Intake level of calcium is 1,300 mg/day for pregnant and lactating women 18 years and younger and 1,000 mg/day for pregnant and lactating women 19 years and older (IOM 1997). The richest and most absorbable sources of calcium are dairy products including: milk, cheese, and yogurt. However, many ethnic groups avoid dairy products because of lactose intolerance which has been estimated to have a high prevalence in Asians (100%), African Americans (75%), Native Americans (100%), and Hispanics (53%)(Jackson and Savaiano, 2001). Calcium-set tofu and calcium-fortified fluids such as orange juice, soymilk, almond milk, and rice milk, are also rich sources of calcium. Calcium is also found in some vegetables such as broccoli, bok choy, and kale; however, the calcium found in plant foods is less bioavailable than the calcium in dairy products and fortified foods.

Iron

The Recommended Dietary Allowance of iron is 27 mg/day for all pregnant women, 10 mg/day for lactating women 18 years and younger, and 9 mg/day for lactating women 19 years and older (IOM 2001). The amount of iron from food that is absorbed by the body is dependent on the source of the iron. Heme iron is readily absorbed by the body and is found in meat, poultry, and fish. Nonheme iron is found in iron-fortified foods such as bread, cereal, and grain products, beans/legumes, vegetables, and iron supplements. The absorption of nonheme iron is enhanced when eaten at the same time as vitamin C rich foods or with an animal product such as meat or poultry.

Selenium

The Recommended Dietary Allowance of Selenium is 60 µg/day for all pregnant women and 70 µg/day for all lactating women (IOM 2000). Selenium is found in: meats, especially organ meats, seafood, and Brazil nuts. The selenium content of fruits, vegetables, nuts, and grains is dependent on soil selenium content and therefore varies substantially based on the plant's origin.

Zinc

The Recommended Dietary Allowance of zinc is 12 mg/day for pregnant and 13 mg/day for lactating women 18 years and younger and 11 mg/day for pregnant and 12 mg/day lactating women 19 years and older (IOM 2001). Red meat and shellfish are rich sources of bioavailable zinc. Zinc is also found in: nuts, legumes, fortified cereals, and whole grains.

Vitamin C

The Recommended Dietary Allowance of vitamin C is 80 mg/day for pregnant and 115 mg/day for lactating women 18 years and younger and 85 mg/day for pregnant and 120 mg/day lactating women 19 years and older (IOM 2000). Vitamin C is found in: plant products such as citrus fruits, fruit juice, tomatoes, tomato juice, potatoes, cauliflower, broccoli, strawberries, cabbage and spinach.

Vitamin D

The Recommended Dietary Allowance of vitamin D is 200 IU/day for all pregnant and lactating women (IOM 1997). Recommendations for higher dietary intakes of pre-formed vitamin D have also been made (Prentice 2003; Hollis 2005). In nonpregnant adults, daily supplementation with 400 IU vitamin D increases 25(OH)D by 7.0 nmol/L (2.8 ng/ml) (Heaney). Supplementation of a pregnant woman with 400 IU vitamin D, as in prenatal vitamins, has little effect on her 25(OH)D concentration (Wagner 2008). The AAP recommends that pregnant women maintain a 25(OH)D level of ≥80 nmol/L (32 ng/ml) (Wagner 2008). Dark-skinned individuals require exposures about 5-10 times as long as light-skinned individuals to achieve similar levels of cutaneous vitamin D production. (Holick 2004). At latitudes above 35°N and below 35°S ultraviolet B photons do not penetrate of the earth's surface in winter months, making cutaneous vitamin D production negligible in those months; additionally sun exposures outside the peak sun hours of 10 AM to 3 PM in the spring, summer and fall has limited impact on cutaneous vitamin D synthesis (Holick 2003). Clinicians should note that obesity is a risk factor for low 25(OH)D and that sunscreen blocks cutaneous production of vitamin D (Holick 2007). The AAP recommends that exclusively and partially breastfed infants receive supplements of 400 IU/day of vitamin D shortly after birth and continue to receive these supplements until they are weaned and consume ≥1,000 mL/day of vitamin D-fortified formula or vitamin D-fortified milk (Wagner).

Food sources of vitamin D (25-hydroxy vitamin D) include: fortified milk, fortified orange juice, fortified cereal, some fatty fish (such as salmon and sardines), fish liver oils, and some eggs. UV radiation exposure stimulates vitamin D synthesis (through activation of the pro-vitamin D precursor 7-dehydrocholesterol present in skin), so vitamin D needs can also be met through sun exposure though dark-skinned women require more time exposed to sunlight for the same benefits and, thus, more vitamin D to be obtained from the diet (Holick, 2004).

In the United States 98% of fluid milk is estimated to be fortified with vitamin D (Anderson and Toverud, 1994), however, one study found that only 47.7% of milk samples were appropriately fortified with most of the out-of-compliance milk samples being under-fortified (Murphy et al., 2001). In 2003, the Food and Drug Administration approved food fortification with vitamin D of calcium-fortified juices and juice drinks (FDA, 2003). This may provide enhanced sources of dietary vitamin D to ethnic groups who avoid dairy products because of lactose intolerance. Strategies to increase vitamin D intake, especially for non-Caucasians, emphasize dietary supplements and these vitamin-D enriched non-dairy products.

Vitamin E

The Recommended Dietary Allowance of vitamin E is 15 mg (22.5 IU)/day for all pregnant women and 19 mg (28.5)/day for all lactating women (IOM 2000). Foods rich in vitamin E include: vegetable oils (olive, sunflower, and safflower oils), nuts, whole grains, green leafy vegetables, and meats.

ASSESSMENT OF NUTRIENT STATUS AND INTAKE

Biochemical Indicators

Blood hemoglobin levels are routinely measured to screen for iron deficiency anemia (IOM 2001) and serum concentration of 25(OH)D is the best indicator of vitamin D status (IOM 1997). Biochemical assessment of nutrient status is not routinely performed for all vitamins and minerals, however, because reliable and valid laboratory tests of nutritional status are not available for many nutrients such as zinc and calcium (reference needed).

In the absence of biochemical assessment options, dietary assessment methods are utilized to estimate usual dietary intake and to screen for possible dietary inadequacies. The most commonly used dietary assessment methods include: 24-hour recalls, food (diary) records, and food frequency questionnaires.

24-Hour Recall

During a 24-hour recall, an individual is asked to report food and fluid intake information for the previous day (Hu 2008). The individual is probed for additional information about the food or beverage consumed, including preparation the portion size eaten. A brief qualitative assessment of the recall is usually conducted by the clinician performing the assessment. Common qualitative assessments conducted include: estimation of the number of servings of fruits/vegetables eaten or for the inclusion so of iron-rich or calcium-rich foods. The 24-hour recall is the dietary assessment method most commonly utilized in clinical settings because they can be conducted in a short amount of time and they do not require advanced preparation or complicated scoring. Limitations of the 24-hour recall include: reliance on memory, difficulty in estimation of portion sizes, underreporting of food intake, and intentional omission of nutrient-poor foods. In addition, food consumed in the previous day may also not be representative of usual dietary intake.

Food Record

The food record (diary) method requires that an individual record in detail all the foods and beverages consumed over one or more days (typically between 3 and 7 days) (Hu 2008). The individual completing the food record is typically taught about recording procedures such as portion size estimation prior to completing the records. Quantitative analysis of completed food records are typically completed by a Registered Dietitian so dietary inadequacies and excesses can be identified. Although food records are typically considered the "gold standard" of dietary assessment, there are a number of limitations to this approach. Food records are time and labor intensive to both the individual completing the record and the individual conducting the dietary analysis. Individuals may also alter their food intake while completing the food record.

Food Frequency Questionnaire

Food Frequency Questionnaires (FFQs) were developed to assess long-term dietary intake and are often used in epidemiologic studies (Hu 2008). Numerous food frequency questionnaires have been developed and validated for use in specific populations. A food frequency questionnaire consists of a list of food items and beverages. Individuals are asked to report their usual consumption over a specified period of time from a list of frequency categories. The average intake over the designated time period of an assortment of nutrients is calculated based on the individual's responses. FFQs have a number of advantages in epidemiologic studies such as minimal respondent burden and low costs. However, since FFQs lack the detail of dietary records or 24-hour recalls, they provide less accurate estimates of absolute intake.

TABLE XII-1 Recommended Dietary Intake and Common Food Sources of Selected Nutrients

Recommended Intake and Common Food Sources of Selected Nutrients				
Nutrient	Recommended Intakes		Food Sources	Nutrient Content
	(**RDA**/AI) Pregnancy	(**RDA**/AI) Lactation		
Calcium (mg)	**1,300** (≤18 years) **1,000** (>19 years)	**1,300** (≤18 years) **1,000** (>19 years)	Fortified ready-to-eat cereals (various), 1 oz Plain yogurt, low-fat (12 g protein/8 oz), 8-oz container Soy beverage, calcium fortified, 1 cup Fruit yogurt, low-fat (10 g protein/8 oz), 8-oz container Swiss cheese, 1.5 oz Ricotta cheese, part skim, ½ cup Mozzarella cheese, part-skim, 1.5 oz Cheddar cheese, 1.5 oz Fat-free (skim) milk, 1 cup Sardines, Atlantic, in oil, drained, 3 oz 1% low-fat milk, 1 cup Low-fat chocolate milk (1%), 1 cup Whole milk, 1 cup Tofu, firm, prepared with nigari , ½ cup Spinach, cooked from frozen, ½ cup	236-1043 415 368 345 336 335 311 307 306 325 290 288 276 253 146
Iron (mg)	**27 (All ages)**	**10 (All ages)**	Clams, canned, drained, 3 oz Fortified ready-to-eat cereals (various), ~ 1 oz Oysters, eastern, wild, cooked, moist heat, 3 oz Fortified instant cooked cereals (various), 1 packet Soybeans, mature, cooked, ½ cup White beans, canned, ½ cup Blackstrap molasses, 1 Tbsp Lentils, cooked, ½ cup Spinach, cooked from fresh, ½ cup	23.8 1.8 -21.1 10.2 4.9-8.1 4.4 3.9 3.5

			Beef, chuck, blade roast, lean, cooked, 3 oz Prune juice, ¾ cup Shrimp, canned, 3 oz Ground beef, 15% fat, cooked, 3 oz	3.3 3.2 3.1 2.3 2.3 2.2
Selenium (µg)	**60 (All ages)**	**70 (All ages)**	Brazil nuts, dried, unblanched, 1 ounce Tuna, light, canned in oil, drained, 3 ounces Beef, cooked, 3½ ounces Cod, cooked, 3 ounces Turkey, light meat, roasted, 3½ ounces Chicken Breast, meat only, roasted, 3½ ounces Noodles, enriched, boiled, 1/2 cup Egg, whole, 1 medium Cottage cheese, low fat 2%, 1/2 cup Oatmeal, instant, fortified, cooked, 1 cup Rice, white, enriched, long grain, cooked, 1/2 cup Rice, brown, long-grained, cooked, 1/2 cup Bread, enriched, whole wheat, commercially prepared, 1 slice	544 63 35 32 32 20 17 14 12 12 12 10 10
Zinc (mg)	**12** (≤18 years) **11** (>19 years)	**13** (≤18 years) **12** (>19 years)	Beef shank, lean only, cooked 3 oz Beef tenderloin, lean only, cooked, 3 oz Breakfast cereal, complete wheat bran flakes, 3/4 c serving Chicken leg, meat only, roasted, 1 leg Pork tenderloin, lean only, cooked, 3 oz Yogurt, plain, low fat, 1 c Baked beans, canned, with pork, 1/2 c Cashews, dry roasted w/out salt, 1 oz Pecans, dry roasted w/out salt, 1 oz	8.9 4.8 3.7 2.7 2.5 2.2 1.8 1.6 1.4 1.3 1.3 1.1 1.1

			Raisin bran, 3/4 c Chickpeas, mature seeds, canned, 1/2 c Mixed nuts, dry roasted w/peanuts, w/out salt, 1 oz Cheese, Swiss, 1 oz	
Vitamin C (mg)	**80** (≤18 years) **85** (>19 years)	**115** (≤18 years) **120** (>19 years)	Red sweet pepper, raw, ½cup Kiwi fruit, 1 medium Orange, raw, 1 medium Orange juice, ¾ cup Green pepper, sweet, raw, ½ cup Grapefruit juice, ¾ cup Vegetable juice cocktail, ¾ cup Strawberries, raw, ½ cup Brussels sprouts, cooked, ½ cup Cantaloupe, ¼ medium Broccoli, raw, ½ cup	142 70 70 61-93 60 50-70 50 49 48 47 39
Vitamin D (IU)	**200**	**200**	Cod liver oil, 1 tablespoon Salmon, cooked, 3.5 ounces Mackerel, cooked, 3.5 ounces Tuna fish, canned in oil, 3 ounces Sardines, canned in oil, drained, 1.75 ounces Milk, nonfat, reduced fat, and whole, vitamin D-fortified, 1 cup Margarine, fortified, 1 tablespoon Ready-to-eat cereal, fortified with 10% of the DV for vitamin D, 0.75-1 cup Egg, 1 whole (vitamin D is found in yolk) Liver, beef, cooked, 3.5 ounces Cheese, Swiss, 1 ounce	1,360 360 345 200 250 98 60 40 20 15 12
Vitamin E (mg)	**15 mg**	**19 mg**	Fortified ready-to-eat cereals, ~1 oz Sunflower seeds, dry roasted, 1 oz Almonds, 1 oz	1.6-12.8 7.4

			Sunflower oil, 1 Tbsp	7.3
			Cottonseed oil, 1 Tbsp	5.6
			Safflower oil, 1 Tbsp	4.8
			Hazelnuts (filberts), 1 oz	4.6
			Mixed nuts, dry roasted, 1 oz	4.3
			Turnip greens, frozen, cooked, ½ cup	3.1
			Peanut butter, 2 Tbsp	2.9
			Tomato puree, ½ cup	2.5
			Canola oil, 1 Tbsp	2.5
			Wheat germ, toasted, plain, 2 Tbsp	2.4
			Peanuts, 1 oz	2.3
			Avocado, raw, ½ avocado	2.2
				2.1

Appendix XIV

Template for Letter to Construction Employer re: Occupational Exposure

TEMPLATE FOR HEALTH CARE PROVIDER LETTER TO EMPLOYER

Prior to issuing such a letter, the healthcare provider should discuss the contents with the affected employee and obtain her authorization.

Physician Provider Letterhead

Month XX, 20XX

Employer
Company Name
Company Address
City, State XXXXX

Re: Medical Opinion Regarding Occupational Lead Exposure of [NAME OF PATIENT]

Dear Employer:

On [DATE], I conducted a medical evaluation of Ms. [NAME OF PATIENT], who reports being an employee of your company. Based on the information provided by Ms. [NAME OF PATIENT], she performs work at your company that may expose her to lead. A laboratory test performed on [DATE] reported a blood lead concentration of [ENTER RESULT] micrograms per deciliter (μg/dL).

My evaluation of Ms. [NAME OF PATIENT] indicates that she is pregnant or planning to conceive. Lead exposure has been associated with adverse reproductive outcomes, including an increased risk of miscarriage, hypertension during pregnancy, decreased fetal growth, and developmental problems in children born to lead-exposed mothers. The U.S. Centers for Disease Control and Prevention recommends that women who are or may become pregnant limit their exposure to lead.

In accordance with the OSHA Lead Standards [1910.1025(j)-(k), and 1910.1025 App C – Section I. Medical Surveillance and Monitoring Requirements for Workers Exposed to Inorganic Lead, or 1926.62(j)-(k)], this letter represents my medical opinion that Ms. [NAME OF PATIENT] should be removed from lead exposure at your company. This removal should remain in effect until such time that she is no longer pregnant or no longer trying to conceive a child. In the interim, Ms. [NAME OF PATIENT] is capable of continuing to work at a job task or location associated with her employment that would not be expected to result in a blood lead concentration of ≥ 5 μg/dL. I am available to discuss the acceptability of any alternative work assignments for the patient with you or one of your representatives.

I have also attached a brochure that discusses the health effects of lead exposure and outlines steps that may be taken to reduce workplace exposure.

Sincerely,

[PHYSICIAN NAME]

Appendix XV

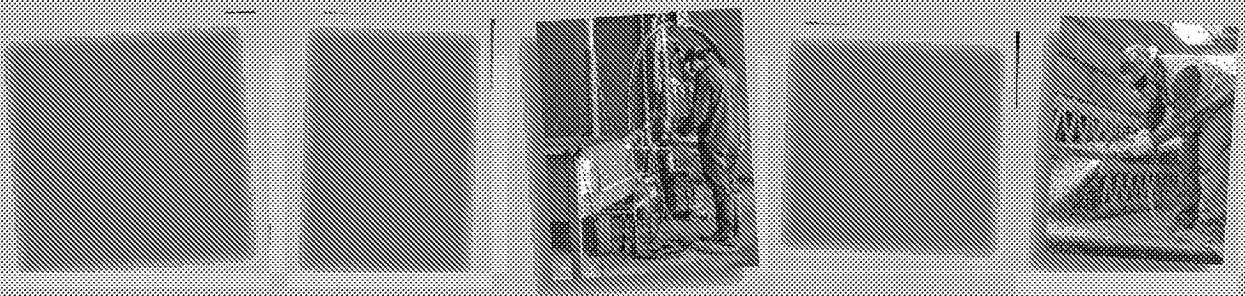
Workplace Hazard Alert for Lead

Occupational Lead Poisoning Prevention Program

California Department of Health

WORKPLACE HAZARD ALERT

New Health Dangers from Lead



Levels of lead once thought harmless now shown to be toxic

If you work with lead you need to:

- Find out how much lead is in your blood.
- Talk to your doctor about lead and your health.
- Take steps to protect yourself at work.

Health damage from lead:

- **Can be permanent.**
- **Can be occurring even if you have no symptoms.**
- **May not show up until many years later.**

What health damage can low levels of lead cause?

Studies in recent years show that low levels of lead in adults can:

- **increase blood pressure**— may increase your chances of having a heart attack or stroke.
- **decrease brain function**— making it more difficult to think, learn, and remember.
- **decrease kidney function**— making it more difficult to get rid of toxic waste products through your urine.
- **harm the physical and mental development of your baby** before it's born.
- **increase chances of having a miscarriage.**

You may work with lead if you:

- Make or repair radiators
- Make or recycle batteries
- Recycle scrap metal or electronics
- Melt, cast, or grind lead, brass, or bronze
- Make or glaze ceramics
- Work at a shooting range
- Remove paint or coatings
- Remodel homes and buildings
- Tear down buildings, bridges, or tanks

This is not a complete list. If you are unsure if you work with lead, ask your employer.

California Department of Public Health

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Occupational Lead Poisoning Prevention Program

How does lead get into my body?

Lead gets into the body through the air you breathe. You can also swallow lead without knowing it if lead dust gets onto your hands or face or on food you eat.

How do I know how much lead is in my body?

Get a blood lead level test. This test measures the amount of lead in a person's blood. Blood lead test results are reported as micrograms of lead per deciliter of blood (µg/dL or mcg/dL). The typical blood lead level for adults in the U.S. is less than 2 µg/dL. Even if you feel fine, you should get tested.

Know your number.

What level of lead is harmful?

Some of the harmful effects of lead have been seen at very low levels. Scientists and doctors now recommend that blood lead levels be kept below 10 µg/dL. Pregnant women or women considering pregnancy should not have a blood lead level above 5 µg/dL.

Blood lead levels should be kept below 10.

Will my health be damaged?

No one can predict for sure whether your health will be damaged at a low blood lead level. Your risk (chance) of suffering from health damage increases with the amount of lead in your blood and the length of time you have been exposed. It will also depend on whether you have any health conditions that place you at higher risk of damage from lead.

If your blood lead level has been above 10 µg/dL for more than a year, the most important thing you can do is take steps to lower your exposure in the future. Information on how you can protect yourself is on pages 4 and 5.

You should also talk to your personal doctor about whether you have any medical conditions that may make you more sensitive to the harmful effects of lead.

Can lead at work harm my family?

YES. You take lead dust from your job to your family when you wear your work clothes and shoes home. Lead dust can get in your car. It can get on furniture, floors, and carpets. Your child can swallow this lead dust and be poisoned. The steps you take to protect yourself will also keep you from bringing lead home to your family. See pages 4 and 5 for more information on what you can do.

What should I tell my doctor?

Your doctor needs to know if you work with lead. Your doctor can order a blood lead level test if you need one. Also, you may have a medical condition that makes you more sensitive to the harmful effects of lead.

Tell the doctor:

- What you do at work.
- How long you have been at your job.
- Any lead jobs you've had in the past.
- If you've ever had a blood lead level test.
- If you've had to be moved to a different job or be off work because your lead level was high.
- If you think working with lead is making you sick.

Women should also tell their doctor if they are pregnant or considering becoming pregnant.

Ask the doctor if you:

- Have any medical conditions that may make you more sensitive to the effects of lead.
  - ☐ High blood pressure
  - ☐ Kidney disease
  - ☐ Brain or nerve disease
  - ☐ Other
- Need any follow-up medical tests to see if lead is affecting your health.
  - ☐ Recheck blood pressure
  - ☐ Kidney function tests
  - ☐ Cognitive evaluation
  - ☐ Other

See the attached clip-off form to fill out and take to your doctor.

My blood lead level has been high for years. Should I find other work?

Whether you continue to work with lead is a personal decision. It is often a tough decision to make. When making this decision, consider:

- Are there steps you can take to lower your exposure to lead? See pages 4 and 5 for steps you can take to protect yourself.
- Do you have any health conditions that may make you more sensitive to the harmful effects of lead?
- If you have a medical condition that places you at higher risk, can you transfer to another job without lead at the same company?
- If you change jobs will you receive the same salary and benefits? If not, can you and your family afford a lower paying job?

For industrial workers

What can I do to protect myself?

Make sure you don't accidentally swallow lead.

- **Wash your hands and face** with soap and water before eating or drinking and before leaving work.
- **Do not eat, drink, or smoke in the work area.**
- **Take a shower and wash your hair** as soon as you get home. (It's better to shower at work if you can.)
- **Change into clean clothes and shoes at work** before you go home. Keep dirty work clothes and shoes separate from clean street clothes. If you don't have a storage locker, keep your dirty clothes and shoes in a plastic bag.
- **Use wet cleaning methods.** Wet wipe surfaces and mop or HEPA vacuum the shop floor daily.

Do what you can to lower the amount of lead you breathe in.

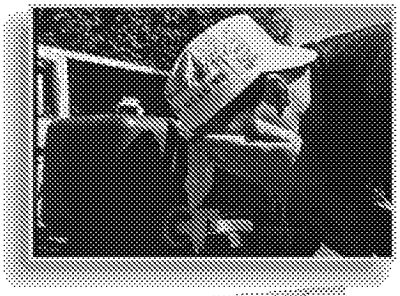
- **If you have local exhaust ventilation, turn it on** and position it correctly while you work with lead.
- **Ask your employer for a respirator** to wear while you work with lead. If you already wear a respirator, ask whether there is another type of respirator that will protect you better. If you use a respirator, your employer has to pay for a doctor to evaluate whether you can wear one safely. Your employer must also provide you with a fit-test to make sure that the respirator fits you well.

Get a blood lead level test at least every 6 months.

- **Ask your employer for a blood lead level test.** If you have significant lead exposure at work, your employer must provide you with a test and pay for it.
- **Ask your personal doctor for a test** if your employer doesn't provide one.

Get tested at least every 6 months.

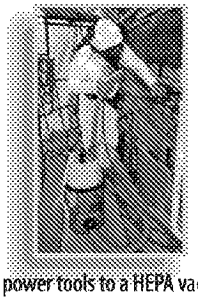
What can I do to protect myself?



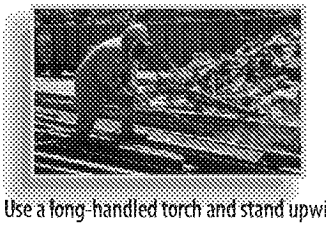
Make sure you don't accidentally swallow lead.

- **Wash your hands and face** with soap and water before eating or drinking and before leaving work. Use a portable plastic container with a spigot if running water is not available.
- **Do not eat, drink, or smoke in the work area.** Move to a clean area for lunch or breaks.
- **Take a shower and wash your hair** as soon as you get home. (It's better to shower at the job site if there are portable showers.)
- **Change into clean clothes and shoes at the job site** before you go home. Keep dirty work clothes and shoes separate from clean street clothes. Dirty clothes and shoes can be stored in a plastic bag.
- **Use wet cleaning methods.** Wet wipe surfaces and wet clean or HEPA vacuum the work area daily.

Strip back paint before cutting or welding.



Attach power tools to a HEPA vacuum.



Use a long-handled torch and stand upwind.

Do what you can to lower the amount of lead you breathe in.

- **Use work methods that keep dust and fume levels down.**
- **Ask your employer for a respirator** to wear while you work with lead. If you already wear a respirator, ask whether there is another type of respirator that will protect you better. If you use a respirator, your employer has to pay for a doctor to evaluate whether you can wear one safely. Your employer must also provide you with a fit-test to make sure that the respirator fits you well.

Get a blood lead level test at least every 6 months.

- **Ask your employer for a blood lead level test.** If you have significant lead exposure at work, your employer must provide you with a test and pay for it.
- **Ask your personal doctor for a test** if your employer doesn't provide one.

Get tested at least every 6 months.

Are there any laws that protect me if I work with lead?

Yes. Your employer must follow special laws to protect you from lead hazards on the job. These laws are called the Cal/OSHA Lead Standards.

The Lead Standards contain many important requirements to protect you from lead. However, because they were written many years ago they are not based on the most recent scientific information. You can have a blood lead level above 10 µg/dL even if your employer follows the standards. That's why it's important for workers and employers to do everything they can to lower the amount of lead in the workplace.

To find out more about the Cal/OSHA Lead Standards, call the Lead in the Workplace Helpline (866/ 627-1587) or visit www.cdph.ca.gov/programs/olppp .

Talk to your employer if you think there is a lead problem at your job. If your employer does not fix the problem, you can call Cal/OSHA and ask for an inspection. Cal/OSHA will not tell your employer who made the call. Call the Cal/OSHA office in your area or call Cal/OSHA headquarters at (510) 285-7000.

RESOURCES

Toll-free to California callers.

- **For information about lead safety: (866) 627-1587**
- **For information about other workplace hazards: (866) 282-5516**
- **California Relay Service: (800) 735-2929 or 711**
- **www.cdph.ca.gov/programs/ohb**

To obtain a copy of this document in an alternate format, please contact: (510) 620-5757. Please allow at least ten (10) working days to coordinate alternate format services.

California Department of Public Health

OLPPP

Occupational Lead Poisoning Prevention Program

California Department of Public Health
Occupational Health Branch
850 Marina Bay Parkway, Building P, Third Floor
Richmond, CA 94804

Arnold Schwarzenegger, Governor
State of California
Kimberly Belshe, Secretary
Health and Human Services Agency
Mark B. Horton, MD, MSPH, Director
California Department of Public Health

Worksite Evaluation Form

What your employer should do to protect you

The best thing that your employer can do is to get rid of lead and lead-containing materials. If it's not possible to get rid of the lead, your employer should take steps to keep the amount of lead in the workplace as low as possible. Your employer should:

- ☐ **Train you to work safely with lead.**
- ☐ **Provide wash-up and shower facilities.**
  - If you work in construction these may be portable wash stations and portable showers.
  - Your employer should provide you sufficient time to wash up before breaks, lunch, and going home.
- ☐ **Provide clean areas for eating and changing.**
- ☐ **Provide work clothes and work shoes** that stay at the job site.
- ☐ **Provide a HEPA vacuum or tools for wet cleaning** the work area.
- ☐ **Install local exhaust ventilation** whenever possible.
  - If there is already local exhaust ventilation your employer should check it regularly to make sure it works well.
- ☐ **Provide you with the right tools to keep lead dust and fume levels down** such as power tools attached to a HEPA vacuum and long-handled torches.
- ☐ **Separate lead work areas from non-lead work areas.**
  - In construction, plastic sheeting can be used to isolate dusty work from the surrounding area.
- ☐ **Provide you with a respirator** to give you even more protection.
  - If you use a respirator, your employer has to pay for a doctor to evaluate whether you can wear one safely. Your employer must also provide you with a fit-test to make sure that the respirator fits you well.
- ☐ **Provide you with a blood lead level test** at least every six months.

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Occupational Lead Poisoning Prevention Program
California Department of Public Health, Occupational Health Branch
850 Marina Bay Parkway, Building P, Third Floor, Richmond, CA 94804

California Department of Publi He l

Lead Health Evaluation Form

To the worker:

Fill out the upper part of this form as completely as you can and share the form with your doctor. The lower part of the form has information for your doctor on body systems and health conditions that may be affected by lead. Talk to your doctor about any concerns you have.

Your name _____ Date of birth _____

Your employer's name _____

What job do you do now? _____ How long have you been at this job? _____

Have you worked with lead at other jobs in the past? _____

Have you had a blood lead level test done in the past? *(List the date(s) and the test results if you know them.)* _____

_____

Have you ever had to be moved to a different job or be off work because your blood lead level was high? _____

Do you think working with lead is making you sick? If yes, explain. _____

_____

To the healthcare provider:

Recent studies show that persistent low-level lead exposures are associated with an increased risk of hypertension, subtle effects on renal function, subclinical cognitive dysfunction, and adverse female reproductive outcome. Please review the following with your patient:

☐ Any blood pressure concerns ☐ Any kidney function concerns

☐ Any brain function concerns ☐ Pregnancy concerns (for female patients of reproductive age)

Follow-up recommendations:

☐ Recheck blood pressure? ☐ Test kidney function with BUN/Cr?

☐ Cognitive evaluation? ☐ Other?

For health care providers with questions about medical management of lead-exposed California workers, please call Dr. Ray Meister of the Occupational Lead Poisoning Prevention Program at (510) 620-5731.

OLPPP

Occupational Lead Poisoning Prevention Program

California Department of Public Health, Occupational Health Branch
850 Marina Bay Parkway, Building P, Third Floor, Richmond, CA 94804

California Department of Publi He l

This Document is a Non-Responsive Attachment.

From: Wells, Eden (DHHS)
Sent: Friday, October 30, 2015 4:00 PM
To: Dykema, Linda D. (DHHS)
Subject: Re: Breast feeding and maternal lead exposure

I cowards that to them / gosh that feels like a long time ago!

Sent from my iPhone

On Oct 30, 2015, at 2:26 PM, Dykema, Linda D. (DHHS) <DykemaL@michigan.gov> wrote:

> I don't have any information beyond what's in this CDC publication that I had previously shared with you.
>
> ---
>
> **From:** Wells, Eden (DHHS)
> **Sent:** Friday, October 30, 2015 2:18 PM
> **To:** Dykema, Linda D. (DHHS)
> **Subject:** Fwd: Breast feeding and maternal lead exposure
>
> Sent from my iPhone
>
> Begin forwarded message:
>
> > **From:** "Valacak, Mark" <MVALACAK@gchd.us>
> > **Date:** October 30, 2015 at 1:53:22 PM EDT
> > **To:** "Wells, Eden (DHHS)" <WellsE3@michigan.gov>, Laura Carravallah <Laura.Carravallah@hc.msu.edu>
> > **Cc:** Lawrence Reynolds <PPI>, <PPI>, Peter Levine <plevine@gcms.org>
> > **Subject: RE: Breast feeding and maternal lead exposure**
> >
> > In adults when we see high levels it is generally an occupational exposure and inhalation of lead fumes in industrial exposure settings like battery manufacturing, lead smelting, and stained lead glass.
> >
> > A couple of factors are important to remember when we are talking about lead exposure in adults versus children. Absorptions rates from gastrointestinal exposure are lower in adults versus children. So where a toddler might absorb about 50%, absorption rates decline in adults to 3-10%. About 90% of lead will end up in the bone where it mimics calcium. It causes less harm there then if it went to soft tissues like the liver or kidneys. The problem is that under circumstances that cause calcium mobilization, lead stored in the bone may remobilize and circulate in the blood, elevating blood lead levels. The mobilization of stored lead with pregnancy, menopause, and aging is a cause for concern. So to help mitigate that there should be an emphasis on good nutrition and a calcium rich diet. Pregnant and breastfeeding woman should be sure to take their vitamins to minimize calcium mobilization from the bones.
> >
> > Reinforcing these messages would help minimize exposure.

Mark Valacak, MPH, Health Officer
Genesee County Health Department,

630 S. Saginaw St. Suite 4 Flint, MI 48502-1540

Phone 810-257-3588 Fax 810 257-3147
E-mail mvalacak@gchd.us

Public Health

Please consider the environment before printing this e-mail.

"There are two lasting bequests we can hope to give our children: one is roots; the other is wings." Hodding Carter

*NOTICE: This e-mail, including attachments, is intended for the exclusive use of the addressee and may contain proprietary, confidential or privileged information. If you are not the intended recipient, any disclosure, use, distribution, copying, or taking of any action in reliance of the contents of this e-mail is strictly prohibited. If you have received this e-mail in error, please notify me via e-mail and permanently delete the original and destroy all copies. Thank you.

For a copy of the Health Department's Notice of Information Practices, contact the Health Department or visit the Health Department's website at http://www.gchd.us/

From: Wells, Eden (DHHS) [mailto:WellsE3@michigan.gov]
Sent: Friday, October 30, 2015 12:02 PM
To: Laura Carravallah
Cc: Lawrence Reynolds; [PPI]; Peter Levine; Valacak, Mark
Subject: Re: Breast feeding and maternal lead exposure

Looping I our toxicologist, as we ha e discussed this. Note that anyone should be using filtered or bottled water now, so that the issue of which house and which risk should already be addressed. Also- we do not have any data supporting adults with blood lead levels that high (Off top of my head) and none have been in the 40's or higher since Long before April 2014.

Regardless, Linda and I had talked about breastfeeding moms... She can help.

Eden

Sent from my iPhone

On Oct 30, 2015, at 11:33 AM, Laura Carravallah <Laura.Carravallah@hc.msu.edu> wrote:

> Thank you for your quick answer!
>
> This makes sense for pregnant moms, as there is no choice as to how the baby will get its nourishment. However, for breastfeeding moms in households in which filters will be provided, **do we know that breast milk (with possible higher maternal BLLs secondary to bone release from chronic exposure) is preferable to filtered tap water?** Does anybody know what the range of breast milk lead levels are in women who have BLLs around 30 or 35? In the data that Dr. Reynolds and I

looked at (previously attached) the BLLs didn't go that high, and it said that the breast milk levels fluctuated.

In the Ettinger paper the highest maternal BLL with a breast milk sample was 29.9 (Table 1), which is less than the level of 40 recommended in the MDHHS handout. The article said that "Breast milk lead expressed as percentage of maternal blood lead ranged from 0.4 to 9.2% (mean = 1.6%, SD = 1.2%)" -- p 929. The means a less an issue than the outliers, considering some of the extremely high water lead levels that have been found in the city and also the difficulty of predicting which houses might be most at risk.

I'm not sure if there is other, better data out there that might shed some light on this? Also, your attached pamphlet does deflect patients back to their doctors, but I'm not sure that those of us in the GCMS feel that we have adequate information to advise people further.

Laura

From: Wells, Eden (DHHS) [mailto:WellsE3@michigan.gov]
Sent: Friday, October 30, 2015 11:02 AM
To: Laura Carravallah
Cc: 'Lawrence Reynolds'; 'PPI'; Peter Levine; Mark Valacak
Subject: RE: Breast feeding and maternal lead exposure

Good morning,

Note that MDHHS/GCHD is about to send out (by emails and hopefully you all can disseminate at will to your colleagues?) a provider letter with provider resources, which will also all be on the webpage we are using. Parent letters with resources for them will be going out in hard copy through schools and daycares---all of this will be occurring in the next couple of days. Note that there is already a flyer on the Michigan.gov/flintwater webpage for pregnant moms and breastfeeding---note that, like all others including children, treatment only occurs for levels over 45, but removing lead from any environmental sources is important at all times.

We have already gotten information regarding pregnancy and lead levels from CDC: (Mary Jean Brown): "Pregnant women who work with lead should be tested (occupational, hobby, shooting ranges, renovation exposures). Worried women who want to be tested should not be refused but if their only exposure is the water the only intervention is to stop drinking the water from the river and it is my understanding that that has been accomplished. There is no medical treatment for pregnant women (chelation therapy) in the first trimester because of teratogenic concerns. At blood lead levels >=45 in later trimesters, chelation may be considered to protect the fetus but should only be done in consultation with someone familiar with chelation in early childhood and high risk pregnancies. A general alert to area OB/Gyn's and maternity clinics that patients should not drink water from the river, would be advisable."

Eden

Eden V. Wells, MD, MPH, FACPM
Chief Medical Executive
Michigan Department of Health and Human Services
201 Townsend St., 5th Floor CVB
Lansing, MI 48913

From: Laura Carravallah [mailto:Laura.Carravallah@hc.nsu.edu]
Sent: Friday, October 30, 2015 10:51 AM
To: Wells, Eden (DHHS)
Cc: 'Lawrence Reynolds'; '[redacted]'; Peter Levine; Mark Valacak
Subject: Breast feeding and maternal lead exposure

Dear Eden,

Our county medical society is in the process of drafting a "fact sheet" specifically for our physician members to try and help them help their patients. We are endeavoring to keep the content consistent with the other messaging going out, but to use as many channels as we can, and to make this very easy for physicians to digest (i.e. brief and pertinent to their patients). I am attaching our draft to this email, as well as some of the articles that we have found.

One of the questions that came up is what to tell lead-exposed mothers who are pregnant or breastfeeding. We have pulled a number of articles that talk about lower maternal BLLs, but these are usually in the context of lower lead levels in drinking water. We are not sure if these recommendations still hold in our situation: the water is variable, the mothers are not routinely tested (should they be?), and lead is released from maternal bone for a long time. We also read that the lead levels fluctuate. All of this is to say, we are not certain that breastfeeding is safer than using filtered water in our situation (though it pains us as pediatricians and family docs to suggest this) and also, what the safe BLL is for a mother? The MDHHS recommendation of 40 in the recent Lead Week Toolkits seemed high, considering the fluctuating BLL and bone storage.

You had previously asked your toxicologist about the copper levels for us, and I was hoping you might pose this question to them as well.

Thank you for your help!

Laura Carravallah, MD

<deq-flintwater-breastfeedingandlead_503281_7.pdf>

<leadandpregnancy CDC 2010.pdf>

From: Wells, Eden (DHHS)
Sent: Friday, October 30, 2015 5:05 PM
To: Lasher, Geralyn (DHHS);Moran, Susan (DHHS);Robinson, Mikelle (DHHS);Hertel, Elizabeth (DHHS);Becker, Timothy (DHHS);Lyon, Nick (DHHS)
Subject: Re: need a phone chat ...

We cannot wait that long to get a message out- we can definitely provide some descriptive epi ---the data does not need a full in depth analysis to present useful information.

E

From: Lasher, Geralyn (DHHS)
Sent: Friday, October 30, 2015 4:19 PM
To: Moran, Susan (DHHS); Robinson, Mikelle (DHHS); Hertel, Elizabeth (DHHS); Wells, Eden (DHHS); Becker, Timothy (DHHS); Lyon, Nick (DHHS)
Subject: Re: need a phone chat ...

Mikelle And I just discussed and she is going to find out what exactly has robe done to get the results completed and what the real timeframe is.

We discussed how unfortunate it was that this information was not shared internally first so we could have the appropriate information BEFORE it was shared externally so we could have these questions answered.

Sent from my iPhone

On Oct 30, 2015, at 3:19 PM, Lasher, Geralyn (DHHS) <lasherg@michigan.gov> wrote:

> Is this an accurate timeframe?
>
> ---
>
> **From:** Wurfel, Brad (DEQ)
> **Sent:** Friday, October 30, 2015 3:00 PM
> **To:** Lasher, Geralyn (DHHS) <lasherg@michigan.gov>
> **Subject:** RE: need a phone chat ...
>
> DHHS called into the weekly meeting in Flint today.
> Our folks who were in the room got it from Linda during the meeting that the DHHS blood lead data won't be released until **Nov 9**.
> b

From: Wells, Eden (DHHS)
Sent: Friday, October 30, 2015 6:01 PM
To: Mona Hanna-Attisha
Cc: Dean Sienko
Subject: Re: Toxic Stress resources follow-up

These are fantastic- thanks, Mona!

Sent from my iPhone

On Oct 30, 2015, at 2:11 PM, Mona Hanna-Attisha <MHanna1@hurleymc.com> wrote:

> Sorry for the delay. Just finished my presentations in chilly Marquette and had a chance to send you toxic stress info. (Dean, I did not have a chance to find the cinnamon roll.)
>
> 1) Attached is my Marquette presentation, Healthy Communities Start with Healthy Kids, which is briefly about toxic stress and incorporates the lead issue.
>
> 2) Also below are links to two of the foundational articles in *Pediatrics* about Toxic Stress.
> http://pediatrics.aappublications.org/content/pediatrics/early/2011/12/21/peds.2011-2662.full.pdf
> http://pediatrics.aappublications.org/content/pediatrics/early/2011/12/21/peds.2011-2663.full.pdf
>
> 3) An incredible website for more toxic stress info is run by Dr Shonkoff at the Harvard Center on the Developing Child. I highly recommend it. http://developingchild.harvard.edu
>
> 4) Lastly, below is a link to my MSU Rx talk from last year (TED-like talk) which is also about toxic stress and pediatric prevention work in Flint. https://vimeo.com/user21837743/review/107582466/b4c78211ef
>
> Best, Mona
>
> Mona Hanna-Attisha MD MPH
>
> Director, Pediatric Residency Program
>
> Hurley Children's Hospital at Hurley Medical Center
>
> Assistant Professor, Department of Pediatrics and Human Development
>
> Michigan State University College of Human Medicine
>
> Office: 810-262-7257
>
> mhanna1@hurleymc.com

<Pediatrics-2012-Shonkoff-e232-46.pdf>

<MSU UP Healthy Communities Start With Healthy Kids 103015.pdf>

From: Wells, Eden (DHHS)
Sent: Friday, October 30, 2015 6:01 PM
To: Dean Sienko
Cc: Mona Hanna-Attisha
Subject: Re: Toxic Stress resources follow-up

You have the power....

Sent from my iPhone

On Oct 30, 2015, at 2:18 PM, Dean Sienko <Dean.Sienko@hc.msu.edu> wrote:

> Thanks, Mona. I wonder if they took the cinnamon rolls off the menu???
>
> Have a safe trip back!
>
> Dean
>
> ---
>
> **From:** Mona Hanna-Attisha [mailto:MHanna1@hurleymc.com]
> **Sent:** Friday, October 30, 2015 2:09 PM
> **To:** wellse3@michigan.gov; Dean Sienko
> **Subject:** Toxic Stress resources follow-up
>
> Sorry for the delay. Just finished my presentations in chilly Marquette and had a chance to send you toxic stress info. (Dean, I did not have a chance to find the cinnamon roll.)
>
> 1) Attached is my Marquette presentation, Healthy Communities Start with Healthy Kids, which is briefly about toxic stress and incorporates the lead issue.
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>
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>
> 4) Lastly, below is a link to my MSU Rx talk from last year (TED-like talk) which is also about toxic stress and pediatric prevention work in Flint. https://vimeo.com/user21837743/review/107582466/b4c78211ef
>
> Best, Mona
>
> Mona Hanna-Attisha MD MPH
>
> Director, Pediatric Residency Program

Hurley Children's Hospital at Hurley Medical Center

Assistant Professor, Department of Pediatrics and Human Development

Michigan State University College of Human Medicine

Office: 810-262-7257

mhanna1@hurleymc.com

Message

From: Wells, Eden (DHHS) [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=F3A10E41478E4A4E9E9595DF85DCCF97-WELLS EDEN]
Sent: 10/30/2015 10:01:34 PM
To: Mona Hanna-Attisha [MHanna1@hurleymc.com]
Subject: Re: Provider Letter and Attachments

Yay!!!

Sent from my iPhone

On Oct 30, 2015, at 2:22 PM, Mona Hanna-Attisha <MHanna1@hurleymc.com> wrote:
thanks. just sent to all residents, hurley peds faculty and hurley privileged docs.

Mona Hanna-Attisha MD MPH

Director, Pediatric Residency Program

Hurley Children's Hospital at Hurley Medical Center

Assistant Professor, Department of Pediatrics and Human Development

Michigan State University College of Human Medicine

Office: 810-262-7257

mhanna1@hurleymc.com

From: Wells, Eden (DHHS) [WellsE3@michigan.gov]
Sent: Friday, October 30, 2015 2:17 PM
To: Mona Hanna-Attisha; PPI; plevine@gcms.org; Laura.Carravallah@hc.msu.edu
Subject: Fwd: Provider Letter and Attachments
Please distribute far and wide amongst your provider colleagues.

Sent from my iPhone

Begin forwarded message:
From: "Minicuci, Angela (DHHS)" <MinicuciA@michigan.gov>
Date: October 30, 2015 at 1:59:49 PM EDT
To: "Valacak, Mark" <MVALACAK@gchd.us>, "Sandlin, Mary" <MSANDLIN@gchd.us>
Cc: "Wells, Eden (DHHS)" <WellsE3@michigan.gov>, "Eisner, Jennifer (DHHS)" <EisnerJ@michigan.gov>, "Lasher, Geralyn (DHHS)" <lasherg@michigan.gov>
Subject: Provider Letter and Attachments
Good afternoon,

Attached is the final letter and attachments for the providers for distribution.

Thank you,

Angela Minicuci
Office of External Relations and Communications
Michigan Department of Health and Human Services
Office: (517) 241-2112
Mobil PPI
minicucia@michigan.gov
www.michigan.gov/mdhhs

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From: Wells, Eden (DHHS)
Sent: Friday, October 30, 2015 7:09 PM
To: Dykema, Linda D. (DHHS)
Cc: Miller, Corinne (DHHS)
Subject: Re: need a phone chat ...

Ok- I totally get that- but even if we can get something pretty aggregate that could help- something we would never need to back off in- this data set sounds quite complex!!

No more talk this weekend about it. Rest- you deserve it- as does your whole team!!!!

Sent from my iPhone

On Oct 30, 2015, at 6:31 PM, Dykema, Linda D. (DHHS) <DykemaL@michigan.gov> wrote:

> Patty just got the data this morning. It's not straight forward as it appears that some kids who were tested some time ago have been recently retested. If we rush the analysis, we run the risk of again having to backtrack and admit mistakes. It might be possible to have preliminary data sooner than the 9th but I heard the director say do it right not fast. Meanwhile I can't even get anyone to tell me what the front office wants. If I could get some insight on the minimal data requested and a reasonable date, we can try to meet that.
>
> Sent from my iPhone
>
> On Oct 30, 2015, at 5:05 PM, Wells, Eden (DHHS) <WellsE3@michigan.gov> wrote:
>
> > FYI,
> >
> > I do think we could get some descriptive stats out before the 9th?
> >
> > ---
> > **From:** Wells, Eden (DHHS)
> > **Sent:** Friday, October 30, 2015 5:04 PM
> > **To:** Lasher, Geralyn (DHHS); Moran, Susan (DHHS); Robinson, Mikelle (DHHS); Hertel, Elizabeth (DHHS); Becker, Timothy (DHHS); Lyon, Nick (DHHS)
> > **Subject:** Re: need a phone chat ...
> >
> > We cannot wait that long to get a message out- we can definitely provide some descriptive epi ---the data does not need a full in depth analysis to present useful information.
> >
> > E

Is this an accurate timeframe?

From: Wurfel, Brad (DEQ)
Sent: Friday, October 30, 2015 3:00 PM
To: Lasher, Geralyn (DHHS) <lasherg@michigan.gov>
Subject: RE: need a phone chat ...

DHHS called into the weekly meeting in Flint today.
Our folks who were in the room got it from Linda during the meeting that the DHHS blood lead data won't be released until **Nov 9**.
b

From: Wells, Eden (DHHS)
Sent: Thursday, November 05, 2015 1:59 PM
To: Moran, Susan (DHHS)
Subject: Re: Flint Lead

Sounds good. I think getting I contact with Mary Jean and also perhaps Judy Monroe or others would help to ensure that MDHHS working with CDC... Sounds like Kildee talked with Friedman last week.

Eden

Sent from my iPhone

On Nov 5, 2015, at 1:04 PM, Moran, Susan (DHHS) <MoranS@michigan.gov> wrote:

> Just trying to figure out where I should be, but not duplicate our efforts. I will send Dean an email.
>
> ---
>
> **From:** Wells, Eden (DHHS)
> **Sent:** Thursday, November 05, 2015 12:28 PM
> **To:** Moran, Susan (DHHS)
> **Subject:** Re: Flint Lead
>
> I can ask Mona and Dean in in am -- an email to Dean from you may not hurt? We could also just alternate...?
>
> And I agree we need to be on top of ANY CDfV visit- I got CCd that I would be invited to a meeting if Mary Jean came; but I would not expect a CDC person would visit without notice to the State Health Officer or State Epi, but stranger things have happened!
>
> Sent from my iPhone
>
> On Nov 5, 2015, at 12:19 PM, Moran, Susan (DHHS) <MoranS@michigan.gov> wrote:
>
> > I want to be included in any local CDC efforts, and how do I insert myself into the Flint Innovation Team- do I send Mona a note? Or Dean?
> >
> > ---
> >
> > **From:** Wells, Eden (DHHS)
> > **Sent:** Thursday, November 05, 2015 11:54 AM
> > **To:** Brown, Mary Jean (CDC/ONDIEH/NCEH)
> > **Cc:** Moran, Susan (DHHS)
> > **Subject:** Re: Flint Lead
> >
> > Just a follow-up, Mary Jean and Sue,
> >
> > Our CLPP lead, nancy, has the contacts I was looking for: FYI only-
> >
> > Evidence-based home visiting programs that have evidence of effectiveness impacting child development, which could include Healthy Families America, Early Head Start, Parents As Teachers.

2. Early On services (Michigan's name for services under Part C of IDEA).
3. High quality child care
4. Special Education services

MDHHS is generally the lead on #1, while #2-4 are managed within the MDE Office of Great Start, under Susan Broman (Deputy Superintendent). Under Susan, the contacts would be Renee DeMars-Johnson (infant/toddler programs) and Richard Lower (preschool programs), and Lisa Brewer-Walraven (child care).

Hope that helps -- and I've added a few notes below, not sure if the additional info is what you are looking for, feel free to skip that part!

Nancy

From: Wells, Eden (DHHS)
Sent: Thursday, November 5, 2015 10:46 AM
To: Brown, Mary Jean (CDC/ONDIEH/NCEH)
Cc: Dykema, Linda D. (DHHS); Hertel, Elizabeth (DHHS); Moran, Susan (DHHS)
Subject: Flint Lead

Good morning, Mary Jean,

Dr. Reynolds forward the great CDC report you authored about Educational Needs for Children Affected by Lead from earlier this year. I am looping in someone from our Michigan Department of Education to be a state point person regarding this report, and I wondered if you already had a contact there.

Also, I hadn't gotten any follow-up but had heard you may be coming to Flint at some point, and I am hoping that we can connect.

Warm Regards,

Eden

Eden V. Wells, MD, MPH, FACPM
Chief Medical Executive
Michigan Department of Health and Human Services
201 Townsend Street, 5th Floor CVB
Lansing, MI 48913
Phone: 517-335-8011
wellse3@michigan.gov

From: Wells, Eden (DHHS)
Sent: Monday, November 2, 2015 10:01 AM
To: Mona Hanna-Attisha
Subject: RE: Kildee and CDC

Sounds good!

From: Mona Hanna-Attisha [mailto:MHanna1@hurleymc.com]
Sent: Monday, November 02, 2015 9:54 AM
To: Wells, Eden (DHHS)
Subject: FW: Kildee and CDC

Eden, I have given your name (and Dean's) for a potential meeting with CDC folks....

On Oct 30, 2015, at 6:18 PM, Dickinson, Jordan <Jordan.Dickinson@mail.house.gov> wrote:

> Mona,
>
> I met with the CDC today and they were very willing to help. Mary Jean Brown, Chief of CDC Lead Poisoning Prevention Program, has offered to come to Flint and have initial discussions about this. She has over 30 years' experience and seemed very willing to help. She asked that I get a list together of people from medical community that she should reach out to about helping to shape the public health system in the Flint area.
>
> So far I have Mark Valacak, Dr. Lawrence and Kirk Smith. Is there anyone else that you think should be included? If you do, can you give me their email addresses?
>
> Thanks,
>
> Jordan

From: Mona Hanna-Attisha [mailto:MHanna1@hurleymc.com]
Sent: Friday, October 30, 2015 7:09 AM
To: Dickinson, Jordan; edwardsm@vt.edu
Subject: Kildee and CDC

Jordan,

Rep Kildee mentioned the other day that he spoke with the CDC Director about what was going on in Flint and that the CDC director was aware and was following the situation.

I think there is an incredible opportunity here for the CDC to help us build a model public health program. Ok, so our entire population has been exposed to this neurotoxin, now what do we do? We could do nothing and wait 10-20 years and see the impact of lead poisoning, or we can try to defy the odds and build an innovative model public health program that buffers the exposure. We have created something called FLINT - Flint Lead INNovation Team - that is trying to do just that. Drawing on the burgeoning science of toxic stress and developmental neuroscience, we hope to use short term and long term interventions that can build resilience in our kids. Things like nutrition, early head start, medical homes, home visiting programs, parenting, etc. Of course, we have no money or resources to do any of this yet. I can share more details if you like.

So do you think we should also contact the CDC dude? Do you know what Kildee asking him for specifically?

thanks, mona

Mona Hanna-Attisha MD MPH
Director, Pediatric Residency Program
Hurley Children's Hospital at Hurley Medical Center
Assistant Professor, Department of Pediatrics and Human Development
Michigan State University College of Human Medicine
Office: 810-262-7257
mhanna1@hurleymc.com

From: Wells, Eden (DHHS)
Sent: Saturday, November 07, 2015 9:12 AM
To: Moran, Susan (DHHS)
Subject: Re: CDC Request for Assistance

Thanks, Sue. Matt says hello!

Sent from my iPhone

On Nov 7, 2015, at 8:34 AM, Moran, Susan (DHHS) <MoranS@michigan.gov> wrote:

> We are getting nudged from a couple different fronts- including Rep Kildee office and the Flint innovation team— to engage with CDC and ask for assistance/support as part of the health response to Flint Water situation. In order for CDC to engage with state, a request must be made by state, ie. From the State Health Official, State Environmental Director, State Epidemiologist.
>
> When I was in Salt Lake City for annual ASTHO meeting, I did alert Judy Monroe, Deputy Director, Office for State, Tribal, Local, and Territorial Support (OSTLTS) about Flint water situation. Judy is a key advisor to the CDC director for the support of US health departments, tribal nations, and insular areas. She oversees key activities and technical assistance that support the nation's health departments and the public health system, and would be my first point of contact if we were to seek CDC assistance.
>
> The CDC is an invaluable resource and it would be very beneficial to have their support and expertise, and who knows, possibly additional funding, as we address both short term and long term consequences of the lead exposure. **Do we all agree that Michigan should reach out to the CDC at this time? Would you like me to work with Eden to draft our request to Judy for your review?**
>
> See excerpts below from recent communication between Dr Hanna Attsiha and Rep Kildee office.
>
> On Oct 30, 2015, at 6:18 PM, Dickinson, Jordan <Jordan.Dickinson@mail.house.gov> wrote:
> Mona,
>
> I met with the CDC today and they were very willing to help. Mary Jean Brown, Chief of CDC Lead Poisoning Prevention Program, has offered to come to Flint and have initial discussions about this. She has over 30 years' experience and seemed very willing to help. She asked that I get a list together of people from medical community that she should reach out to about helping to shape the public health system in the Flint area.
>
> So far I have Mark Valacak, Dr. Lawrence and Kirk Smith. Is there anyone else that you think should be included? If you do, can you give me their email addresses?
>
> Thanks,
>
> Jordan
>
> Per Dr Hanna Attisha:

Rep Kildee mentioned the other day that he spoke with the CDC Director about what was going on in Flint and that the CDC director was aware and was following the situation.

I think there is an incredible opportunity here for the CDC to help us build a model public health program. Ok, so our entire population has been exposed to this neurotoxin, now what do we do? We could do nothing and wait 10-20 years and see the impact of lead poisoning, or we can try to defy the odds and build an innovative model public health program that buffers the exposure. We have created something called FLINT - Flint Lead INNovation Team - that is trying to do just that. Drawing on the burgeoning science of toxic stress and developmental neuroscience, we hope to use short term and long term interventions that can build resilience in our kids. Things like nutrition, early head start, medical homes, home visiting programs, parenting, etc. Of course, we have no money or resources to do any of this yet. I can share more details if you like.

From: Wells, Eden (DHHS)
Sent: Tuesday, November 10, 2015 3:48 PM
To: Lasher, Geralyn (DHHS);Hertel, Elizabeth (DHHS)
Subject: Fwd: [Flint Water Advisory Task Force] FW: [DEQ] Freeman Elementary water testing shows lead exposure limited to fixtures

Sent from my iPhone

Begin forwarded message:

> **From:** Laura Sullivan <lsulliva@kettering.edu>
> **Date:** November 10, 2015 at 3:31:45 PM EST
> **To:** Lawrence Reynolds <lrey52@gmail.com>
> **Cc:** Flint Water Advisory Task Force <U73EC5B7B3104P95595780-reply@obm.basecamphq.com>, Mona Hanna-Attisha <monahannaattisha@gmail.com>, Peter Levine <plevine@gcms.org>, Kirk Smith <ksmith@flint.org>, Laura Caravallah <Laura.Carravallah@hc.msu.edu>, "Wells, Eden (DHHS)" <WellsE3@michigan.gov>, Marc Edwards <edwardsm@vt.edu>
> **Subject: Re: [Flint Water Advisory Task Force] FW: [DEQ] Freeman Elementary water testing shows lead exposure limited to fixtures**
>
> It would seem that this is an attempt to place responsibility going forward on the shoulders of these schools. Damage sustained to these fixtures and plumbing occurred while the corrosive Flint river water ran through them. Replacing plumbing and fixtures must not be a financial burden that schools ... or residents .... should bear.
>
> I am so weary of the MDEQ and LAN "diverting scrutiny." How in the world could anyone ever hope to rebuild trust with these attitudes persisting?
>
> On Tuesday, November 10, 2015, Lawrence Reynolds <lrey52@gmail.com> wrote:
> If EBLLs are due to sources other than water,why did the frequency double only in Flint and not other areas in Genesee County.Why in wards where they were already high before the change in water source? Or did paint chips become more tasty on the inside of Flint only but not across the street on the fringes ?
> Is the DEQ working with MDHHS and local epidemiologists or just their chemists ?
> Why are BLLs not higher in the catchment areas for the schools with the higher WLLs?
> Are there mitigating factors in the tested schools's student population ?
> Check out BLLs in children under 2 or three before BLLs decline and they start school
> Does this mean lead in city water is ok ?
> We have repeatedly stated that the powder formula fed children under 6-12 months of age are at the greatest risk and the least tested. Add pregnant and breast feeding women with adults with decreased renal function or failure.
> This appears to be an attempt to divert scrutiny or , at best , an answer to another question .The decision to not monitor schools until recently is in itself problematic .There has always been the

school problem ,which is a separate issue,perhaps exacerbated by water quality.

On Monday, November 9, 2015, Eric Rothstein <notifications@ohm.basecamphq.com> wrote:

Reply ABOVE THIS LINE to add a comment to this message

Project: Flint Water Advisory Task Force
Company: Flint Water

Eric Rothstein posted a new message:
FW: [DEQ] Freeman Elementary water testing shows lead exposure limited to fixtures

FYI – provided by Madhu Anderson, MDEQ

From: Michigan Department of Environmental Quality [mailto:MIDEQ@govsubscriptions.michigan.gov]
Sent: Monday, November 09, 2015 3:58 PM
To: Anderson, Madhu (DEQ)
Subject: [DEQ] Freeman Elementary water testing shows lead exposure limited to fixtures

Having trouble viewing this email? View it as a Web page.

[Bookmark and Share]

[DEQ Header]

Freeman Elementary water testing shows lead exposure limited to fixtures

Experts release water testing results on schools and homes in Flint

Nov. 9, 2015

For More Information:
George Krisztian, 517-284-6719, krisztiang@michigan.gov

As part of Gov. Rick Snyder's action plan for Flint drinking water, the DEQ today released water testing data from nearly 400 homes and businesses in Flint as well as comprehensive sampling results from Freeman Elementary School.

Both sets of data indicate the problems with lead are localized to individual buildings or even individual faucets, rather than system-wide issues.

"The results from this data underline the need for water testing at all homes, businesses, schools and other buildings in Flint," said George Krisztian, the DEQ's Flint Action Plan Coordinator. "Problems with lead exposure appear to be localized to individual service lines or plumbing fixtures, and we want to see all families in Flint take advantage of free water testing from the state."

Freeman Elementary testing results

At Freeman Elementary, 31 faucets were tested using a series of four samples each. Twenty-two outlets did not show elevated lead exposure, but nine faucets came back with initially high results.

Those nine outlets involve brass components, indicating the problem involves the fixtures or plumbing immediately surrounding the fixture. When the faucets and fountains were operated for several minutes, lead levels fell significantly, in some cases to non-detectable levels.

Additional testing designed to look deep into the school's plumbing did not suggest larger, systemic issues.

Freeman Elementary has several options for remedying the issues at these nine faucets and fountains. The school can elect not to use those particular fountains, or implement a formalized flushing regimen. The sampling results indicate that for all but one tap, a 3- to 4-minute flushing period each morning would drastically reduce lead exposure.

For a permanent solution, the school should opt to replace the faucets and fountains of concern.

"The safety and health of our students are our primary concern at Flint Community Schools, so we will start work as soon as possible to replace faucets, aerators and other related components where high lead levels were detected," FCS Superintendent Bilal Tawwab said. "Once those fixes have been made, the DEQ has offered to provide additional testing of the water at Freeman Elementary to ensure the water from every sample is safe for our students. Flint Community Schools appreciates the efforts by the DEQ, working with all stakeholders to make sure our water continues to be tested and that our students have access to safe, clean drinking water."

For Freeman Elementary's complete sampling results and more information about how sampling was conducted, visit www.michigan.gov/flintwater.

The DEQ and the DLARA also have conducted sampling at other Flint schools, and results will soon be available on the DEQ's website. Additionally, the state will test every other school in the Flint Community Schools district, as well as any school or daycare in the city. Interested schools and daycare centers should contact George Krisztian at krisztiang@michigan.gov.

Homeowner and other customer-requested testing results

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This message was sent to Chris Kolb, Dana Pulver, Deborah Higgins, Eric Rothstein, Ken Sikkema, Larry Reynolds, Matthew Davis, and Tracey Poteat.

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--
Lawrence Reynolds

From: Wells, Eden (DHHS)
Sent: Tuesday, November 10, 2015 4:27 PM
To: Lyon, Nick (DHHS)
Cc: Moran, Susan (DHHS)
Subject: Re: `FW: Flint water situation

Executive Director of MI Academy of Pediatrics

Sent from my iPhone

On Nov 10, 2015, at 4:11 PM, Lyon, Nick (DHHS) <LyonN2@michigan.gov> wrote:

> Do you know who this is?
>
> ---
>
> **From:** Lyon, Nick (DHHS)
> **Sent:** Monday, November 09, 2015 3:11 PM
> **To:** Lyon, Nick (DHHS) <LyonN2@michigan.gov>
> **Subject:** Fwd: Flint water situation
>
> Begin forwarded message:
>
> > **From:** Denise Sloan <dsloan9@gmail.com>
> > **Date:** October 1, 2015 at 8:08:25 PM EDT
> > **To:** "Nick Lyon, (DCH)" <LyonN2@michigan.gov>
> > **Subject: Flint water situation**
> >
> > Nick,
> > Please see our call to state, Genesee officials on lead levels in kids in Flint due to the water situation. This is serious to pediatricians and to the children we serve.
> > We need an aggressive action from MDHHS and local folks .
> > Please let me know how we might collaborate.
> > Thanks.
> > Denise

From: Wells, Eden (DHHS)
Sent: Wednesday, November 11, 2015 9:16 AM
To: Hertel, Elizabeth (DHHS)
Cc: Lasher, Geralyn (DHHS)
Subject: Re: [Flint Water Advisory Task Force] FW: [DEQ] Freeman Elementary water testing shows lead exposure limited to fixtures

Thanks-I will get a bunch of other to-do's done and see how far I get---otherwise later this week, Eden

---

From: Hertel, Elizabeth (DHHS)
Sent: Wednesday, November 11, 2015 5:54 AM
To: Wells, Eden (DHHS)
Cc: Lasher, Geralyn (DHHS)
Subject: Re: [Flint Water Advisory Task Force] FW: [DEQ] Freeman Elementary water testing shows lead exposure limited to fixtures

I can talk about this today if you need.

Sent from my iPad

On Nov 10, 2015, at 3:28 PM, Wells, Eden (DHHS) <WellsE3@michigan.gov> wrote:

> FYI-I am not sure how or if to answer any of these---seems better to be part of a conversation--
>
> E
>
> ---
>
> **From:** Lawrence Reynolds <lrey52@gmail.com>
> **Sent:** Tuesday, November 10, 2015 3:12 PM
> **To:** Flint Water Advisory Task Force; Mona Hanna-Attisha; Peter Levine; Kirk Smith; Laura Caravallah; Laura Sullivan; Wells, Eden (DHHS); Marc Edwards
> **Subject:** Re: [Flint Water Advisory Task Force] FW: [DEQ] Freeman Elementary water testing shows lead exposure limited to fixtures
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Reply ABOVE THIS LINE to add a comment to this message

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From: Michigan Department of Environmental Quality [mailto:MIDEQ@govsubscriptions.michigan.gov]
Sent: Monday, November 09, 2015 3:58 PM
To: Anderson, Madhu (DEQ)
Subject: [DEQ] Freeman Elementary water testing shows lead exposure limited to fixtures
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For More Information:
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Sent: Wednesday, November 11, 2015 9:57 AM
To: Lasher, Geralyn (DHHS);Hertel, Elizabeth (DHHS)
Subject: Fw: [Flint Water Advisory Task Force] FW: [DEQ] Freeman Elementary water testing shows lead exposure limited to fixtures

sticking to water

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Cc: Flint Water Advisory Task Force; Mona Hanna-Attisha; Kirk Smith; Laura Caravallah; Laura Sullivan; Wells, Eden (DHHS); Marc Edwards
Subject: Re: [Flint Water Advisory Task Force] FW: [DEQ] Freeman Elementary water testing shows lead exposure limited to fixtures

The message regarding lead paint from some in the City of Flint and the DEQ in yesterdays meeting was purely an effort to mitigate their sense of responsibility. We need to make sure that stops. It is not even remotely the truth.

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Peter A. Levine, MPH
Executive Director
Genesee County Medical Society
4438 Oak Bridge Dr. Suite B
Flint, Mi. 48532
Phone:810-7339925
Fax:810-2303737
email:plevine@gcms.org

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From: Wells, Eden (DHHS)
Sent: Wednesday, November 11, 2015 10:06 AM
To: Lasher, Geralyn (DHHS)
Cc: Hertel, Elizabeth (DHHS)
Subject: Fw: [Flint Water Advisory Task Force] FW: [DEQ] Freeman Elementary water testing shows lead exposure limited to fixtures

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Cc: Lawrence Reynolds; Flint Water Advisory Task Force; Kirk Smith; Laura Caravallah; Laura Sullivan; Wells, Eden (DHHS); Marc Edwards
Subject: Re: [Flint Water Advisory Task Force] FW: [DEQ] Freeman Elementary water testing shows lead exposure limited to fixtures

Mona, that has to be our message

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Peter A. Levine, MPH
Executive Director
Genesee County Medical Society
4438 Oak Bridge Dr. Suite B
Flint, Mi. 48532
Phone:810-7339925
Fax:810-2303737
email:plevine@gcms.org

On Tue, Nov 10, 2015 at 3:29 PM, Mona Hanna-Attisha <MHanna1@hurleymc.com> wrote:
This is ridiculous. The way water lead testing is done by the state and city purposefully limits lead in water. And as recommended yesterday, the preflushing for home testing should be stopped.

In addition, we did not screen blood lead for school age kids nor infants at greatest risk.

This is an attempt to minimize the problem.

Mona Hanna-Attisha MD MPH FAAP
Director, Pediatric Residency Program
Hurley Children's Hospital
Michigan State University

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Nov. 9, 2015

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This email was sent to andersonm30@michigan.gov using GovDelivery, on behalf of: Michigan Department of Environmental Quality · Constitution Hall · 525 West Allegan Street · PO Box 30473 · Lansing, MI 48909 · 800-662-9278

This message was sent to Chris Kolb, Dana Pulver, Deborah Higgins, Eric Rothstein, Ken Sikkema, Larry Reynolds, Matthew Davis, and Tracey Poteat.

Stop receiving emails when comments are posted to this message. Prefer plain text emails?

....
Lawrence Reynolds

From: Wells, Eden (DHHS)
Sent: Thursday, November 12, 2015 10:23 AM
To: Peeler, Nancy (DHHS)
Cc: LaRocco, Toni;GJOHNSON@gchd.us;Brickey, Tamara;Moran, Susan (DHHS);Lasher, Geralyn (DHHS);Valacak, Mark
Subject: Re: Following up the hard-to-find

Thanks, Nancy, all good thoughts

From: Peeler, Nancy (DHHS)
Sent: Wednesday, November 11, 2015 10:19 PM
To: Wells, Eden (DHHS)
Cc: LaRocco, Toni; GJOHNSON@gchd.us; Brickey, Tamara; Moran, Susan (DHHS); Lasher, Geralyn (DHHS); Valacak, Mark
Subject: Re: Following up the hard-to-find

Some additional ideas:
--The health department has some great tools available that could be used to help locate families - it can check the WIC records, and/or check MCIR to see if there is a new address listed.
--Between GCHD and MDHHS, we should also have a way to check Medicaid records for any new addresses.
--We may also be able to work with other colleagues within MDHHS to see if they can check databases related to other public benefits such as SNAP.
--Mark Miller also had a good suggestion, to connect with the STD (HIV?) investigator that works in Flint, to share the strategies he uses to locate people; Karen Lishinski has his name and can share it with the nurses, or the health department staff probably already know him.
--The schools may also be able to share updated information they have about addresses (if the child is school-aged); we talked briefly to MDE about this last week, and they said the local school district would be the best resource, as the state school database doesn't retain the kind of information that the nurses would be seeking.

Nancy

Sent from my iPad

On Nov 11, 2015, at 10:50 AM, Wells, Eden (DHHS) <WellsE3@michigan.gov> wrote:

> Per our state-local call yesterday, it is hard to find some of these children with EBLs due to their changing addresses. Would partnering with the local health providers help, as these children are hopefully getting primary care locally?
>
> Gary, are you in touch with Drs. Hanna, Reynolds, Levine and others---perhaps there is a way to query their databases to locate children for follow-up of EBLS since April 2014? I am not sure if HIPAA would play a role, but seems that we could find a few of these children.
>
> Just thinking out loud....

Eden

From: Wells, Eden (DHHS)
Sent: Friday, November 13, 2015 5:43 PM
To: Mona Hanna-Attisha
Subject: EBLs

I just heard today GCHD planning, maybe-possibly, 1-2 more information fairs that will also do testing...my understanding is rationale similar to the one done yesterday- that many of the Medicaid tests for 1-year olds still needed; while may not catch an affect from water switch, would catch any EBLs so they can get an EBL investigation (which now includes water). I would be interested in your thoughts about how yesterday went- heard good things in news but have been in Detroit all day and have not heard much else.

Sent from my iPhone

On Oct 23, 2015, at 5:40 PM, Mona Hanna-Attisha <MHanna1@hurleymc.com> wrote:

> As I keep saying, these mass blood lead testing events are a bad idea. False sense of reassurance. It should not be the focus.
>
> Prof Edwards also agrees below.
>
> Mona Hanna-Attisha MD MPH FAAP
> Director, Pediatric Residency Program
> Hurley Children's Hospital
> Michigan State University
>
> Begin forwarded message:
>
> > **From:** Marc Edwards <edwardsm@vt.edu>
> > **Date:** October 23, 2015 at 5:33:40 PM EDT
> > **To:** 'Elin Betanzo' <ebetanzo@nemw.org>, 'Mona Hanna-Attisha' <MHanna1@hurleymc.com>, "Dickinson, Jordan" <Jordan.Dickinson@mail.house.gov>, Andrew Leavitt <ALeavitt@senate.michigan.gov>
> > **Subject: RE: From the Governor.**
> >
> > Is this a joke? ABC reports County is offering free blood lead testing November 5th?
> >
> > Nearly complete waste of time given a half life of 20 days.
> >
> > Designed to make the parent feel great?
> >
> > Marc

From: Wells, Eden (DHHS)
Sent: Monday, November 16, 2015 3:18 PM
To: Lasher, Geralyn (DHHS)
Subject: FW: Zip codes on EBL one pager and zip code sheet

Gosh, MY BAD!!!!!

-----Original Message-----
From: Wells, Eden (DHHS)
Sent: Monday, November 16, 2015 3:15 PM
To: LyonCallo, Sarah (DHHS) <lyoncallos@michigan.gov>; McKane, Patricia (DHHS) <McKaneP@michigan.gov>
Cc: Dykema, Linda D. (DHHS) <DykemaL@michigan.gov>; Miller, Corinne (DHHS) <MillerC39@michigan.gov>
Subject: RE: Zip codes on EBL one pager and zip code sheet

OH ARGH---Linda---can you change that one pager back to 01-07? Is it dude to the fact that the 01-02 numbers are so small? If so, we should footnote the zip code file with that fact.

E

-----Original Message-----
From: LyonCallo, Sarah (DHHS)
Sent: Monday, November 16, 2015 3:02 PM
To: Wells, Eden (DHHS) <WellsE3@michigan.gov>; McKane, Patricia (DHHS) <McKaneP@michigan.gov>
Cc: Dykema, Linda D. (DHHS) <DykemaL@michigan.gov>; Miller, Corinne (DHHS) <MillerC39@michigan.gov>
Subject: RE: Zip codes on EBL one pager and zip code sheet

There are some cases in those zips (01 and 02). They are included in the Flint total.

-----Original Message-----
From: Wells, Eden (DHHS)
Sent: Monday, November 16, 2015 2:47 PM
To: LyonCallo, Sarah (DHHS) <lyoncallos@michigan.gov>; McKane, Patricia (DHHS) <McKaneP@michigan.gov>
Cc: Dykema, Linda D. (DHHS) <DykemaL@michigan.gov>; Miller, Corinne (DHHS) <MillerC39@michigan.gov>
Subject: Zip codes on EBL one pager and zip code sheet

Hi there! Thank you all for your help! On the suppressed zip code file-can the far right column in the right (zip 01-07) be changed to 03-07?

I don't think 01 and 02 have residences...

Sent from my iPhone

From: Wells, Eden (DHHS)
Sent: Tuesday, November 17, 2015 7:52 AM
To: Dykema, Linda D. (DHHS)
Subject: Fwd: "The Flint Water Crisis: A Panel Discussion," Wednesday, November 18, 6:00pm, 303 International Center
Attachments: Flint Water Crisis.pdf; ATT00001.htm

Sent from my iPhone

Begin forwarded message:

From: Joan Rose <rosejo@msu.edu>
Date: November 16, 2015 at 11:14:59 PM EST
To: "Eden Wells (DHHS)" <wellse3@michigan.gov>
Subject: Fwd: FW: "The Flint Water Crisis: A Panel Discussion," Wednesday, November 18, 6:00pm, 303 International Center
Reply-To: <rosejo@msu.edu>

-------- Forwarded Message --------

Subject:FW: "The Flint Water Crisis: A Panel Discussion," Wednesday, November 18, 6:00pm, 303 International Center
Date: Fri, 13 Nov 2015 13:29:15 +0000
From: Environmental Science and Policy Program <espp@CAMPUSAD.MSU.EDU>
Reply-To: Environmental Science and Policy Program <espp@CAMPUSAD.MSU.EDU>
To:ESPPFACULTY@LIST.MSU.EDU

From: Center for Gender in Global Context [mailto:gencen@isp.msu.edu]
Sent: Thursday, November 12, 2015 5:52 PM
Cc: Center for Gender in Global Context <gencen@isp.msu.edu>
Subject: "The Flint Water Crisis: A Panel Discussion," Wednesday, November 18, 6:00pm, 303 International Center

The Flint Water Crisis: A Panel Discussion
Wednesday, November 18
6:00-8:00pm, 303 International Center

Please join moderator **Dr. Sara Fingal** (History/Lyman Briggs, Michigan State University) and panelists **Dr. Jennifer Carrera** (Sociology/Environmental Science & Policy Program, Michigan State University), **Dr. Susan Masten** (Civil and Environmental Engineering, Michigan State University), **Melissa Mays** (Water You Fighting For?), and **Claire McClinton** (Democracy Defense League) for a discussion and audience Q&A on the Flint water crisis.

Following the Flint city government's decision to no longer source its water supply from Detroit, but rather pump its water supply from the Flint River without properly treating it, old pipes further corroded and lead levels dangerously spiked, contaminating the water of Flint residents, businesses, and schools. Now the EPA has been called in to investigate Flint's water contamination and has recently announced it will audit the entire state's drinking water program to "ensure that MDEQ maintains reliable drinking water supplies that meet all of the requirements of the Safe Drinking Water Act."

PANELISTS:

Sara Fingal specializes in environmental history, twentieth century U.S. history, the history of coastal zone management, water resources, environmental politics, policy, and planning, and U.S. social movements. Her work to date ties together urban and rural history with an analysis of landscapes and ecosystems that transcend municipal, state, and national boundaries throughout North America. She has extensive experience performing oral history interviews with former civil rights and environmental activists, state politicians, officials, and employees.

Jennifer Carrera is part of the campus-wide Global Water Initiative. Her area of research focuses on environmental justice issues of access to clean water and sanitation in low-income communities domestically and internationally. Her work examines the role of power and exclusion in the production of marginalized spaces and bodies, using water as a surrogate for mapping power.

Susan Masten's research involves the use of chemical oxidants for the remediation of soils, water, and leachates contaminated with hazardous organic chemicals. She has been working extensively to develop water treatment technologies that are more effective and suitable for use in decentralized water treatment systems. She is currently testing a few samples from Flint for disinfection byproducts.

Melissa Mays is a founder of the citizen advocacy group Water You Fighting For and is often quoted in articles and interviews on the ongoing Flint water crisis (www.theguardian.com/us-news/2015/oct/04/flint-michigan-lead-water-children-health). In August 2015, WYFF distributed 300 test kits to households and worked with volunteer research scientists and grad students to get them tested in order to prove lead toxicity in the city water supply. She was among the petitioners to the EPA on October 1, 2015, urging them to take emergency action under the Safe Drinking Water Act in order to protect Flint residents from the toxic water conditions (www.nrdc.org/media/2015/151001a.asp).

Claire McClinton works extensively with Democracy Defense League and is often quoted in Michigan articles and interviews on the ongoing Flint water crisis. She was among the petitioners to the EPA on October 1, 2015, urging them to take emergency action under the Safe Drinking Water Act in order to protect Flint residents from the toxic water conditions (www.nrdc.org/media/2015/151001a.asp). She is also active with local and statewide community activities centered around exposing the dangers of the Emergency Manager law, and other organization affiliations include the Michigan Poverty Roundtable and Stand Up for Democracy.

This event is co-sponsored by the Center for Gender in Global Context (GenCen), Gender Justice & Environmental Change (GJEC), Community Sustainability, and Lyman Briggs at MSU.

Facebook event link: www.facebook.com/events/1856491884443l0/1884989314926691/
Event flyer hosted online at: http://gencen.isp.msu.edu/documents/FlintWaterCrisis.pdf

---

Center for Gender in Global Context
206 International Center
427 N Shaw Lane
East Lansing, MI 48824
(517) 353-5040 (phone)
(517) 432-4845 (fax)
www.gencen.msu.edu
gencen@msu.edu

From: Wells, Eden (DHHS)
Sent: Tuesday, November 17, 2015 3:10 PM
To: Moran, Susan (DHHS)
Subject: Fw: Excel list of numbers for report.xlsx
Attachments: Excel list of numbers for report.xlsx

From: LaRocco, Toni <tlarocco@gchd.us>
Sent: Tuesday, November 17, 2015 3:06 PM
To: Wells, Eden (DHHS)
Subject: FW: Excel list of numbers for report.xlsx

This is what we have into our spreadsheet so far….it will be updated before the end of today. What one nurse has done is not entered in yet.

Toni L. LaRocco MS, RN
Director of Nursing Services
Genesee County Health Department
810.237.4544
tlarocco@gchd.us

"Gratitude unlocks the fullness of life. It turns what we have into enough, and more. It turns denial into acceptance, chaos to order, confusion to clarity. It can turn a meal into a feast, a house into a home, a stranger into a friend. Gratitude makes sense of our past, brings peace for today, and creates a vision for tomorrow." – Melody Beattie

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For a copy of the Health Department's Notice of Information Practices, contact the Health Department or visit the Health Department's website at http://www.gchd.us/

From: Noble, Kim
Sent: Tuesday, November 17, 2015 3:02 PM
To: LaRocco, Toni
Cc: July, Jori
Subject: Excel list of numbers for report.xlsx

Here you go

	A	B	C	D	E	F	G	H	I	J	K	L
1	Date	Number of children with capillary > 5 since April 2014 on list from CLPPP	Number of children with capillary > 5 since April 2014 Attempts to contact	Number of children with capillary > 5 since April 2014 Contacted	Number of children with capillary > 5 since April 2014 Percentage Contacted	Number of children with capillary > 5 since Oct 2015 on list from CLPPP	Number of children with capillary > 5 since Oct 2015 Attempts to contact	Number of children with capillary > 5 since Oct 2015 Contacted	Number of children with capillary > 5 since Oct 2015 Percentage Contacted	Number of children with venous > 5 since April 2014 from CLPPP	Number of children with venous > 5 since April 2014 Attempts to contact	Number of children with venous > 5 since April 2014 Contacted
2	10/13/2015	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3	10/20/2015	76	0	0	0%	0	0	0	#DIV/0!	77	0	0
4	10/26/2015	80	0	0	0%	3	0	0	0%	79	0	0
5	11/2/2015	82	31	9	11%	0	0	0	#DIV/0!	75	0	0
6	11/9/2015	84	8	3	4%	5	0	0	0%	79	0	0
7	11/16/2015	84	12	3	4%	6	0	0	0%	79	8	2
8	**Average/Totals**	**81**	**51**	**15**	**18%**	**3**	**0**	**0**	**0%**	**78**	**8**	**2**

	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
1	Number of children with venous > 5 since April 2014 Percentage Contacted	Number of children with venous greater > 5 since Oct 2015 on list from CLPPP	Number of children with venous > 5 since Oct 2015 Attempts to contact	Number of children with venous > 5 since Oct 2015 Contacted	Number of children with venous > 5 since Oct 2015 Percentage Contacted	Number of children **Opened** this week to CM	Number of children with First Home visit by PHN billable	Number of children with Second Home visit by PHN billable	Number of Medicaid claims filed	Percentage of Medicaid claims filed	Number of children with open CM cases	EBL Investigations	Residence referred for abatement	Number of children tested in GCHD lead testing clinic
2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0	0	19
3	0%	0	0	0	#DIV/0!	0	0	0	0	#DIV/0!	0	0	0	27
4	0%	3	0	0	0%	1	1	0	1	100%	1	0	0	40
5	0%	0	0	0	#DIV/0!	0	0	0	0	#DIV/0!	0	0	0	0
6	0%	0	0	0	#DIV/0!	0	0	0	0	#DIV/0!	0	1	1	0
7	3%	1	0	0	0%	0	0	0	0	#DIV/0!	0	0	0	0
8	**3%**	**1**	**0**	**0**	**0%**	**1**	**1**	**0**	**1**	**100%**	**1**	**1**	**1**	**86**

	AA	AB
1	Number of children tested at outreach events	Number of letters mailed out to families
2	2	NA
3	2	
4	5	
5	37	
6	0	9
7	0	13
8	**46**	**22**

From: Wells, Eden (DHHS)
Sent: Monday, November 23, 2015 9:11 PM
To: Mona Hanna-Attisha
Subject: Re: 52

Hi- sorry - was in phone with parents--- wow!!!! Vacation! Well-deserved for both you and your family!

I think 2 or 3 - I have it written down in my Lansing office. Was very happy with fast response from primary provider (can relay that when we talk sometime). Let's not disrupt your vacation- can talk next week- but needing to see if we can expand testing by primary care providers (like the case with this child) to ensure maximal surveillance.

The 3rd is busy for you all- and wonder if a webinar the following week may be better--- and if you think it would be a useful thing to do? I would also love to come to the Grand Rounds- I don't need to register do I?

Eden

Sent from my iPhone

> On Nov 23, 2015, at 8:18 PM, Mona Hanna-Attisha <MHanna1@hurleymc.com> wrote:
>
> Interesting. Do you know how old kid was?
>
> I'm actually going on vacation starting tomorrow pm. But I can chat on Wednesday.
>
> Sorry I have not responded about dec 2. Lots going on that day. Edwards Peds grand rounds 8-9, Peds Dept meeting 12-1 and the governors task force 6-8 is holding a listening session.
>
> Mona Hanna-Attisha MD MPH FAAP
> Director, Pediatric Residency Program
> Hurley Children's Hospital
> Michigan State University
>
>> On Nov 23, 2015, at 8:14 PM, Wells, Eden (DHHS) <WellsE3@michigan.gov> wrote:
>>
>> Sure did- just today near end of day--followed up at Children's end of last week- test there was in 30's so sent home. Primary care provider all over it and GCHD now case managing. Looking into siblings, etc, and will be investigated!
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>>> Did you hear about a kid with a 52 BLL that was sent to Detroit from flint for treatment?
>>>
>>> Mona Hanna-Attisha MD MPH FAAP
>>> Director, Pediatric Residency Program Hurley Children's Hospital
>>> Michigan State University

From: Wells, Eden (DHHS)
Sent: Tuesday, November 24, 2015 1:23 PM
To: Mona Hanna-Attisha
Subject: Re: 52

I do know that they are revising (revised?) the protocols from what I see by email traffic....I know that our MDHHS/GCHD EBL investigators or going without flushing and using large mouth bottles as well. I will check on the retesting of prior tests...

E

_____
From: Mona Hanna-Attisha <MHanna1@hurleymc.com>
Sent: Tuesday, November 24, 2015 1:20 PM
To: Wells, Eden (DHHS)
Subject: Re: 52

Interesting - probably more paint or additive at that level. do you know if the state/city/county water sampling for these investigations is now being done as recommended by EPA? Are they going to go back to repeat the water sampling on the cases that was done with the wrong process (flushing, narrow opening bottles, etc).

Mona Hanna-Attisha MD MPH FAAP
Director, Pediatric Residency Program
Hurley Children's Hospital
Michigan State University

> On Nov 24, 2015, at 1:16 PM, Wells, Eden (DHHS) <WellsE3@michigan.gov> wrote:
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> Almost 2 year old---DID get hospitalized but did not require chelation....discharged after a day or 2 of observation. Mom mentioned paint (?- this is all hearsay)...but investigation would look at all potential sources, including water.
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>>> Michigan State University

From: Wells, Eden (DHHS)
Sent: Tuesday, November 24, 2015 1:47 PM
To: Dykema, Linda D. (DHHS)
Subject: Re: 52

Thanks!

_____

From: Dykema, Linda D. (DHHS)
Sent: Tuesday, November 24, 2015 1:37 PM
To: Wells, Eden (DHHS)
Subject: RE: 52

The protocol that we are using in the EBL investigations does not include pre-flush. I'm not sure if DEQ has revised their state-wide protocol, but the city of Flint issued new instructions to homeowners (see attached) that does not include the pre-flush. The only issue that I think is outstanding is the wide-mouth vs narrow-mouth bottle issues that was discussed by the TAC via e-mails. I believe Flint is telling residents they can get their water re-tested if they had earlier tested under the flushing protocol.

-----Original Message-----
From: Wells, Eden (DHHS)
Sent: Tuesday, November 24, 2015 1:23 PM
To: Dykema, Linda D. (DHHS)
Subject: Fw: 52

See below----is DEQs protocol revised yet?

_____

From: Mona Hanna-Attisha <MHanna1@hurleymc.com>
Sent: Tuesday, November 24, 2015 1:20 PM
To: Wells, Eden (DHHS)
Subject: Re: 52

Interesting - probably more paint or additive at that level. do you know if the state/city/county water sampling for these investigations is now being done as recommended by EPA? Are they going to go back to repeat the water sampling on the cases that was done with the wrong process (flushing, narrow opening bottles, etc).

Mona Hanna-Attisha MD MPH FAAP
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>>> Director, Pediatric Residency Program Hurley Children's Hospital
>>> Michigan State University

From: Wells, Eden (DHHS)
Sent: Tuesday, November 24, 2015 1:47 PM
To: Mona Hanna-Attisha
Subject: Re: 52

City has revised---although I am not sure what bottles they are using...

_____
From: Mona Hanna-Attisha <MHanna1@hurleymc.com>
Sent: Tuesday, November 24, 2015 1:20 PM
To: Wells, Eden (DHHS)
Subject: Re: 52

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>>> Michigan State University

From: Wells, Eden (DHHS)
Sent: Wednesday, November 25, 2015 2:49 PM
To: Miller, Corinne (DHHS)
Subject: draft report
Attachments: SitRep_Lead.docx

Eden V. Wells, MD, MPH, FACPM
Chief Medical Executive
Michigan Department of Health and Human Services
201 Townsend St., 5th Floor CVB
Lansing, MI 48913

Michigan Department of Health and Human Services Environmental Health

Flint Water Lead Project

MDHHS Situation Report

****NOTE: Potentially Identifiable Information- REDACT AS INDICATED****

Daily Briefing and Situation Report

Date: November 25, 2015

Surveillance Indicators: People Tested since 10/1/2015: 1,395;

Children 0-6 > 5 mcg/dl since 10/1/2015: 26

Severity Indicators: Hospitalized/Discharged-1/1; Deaths- 0

DAILY ACTIVITY SUMMARY

Elevated Blood Level (EBL) Investigations

- DEH-Residential tap water sampling protocol used to evaluate lead concentrations in households finalized
- Contractor (ETC) has 4 EBL investigations scheduled in the next 2 weeks and DEH staff are working to schedule more
    - ETC anticipates up to 6 investigations/week
    - Reports, with lab analysis, expected 2-3 weeks to complete

Epidemiology/Surveillance

- 1 child hospitalized 11/18-11/20, <2 yo, identified by lab who contacted primary provider with level of 52 mcg/dl; hospitalized at Children's 11/18; follow-up tests decreased without need for chelation- discharged to home 11/20.
    - GCHD follow-up 11/23 and 11/24- case management and investigation in process- possible history of lead paint ingestion
    - Child with history of anemia.
    - Other children in household tested, also followed by PCP.
- Since 10/1/2015 an additional 1,395 people have been testing in Flint; 26 children > 5 mcg/dl
    - 3% of children tested since 10/1/2015 have tested > 5 mcd/dl
- DEH staff developing comprehensive database
    - compiles blood test results, case management services, and environmental sampling data for each Flint child with elevated blood lead level

Communications/Information Sharing

- MDHHS/GCHD weekly call Nov 24 3PM- update on EBL testing
- Technical Advisory Committee meeting originally scheduled for December 9th- postponed by City of Flint- unknown status at this time for next meeting

Health Education Resources

- Bathing-specific fact sheet under development:
    - Dr. Wells to ask Dr. Hannah-Attisha for quote
- DEH has drafted a phosphate fact sheet, reviewing/revising with DEQ Drinking Water Staff
- DEH working with CLPPP and GCHD to revise parent resources package
    - reduce reading level

WIC

- Letter sent 11/24 to GCHD about Ready-to-feed formula availability from WIC program
- Talking points for WIC staff and for providers shared

Healthcare/Providers

- Forum for primary care providers in Flint by public health being planned- 2nd – 3rd week December
- WIC information to be shared by GCHD to providers

DEQ Information

- Samples taken from only once school over weekend due to inclement weather
- Results pending for all schools other than Freeman

From: Wells, Eden (DHHS)
Sent: Wednesday, November 25, 2015 3:00 PM
To: Miller, Corinne (DHHS)
Subject: Sit Rep 11/25
Attachments: Flint Lead MDHHS Sitrep 11_25_15.docx

Eden V. Wells, MD, MPH, FACPM
Chief Medical Executive
Michigan Department of Health and Human Services
201 Townsend St., 5th Floor CVB
Lansing, MI 48913

Michigan Department of Health and Human Services Environmental Health

Flint Water Lead Project

MDHHS Situation Report

****NOTE: Potentially Identifiable Information- REDACT AS INDICATED****

Daily Briefing and Situation Report

Date: November 25, 2015

Surveillance Indicators: People Tested since 10/1/2015: 1,395;

Children 0-6 > 5 mcg/dl since 10/1/2015: 26

Severity Indicators: Hospitalized/Discharged-1/1; Deaths- 0

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    - Reports, with lab analysis, expected 2-3 weeks to complete

CLPP/GCHD Case Management (CM)

- Week Ending 11/20/15:
    - Number of contacts attempted: 58
    - Contacted and offered CM: 13
- 2.5 FTE's (two nurses and 1 staff) hired; 1 more FTE nurse to be hired

Epidemiology/Surveillance

- 1 child hospitalized 11/18-11/20, <2 yo, identified by lab who contacted primary provider with level of 52 mcg/dl; hospitalized at Children's 11/18; follow-up tests decreased without need for chelation- discharged to home 11/20.
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- Samples taken from only once school over weekend due to inclement weather
- Results pending for all schools other than Freeman

From: Wells, Eden (DHHS)
Sent: Monday, November 30, 2015 9:13 AM
To: Collins, Jim (DHHS)
Subject: RE: Time sensitive-?Legionella report

Because the Governor's Task Force wants it.

-----Original Message-----
From: Collins, Jim (DHHS)
Sent: Monday, November 30, 2015 8:49 AM
To: Wells, Eden (DHHS) <WellsE3@michigan.gov>
Subject: Re: Time sensitive-?Legionella report

Why?

Sent from my iPhone

> On Nov 30, 2015, at 8:19 AM, Wells, Eden (DHHS) <WellsE3@michigan.gov> wrote:
>
> Good morning-
> Last Wed eve Mark Valacak said it is ok to share the Legionella Report with the Governors Task Force. Could you please forward to be sure Geralyn has it ASSP this morning?
>
> E
>
> Sent from my iPhone

From: Wells, Eden (DHHS)
Sent: Monday, November 30, 2015 2:24 PM
To: Moran, Susan (DHHS)
Subject: Fwd: talking points.
Attachments: Legionellosis.docx; ATT00001.htm

Eden V. Wells, MD, MPH, FACPM
MDHHS
Sent from my iPad

Begin forwarded message:

> **From:** "Miller, Corinne (DHHS)" <MillerC39@michigan.gov>
> **Date:** November 30, 2015 at 2:01:54 PM EST
> **To:** "Dykema, Linda D. (DHHS)" <DykemaL@michigan.gov>
> **Cc:** "Wells, Eden (DHHS)" <WellsE3@michigan.gov>
> **Subject: FW: talking points.**
>
> Eden asked that I forward these talking points about the Genesee County Legionella investigation to you. They were developed by communicable disease in response to a request from MDHHS communications.
>
> Eden will be using these talking with the Governor's task force as a member of that task force asked for clarification on any Legionnaire's disease in Flint.
>
> ---
>
> **From:** Collins, Jim (DHHS)
> **Sent:** Monday, November 30, 2015 1:17 PM
> **To:** Wells, Eden (DHHS) <WellsE3@michigan.gov>
> **Cc:** Miller, Corinne (DHHS) <MillerC39@michigan.gov>; Fiedler, Jay (DHHS) <FiedlerJ@michigan.gov>
> **Subject:** talking points.
>
> Here's da points

Legionellosis Investigation Summary Points

Legionellosis Background:

Legionella is a type of bacteria found naturally in fresh water environments. This bacteria grows best in warm water, like the kind found in hot tubs, cooling towers, hot water tanks, potable water systems, and decorative fountains. People are exposed to *Legionella* when they breathe in a mist or vapor containing the bacteria. When people are exposed to the bacteria, it can cause illness. Legionellosis is a respiratory disease caused by *Legionella* bacteria. *Legionella* cannot spread from one person to another person. Most people exposed to the bacteria do not become ill. People at higher risk of getting sick include: individuals over 50 years old; current or former smokers; those with chronic lung disease; people with a weakened immune system from diseases like cancer, diabetes, or kidney failure; and individuals who take medications that weaken the immune system, such as steroids or chemotherapy. Cases of legionellosis are most common during the late spring through early fall

Investigation Summary:

- Since fall of 2014, MDHHS staff have been working to promote timely case follow up on Legionellosis cases reported to the Genesee County Health Department. Delays in GCHD follow-up have contributed to a lack of complete information, and a lack of appropriate clinical specimens, however, since January, GCHD has accepted MDHHS assistance in the process.
- Approximately one half of the cases have a reported history of exposure that includes one healthcare facility. As would be the appropriate public health recommendation, that facility continues to undergo environmental remediation to address the issue.
- Legionella bacteria is ubiquitous in the environment. Since water testing at the source was negative for bio-contaminants, it is possible that other factors influenced the release of biofilms from existing water infrastructure.

This Document is a Non-Responsive Attachment.

From: Wells, Eden (DHHS)
Sent: Monday, November 30, 2015 4:21 PM
To: Lasher, Geralyn (DHHS)
Subject: LEgionella talking points.
Attachments: Legionellosis.docx

These??

E

From: Collins, Jim (DHHS)
Sent: Monday, November 30, 2015 1:17 PM
To: Wells, Eden (DHHS) <WellsE3@michigan.gov>
Cc: Miller, Corinne (DHHS) <MillerC39@michigan.gov>; Fiedler, Jay (DHHS) <FiedlerJ@michigan.gov>
Subject: talking points.

Here's da points

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- Legionella bacteria is ubiquitous in the environment. Since water testing at the source was negative for bio-contaminants, it is possible that other factors influenced the release of biofilms from existing water infrastructure.

From: Wells, Eden (DHHS)
Sent: Thursday, December 03, 2015 10:55 AM
To: Collins, Jim (DHHS);Miller, Corinne (DHHS);Lasher, Geralyn (DHHS)
Subject: Fw: McLaren Summary Report
Attachments: McLaren Report 2015-10-16-.pdf; McLarenSpecial Update August 14 2015.pdf

FYI only

From: Valacak, Mark <MVALACAK@gchd.us>
Sent: Wednesday, December 2, 2015 12:32 PM
To: Wells, Eden (DHHS); Moran, Susan (DHHS)
Subject: FW: McLaren Summary Report

Eden & Sue,

I don't know how much information your staff has shared with you about the legionella situation here. MDHHS staff has been informed that we have received a FOIA from an attorney representing one of the positive cases who died. I am sending some info which was already shared with your staff as some background material FYI.

Mark Valacak, MPH, Health Officer
Genesee County Health Department,
630 S. Saginaw St. Suite 4 Flint, MI 48502-1540
Phone 810-257-3588 Fax 810 257-3147
E-mail mvalacak@gchd.us

Public Health

Please consider the environment before printing this e-mail.

"There are two lasting bequests we can hope to give our children: one is roots; the other is wings." Hodding Carter
*NOTICE: This e-mail, including attachments, is intended for the exclusive use of the addressee and may contain proprietary, confidential or privileged information. If you are not the intended recipient, any disclosure, use, distribution, copying, or taking of any action in reliance of the contents of this e-mail is strictly prohibited. If you have received this e-mail in error, please notify me via e-mail and permanently delete the original and destroy all copies. Thank you.
For a copy of the Health Department's Notice of Information Practices, contact the Health Department or visit the Health Department's website at http://www.gchd.us/

From: Cupal, Suzanne
Sent: Friday, October 16, 2015 12:39 PM
To: Bolen, Timothy (DHHS); 'Fiedler, Jay (DHHS)'; Johnson, Shannon (DHHS); Collins, Jim (DHHS); Johnson, M.D., Gary; Valacak, Mark; Henry, James; LaRocco, Toni; Rygiel, Christine
Subject: McLaren Summary Report

Julie Borowski just forwarded their summary report. It does not address all of our questions, but it is a good starting point. Please review and let's discuss outstanding questions so we can address them with her.

Suzanne

Suzanne Cupal, M.P.H.
Public Health Supervisor

Genesee County Health Department
630 S. Saginaw Street
Suite 4
Flint, MI 48502
(810) 768-7970
scupal@gchd.us

EXECUTIVE SUMMARY

Special Pathogens Laboratory (SPL) was contacted by McLaren Flint Health Care to assist the hospital in responding to an increase in the incidence of Legionnaires' disease due to *Legionella pneumophila*, serogroup 1. The Genesee County Health Department had also been in contact with the hospital regarding cases of Legionnaires' disease in patients that had been diagnosed and treated at the hospital. This increase in cases had been observed over the past year when water quality in Flint was adversely affected when the city switched from Detroit water to the Flint River last year.

SPL was asked to provide consultation services, including an on-site risk assessment, review of the facility's current Legionella policy, and development of a Water Safety Plan for the facility.

Assessments of McLaren Flint Hospital buildings were performed from August 11 – 13, 2015. The assessment including collection of samples for *Legionella* culture from distal hot water sites, distal cold water sites, hot water heaters, a hot water return, and the cold water entries. Physicochemical measurements, including pH, temperature, and free chlorine, were also taken.

Legionella pneumophila serogroup 1 was detected across all systems, with the majority of hot water distal sites (water outlets) showing some level of positivity.

McLaren Flint Hospital Administration, Infectious Diseases, Facilities Engineering and Infection Control acted aggressively to address the potential risk for hospital-acquired Legionnaires' disease. Staff worked with SPL to expedite both short and long-term approaches to prevention. This included recommendations for rapid identification and treatment of cases as well as recommendations regarding options for installation of secondary water treatment (disinfection).

The hospital staff performed a "shock" hyperchlorination disinfection in Buildings F, A, and B/C. The hyperchlorination disinfection for Building F Upper System was completed on August 14-15, 2015 and re-sampled for *Legionella* on August 17, 2015.

The "post-disinfection" culture results showed that *Legionella* concentrations were significantly lower—indicating the hyperchlorination disinfection was a successful short-term remediation which temporarily reduced *Legionella*.

Long-term secondary disinfection with monochloramine was recommended in patient care areas because of its proven efficacy and ability to rapidly reduce *Legionella* in hospital hot water systems. A Water Safety Plan is being developed to provide on-going risk management and to comply with the new ASHRAE 188 Legionella standard.

These efforts have resulted in successfully reducing *Legionella* in the hospital water systems. No cases of healthcare-acquired Legionnaires' disease were identified following these measures.

McLaren FLINT

SPECIAL UPDATE

Over the past several weeks, there has been an increase in the number of Legionella cases throughout Genesee County. Although a clear source for this increase has not been specifically identified, McLaren Flint is taking proactive and precautionary measures to ensure that we are implementing all recommended practices and safety measures in the prevention and elimination of Legionella in the water system at our facility. In this initiative, we are working in partnership with the Genesee County Health Department and have engaged with leading experts in this field.

Beginning Friday, August 14, we are taking the following steps:

1. Adding additional chlorine to our water supply, while still maintaining levels well within safe drinking standards;
2. Providing bottled water for drinking while we are implementing specific measures. Patients will receive bottled water with all meals, and it will also be available on the unit throughout the day. Employees will also have access to bottled water for drinking purposes.
3. Implementing hyperchlorination of our water system to reinforce the routine, twice-a-year hyperchlorination process that was last implemented in April.
4. Continuing surveillance testing of our water to ensure consistent quality standards.

We understand these implementations may interrupt daily routines and appreciate your support as we work together to maintain a healthy environment for our patients, visitors and staff.

As additional resources, we are including with this update information outlining frequently asked questions and facts about Legionella.

For any further information, please contact Infection Control at (810) 342-2290.

Frequently Asked Questions about Legionnaires' Disease

What is Legionnaires' disease?

Legionnaires' disease is a lung infection (pneumonia) caused by a bacterium named Legionella pneumophila. The name Legionella pneumophila was derived from the original outbreak at the 1976 American Legion Convention in Philadelphia. Pneumophila means "lung loving" in Greek.

Where do Legionella bacteria come from?

Legionella are natural inhabitants of water and can be detected in rivers, lakes, and streams. The bacteria are commonly found in the water systems of buildings and households, but pose little risk to healthy adults and children. One type of Legionella species (L. longbeachae) has been found in potting soil.

What are the most common symptoms?

Legionnaires' disease can have symptoms like many other forms of pneumonia, so it can be hard to diagnose at first. Signs of the disease can include: a high fever, chills, cough, and confusion. Some people may also suffer from muscle aches and headaches. Symptoms usually begin two to 10 or 14 days after being exposed to the bacteria

Is Legionnaires' disease contagious?

Legionnaires' disease is not contagious. No special precautions, or isolation of the patient is necessary. The disease is transmitted via drinking water not by infected persons. It requires direct exposure to the bacteria – usually by aerosolized water mist that is inhaled or aspiration.

Who is at greatest risk for contracting Legionnaire's disease?

People at risk for contracting Legionnaires' disease following exposure to water that contains Legionella are usually 65 years or older, smokers, patients with chronic lung disease, and those with weakened immune systems. People who have had a bone marrow or solid organ transplant have the greatest risk of contracting Legionella pneumonia.

How is Legionnaires' disease treated?

Many antibiotics are highly effective against Legionella bacteria. The two most effective antibiotics are levofloxacin and azithromycin.

Legionella Facts

1. Legionnaires' disease is a form of bacterial pneumonia caused by the bacteria Legionella found in building water systems.
2. Legionella bacteria are naturally found in municipal cold water, but can grow in high numbers in warm water after entering a building's hot water system.
3. How much Legionella grows depends on the temperature. The ideal temperature range is between 95 and 110 degrees.
4. Brown water events and water pressure changes in pipes can increase Legionella in building water systems.
5. Legionnaires' disease causes a small percentage, only about 2 to 5% of the average 600,000 pneumonia cases that require hospitalization each year.
6. Even if the bacteria enter the lungs, either by inhalation or aspiration drinking water or water droplets, the majority of persons exposed won't become ill. The likelihood for illness is greatest for persons with chronic lung disease (smokers, COPD), those taking high dose steroids, diabetics, patients who have had transplants or persons with compromised immune systems, i.e., cancer treatments.
7. Not all antibiotics are effective against Legionnaires' disease. Two that are very effective are levofloxacin or azithromycin.
8. Diagnosis of Legionnaires' disease requires a specific test—urine antigen—which must be ordered by a physician. Cases are often missed when physicians don't consider Legionnaires' disease as a possible illness. It is often not diagnosed and is under reported for these reasons.
9. Rapid diagnosis and effective treatment are key to minimizing the severity of the disease and in preventing mortality.
10. Approaches to preventing exposure of at risk patient populations to Legionella bacteria in water include:
    - Using sterile water with equipment such as nasogastric and endotracheal tubes, TEE probes, etc.
    - Providing bottled water for drinking when cases of hospital-acquired Legionnaires' disease have been identified and until after water is treated to control Legionella.
    - Since there is no person-to-person spread of Legionella bacteria, disease prevention is accomplished by additional treatment of the warm water system to control and prevent the growth of Legionella.

Source: Special Pathogens Laboratory, Pittsburgh, PA

From: Wells, Eden (DHHS)
Sent: Thursday, December 03, 2015 1:59 PM
To: Eisner, Jennifer (DHHS)
Subject: Re: Flint EBL Release & Documents

Ok

Sent from my iPhone

On Dec 3, 2015, at 1:41 PM, Eisner, Jennifer (DHHS) <EisnerJ@michigan.gov> wrote:

> FYI -- external notifications at 2, press release at 2:30 p.m.
>
> Jennifer Eisner
> Public Information Officer
> Michigan Department of Health and Human Services
> Office: 517-241-2112 or EisnerJ@michigan.gov
> Cell: PPI
>
> ---
>
> **From:** Eisner, Jennifer (DHHS)
> **Sent:** Thursday, December 03, 2015 1:06 PM
> **To:** Lyon, Nick (DHHS) <LyonN2@michigan.gov>; Becker, Timothy (DHHS) <beckert1@michigan.gov>; Lasher, Geralyn (DHHS) <lasherg@michigan.gov>; Minicuci, Angela (DHHS) <MinicuciA@michigan.gov>; Wyant, Dan (DEQ) <WyantD@michigan.gov>; Wurfel, Brad (DEQ) <WurfelB@michigan.gov>; Tommasulo, Karen (DEQ) <TommasuloK@michigan.gov>; Hertel, Elizabeth (DCH) (HertelE@michigan.gov) <HertelE@michigan.gov>
> **Cc:** Murray, David (GOV) <MurrayD1@michigan.gov>; Grijalva, Nancy (DHHS) <GrijalvaN@michigan.gov>; Granger, Patricia (DHHS) <GrangerP@michigan.gov>
> **Subject:** FW: Flint EBL Release & Documents
>
> All --
>
> The governor's team has given the go ahead. We've adjusted the timeline slightly to issue the press release and post the report at 2:30 p.m. Embargoed stakeholder notifications will now happen at 2 p.m. as outlined below:
>
> 2 p.m.
> - Send final embargoed release and summary report to:
> - Genesee County Health Department -- Geralyn Lasher
> - Dr. Mona Hannah-Attisha -- Geralyn Lasher
> - Task Force Members -- Geralyn Lasher
> - City of Flint Mayor's Office -- Geralyn Lasher
> - Congress and legislature -- Elizabeth Hertel
>
> 2:30 p.m.
> - Issue press release and summary report
> - Post press release and summary report to MDHHS website newsroom and Flint Water website, www.michigan.gov/flintwater

3 p.m.

- Pitched media interviews with Dr. Eden Wells

Thank you,

Jennifer Eisner
Public Information Officer
Michigan Department of Health and Human Services
Office: 517-241-2112 or EisnerJ@michigan.gov
Cell: PPI

From: Eisner, Jennifer (DHHS)
Sent: Thursday, December 03, 2015 11:18 AM
To: Agen, Jarrod (GOV) <AgenJ@michigan.gov>; Baird, Richard (GOV) <bairdr@michigan.gov>; Murray, David (GOV) <MurrayD1@michigan.gov>; Wyant, Dan (DEQ) <WyantD@michigan.gov>; Wurfel, Brad (DEQ) <WurfelB@michigan.gov>; Tommasulo, Karen (DEQ) <TommasuloK@michigan.gov>; Lyon, Nick (DHHS) <LyonN2@michigan.gov>; Becker, Timothy (DHHS) <beckert1@michigan.gov>; Lasher, Geralyn (DHHS) <lasherg@michigan.gov>; Minicuci, Angela (DHHS) <MinicuciA@michigan.gov>; Kennedy, Jordan (GOV) <KennedyJ4@michigan.gov>; Grijalva, Nancy (DHHS) <GrijalvaN@michigan.gov>; Granger, Patricia (DHHS) <GrangerP@michigan.gov>
Subject: Flint EBL Release & Documents

Good morning, all:

Attached for your review please find the updated press release, communications plan and December summary report regarding elevated blood lead levels in Flint. We are planning to issue the release and post the report today at 2 p.m.

Yesterday, Dave sent over a two questions from the governor. Our team has provided the following responses:

Do the elevated lead levels stick with a person for life?
We do see blood lead levels decrease after education takes place and exposure to lead sources is reduced. The purpose of screening children for lead is to identify those with elevated levels. Removing potential sources of lead exposure and ensuring proper nutrition and healthcare leads to decreases in blood lead levels in follow-up testing, which is an important part of case management. Lead has a half-life in blood of approximately 25 days; in soft tissue, about 40 days; and in the non-labile portion of bone, more than 25 years.

Why do the lead levels spike on a seasonal basis?
When reviewing historical trend data, the risk of lead exposure is highest during the third quarter of each year – July through September. Seasonal variation is the result of a number of factors including increased exposure to lead in dust and soil in the summer months.

The notifications will be timed as follows:

1:30 p.m.

- Send final embargoed release and summary report to:
  - Genesee County Health Department – Geralyn Lasher
  - Dr. Mona Hannah-Attisha – Geralyn Lasher
  - Task Force Members – Geralyn Lasher
  - City of Flint Mayor's Office – Geralyn Lasher
  - Congress and legislature – Elizabeth Hertel

2 p.m.

- Issue press release and summary report
- Post press release and summary report to MDHHS website newsroom and Flint Water website, www.michigan.gov/flintwater

Please let me know if you have any additional questions, edits or concerns.

Thank you,

Jennifer Eisner
Public Information Officer
Michigan Department of Health and Human Services
Office: 517-241-2112 or EisnerJ@michigan.gov
Cell: PPI

<Flint EBL Data Press Release V9.docx>

<Flint Blood Lead Level Summary Report Dec.pdf>

<Comms Plan - Flint EBL Data Summary 12315.docx>

From: Wells, Eden (DHHS)
Sent: Thursday, December 03, 2015 3:35 PM
To: Mona Hanna-Attisha
Cc: Lasher, Geralyn (DHHS);Eisner, Jennifer (DHHS)
Subject: Re: Summary Data

Hi there ,
I always include water in seasonality issues---agree!. I just did with media just now. Please know that this is a public report being used that is high level--there are surveillance reports we are maintaining by zip and many other factors-we already know about the high risk zip codes, so this report doesn't capture them (but we are tracking them!!! and know where the levels are---)---we can share that with you but was too complicated for public when compiled for a public use report. We were asked to keep it simple. We definitely have zipode level!

Deduplicated by highest level in calendar year.

We know that this may not reflect water---although anecdotally picking up a few children without filters). But, this reporting will be going on long-term--I am telling media that I am primarily interested in what happens in third quarter of every year as well, as Q4 and Q1 will be low due to seasonality.

Can talk by phone if you wish--

From: Mona Hanna-Attisha <MHanna1@hurleymc.com>
Sent: Thursday, December 3, 2015 3:05 PM
To: Lasher, Geralyn (DHHS)
Cc: Wells, Eden (DHHS)
Subject: RE: Summary Data

Eden,

A few questions/comments as I begin to process this info:

1. Of course, because the half life of blood lead is only 20-30 days, blood lead testing done from october on does not accurately reflect the exposure that occurred from the onset of water switch. Very few people based on the media/health advisories were drinking the water and many many more people were being tested as in the past - thus a smaller percentage.
2. So Flint children were determined by their zip code? Was this data geocoded? Neither zip code, nor city of Flint in the address, correlates with flint water.
3. Any chance you also looked more in depth at the two higher risk zip codes (48503 and 48504)?

4. In terms of the first bullet, "people only counted once who had multiple lead levels" - did you use "first time lead" level of a child or "highest" lead" done on a child? As before, just because a child may have a non-elevated first lead does not mean that subsequent lead levels will be non-elevated
5. Lastly, 2014 and 2015 Q3 is concerning and it's unfortunate that the press release statement regarding seasonal variation did not mention the seasonality of lead in water which is well documented and which most likely led to those higher peaks. "Seasonal variation is the result of a number of factors including increased exposure to lead in dust and soil in the summer months."

I'm sure i'll have more questions later. thanks!

Mona Hanna-Attisha MD MPH
Director, Pediatric Residency Program
Hurley Children's Hospital at Hurley Medical Center
Assistant Professor, Department of Pediatrics and Human Development
Michigan State University College of Human Medicine
mhanna1@hurleymc.com

TUESDAY, DECEMBER 1, 2015
https://secure.hurleyfoundation.org/

From: Lasher, Geralyn (DHHS) [lasherg@michigan.gov]
Sent: Thursday, December 03, 2015 2:01 PM
To: Mona Hanna-Attisha
Cc: Wells, Eden (DHHS)
Subject: Summary Data

This afternoon at 2:30 p.m., the Michigan Department of Health and Human Services will issue the attached press release and summary report detailing the latest data on blood lead levels in Flint.

We wanted to ensure that you also received this information in advance of the press release being issued.

The summary report provides annual historical information on children younger than six years, children between the ages of six and seventeen years and adults tested for lead. It also provides detail on the number of test results for these category groups that have tested above five micrograms per deciliter. The summary report also provides information on the numbers tested and with elevated blood lead levels since the MDHHS Action Plan began in October.

The preliminary data indicates that 30 of 1,361 adults and children tested in Flint since October 1 had elevated blood lead levels.

Thank you,
Geralyn

Geralyn Anne Lasher
Senior Deputy Director for External Relations and Communications
Michigan Department of Health and Human Services
201 Townsend Street, Capitol View Building
Lansing Michigan 48913
P: (517) 241-2112
C: PPI
LasherG@michigan.gov
@glasher

From: Wells, Eden (DHHS)
Sent: Thursday, December 03, 2015 9:32 PM
To: Clifford Wells
Subject: Fwd: Summary Data
Attachments: Flint EBL Data Press Release FINAL.PDF; ATT00001.htm; Flint Blood Lead Level Summary Report December.pdf; ATT00002.htm

The press release and summary data

Sent from my iPhone

Begin forwarded message:

From: "Lasher, Geralyn (DHHS)" <lasherg@michigan.gov>
Date: December 3, 2015 at 2:00:14 PM EST
To: "Valacak, Mark" <MVALACAK@gchd.us>, "Brickey, Tamara" <tbrickey@gchd.us>, "LaRocco, Toni" <tlarocco@gchd.us>, "McShane, Hilda" <hmcshane@gchd.us>, "Johnson, M.D., Gary" <GJOHNSON@gchd.us>
Cc: "Miller, Mark (DHHS)" <millerm1@michigan.gov>, "Moran, Susan (DHHS)" <MoranS@michigan.gov>, "Robinson, Mikelle (DHHS)" <RobinsonM18@michigan.gov>, "Thompson, Sheryl D. (DHHS)" <ThompsonS2@michigan.gov>, "Wells, Eden (DHHS)" <WellsE3@michigan.gov>
Subject: Summary Data

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We wanted to ensure that the Genesee County Health Department received this information in advance of the press release being issued.

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Geralyn Anne Lasher
Senior Deputy Director for External Relations and Communications
Michigan Department of Health and Human Services
201 Townsend Street, Capitol View Building
Lansing Michigan 48913
P: (517) 241-2112
C: PPI
LasherG@michigan.gov
@glasher

STATE OF MICHIGAN

RICK SNYDER
GOVERNOR

DEPARTMENT OF HEALTH AND HUMAN SERVICES
LANSING

NICK LYON
DIRECTOR

FOR IMMEDIATE RELEASE
December 3, 2015

CONTACT: Jennifer Eisner
(517) 241-2112

MDHHS releases latest data outlining blood lead levels in Flint
Follow-up care, case management resources continue for families

LANSING, Mich. – Preliminary data indicates that 30 of 1,361 adults and children tested in Flint since October 1 had elevated blood lead levels, according to a report issued today by the Michigan Department of Health and Human Services.

This marks the first summary report on lead testing called for in the state's action plan related to health concerns about Flint's water infrastructure.

"Our goal is to help families reduce their exposure to lead sources," said Dr. Eden Wells, MDHHS chief medical executive. "We have made progress in testing and identifying those with elevated blood lead levels, and the department will continue to work closely with the Genesee County Health Department to reach these families. We will remain diligent in our ongoing outreach and education efforts."

Information comes from tests administered citywide to 1,361 children and adults since October 1. Tests showed that 21 of 969 children age 17 or younger and 9 of 392 adults over the age 18 were identified with elevated blood lead levels.

The report covers test results reported to MDHHS since the state action plan was put in place Oct. 2. It includes the number of tests and number of elevated blood lead levels greater than 5 micrograms per deciliter, and captures both capillary and venous blood tests that have been reported to MDHHS since the beginning of October. People who have had multiple tests are counted only once. Five micrograms per deciliter is the level that the Centers for Disease Control and Prevention considers elevated and triggers health care professional follow up with families.

The full report is posted online at www.michigan.gov/flintwater and will be updated as more data becomes available.

When reviewing historical trend data, the risk of lead exposure is highest during the third quarter of each year – July through September. Seasonal variation is the result of a number of factors including increased exposure to lead in dust and soil in the summer months.

In the third quarter of 2010, 8.3 percent of Flint children 6 and under showed elevated blood lead levels. The figure gradually decreased to 4.1 percent in the third quarter of 2013. During the same months in 2014, the figure increased to 7.5 percent and decreased to 6.4 percent in the third quarter of 2015.

– MORE –

Last month, MDHHS collaborated with the county health department and local partners to distribute educational resources and informational letters to Flint parents regarding lead testing. The state is providing funding for GCHD nurses to work with families when an elevated blood lead level has been detected. During these follow-up visits, nurses coordinate with environmental health investigators to meet with families in their homes to identify lead exposures, address questions and provide water filters. People can be exposed to lead from paint, soil, plumbing and other sources.

MDHHS continues to provide free water filters and replacement cartridges to Flint residents at four locations, including the MDHHS Flint offices and the Genesee County Community Action Resource Department. For a full list of locations and hours of distribution, visit www.michigan.gov/flintwater.

To help residents properly install water filters, and to demonstrate how to replace the original when it expires, MDHHS has created an instructional video on its YouTube channel. For updates, visit www.michigan.gov/flintwater.

# # #

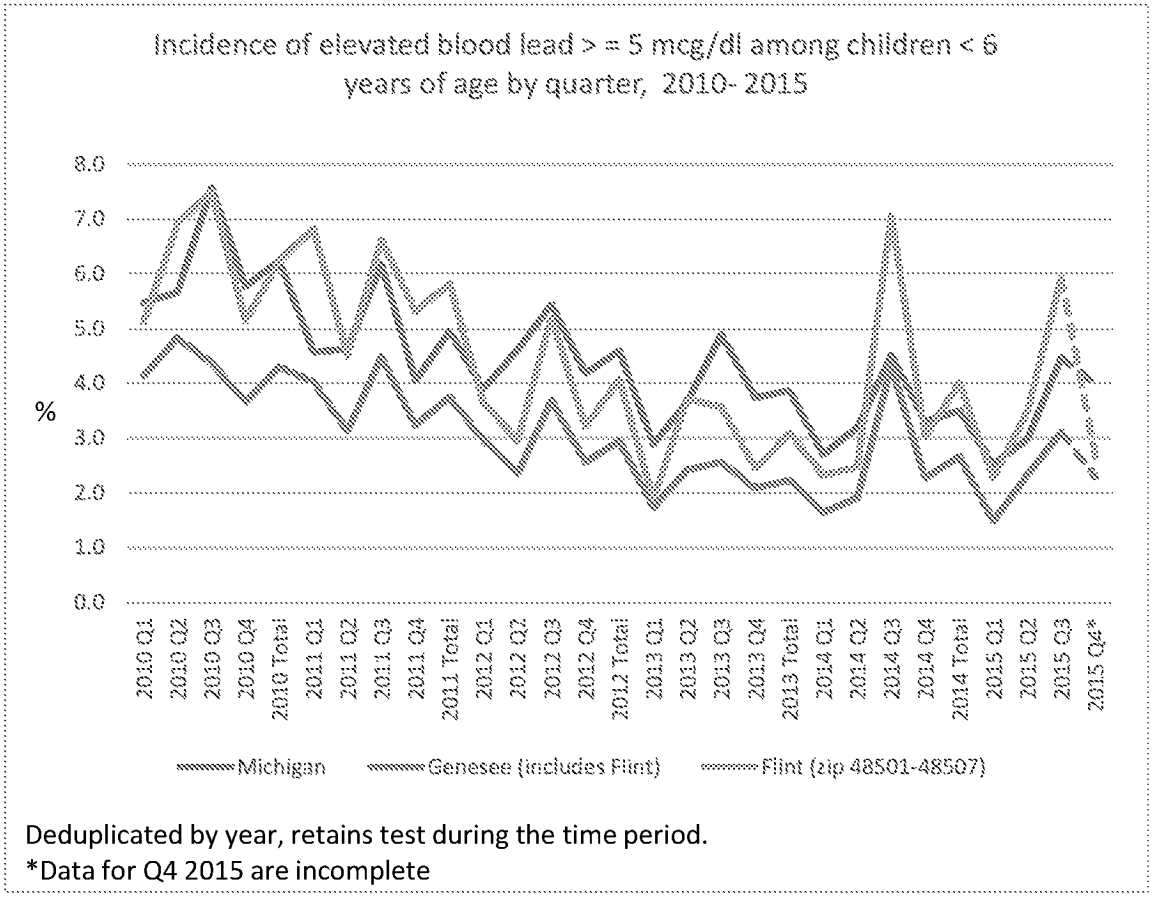
This Document is a Non-Responsive Attachment.

Michigan Department of Health and Human Services (MDHHS)
Blood Lead Level Test Results for Flint Zip Codes 48501-48507
Genesee County, and the State of Michigan
Summary as of November 13, 2015

Executive Summary

This report is generated by MDHHS to track Blood Lead Level test results in Flint, Michigan.

- Counts on this report include both capillary and venous blood tests. People who have had multiple tests are counted only once per year.
- Since 10/1/2015, an additional 1,361 people have been tested in Flint.
- Continued testing efforts by Genesee County Health Department, MDHHS and local medical personnel have identified 21 children with blood lead levels greater than or equal to 5µg/dL (micrograms per deciliter) since 10/1/2015.
- Three percent of the children younger than 6 years old tested since 10/1/2015 have had blood lead levels greater than or equal to 5µg/dL.
- Additional testing is ongoing. Counts will vary as new results are added.



Deduplicated by year, retains test during the time period.
*Data for Q4 2015 are incomplete

** Data for Quarter 4 of 2015 are incomplete and subject to change*

	Children younger than 6 Years Old			Children 6 to 17 Years Old		
	Michigan	Genesee County	Flint 48501-48507	Michigan	Genesee County	Flint 48501-48507
Total tested for lead 1/1/2010 to 12/31/2010:	152,608	6,932	3,560	17,963	867	463
Number of test results ≥5µg/dL 1/1/2010 to 12/31/10:	9,509	298	222	907	25	20
Total tested for lead from 1/1/2011 to 12/31/2011:	149,420	6,667	3,093	15,725	1,038	544
Number of test results ≥5µg/dL 1/1/2011 to 12/31/11:	7,392	250	180	651	20	15
Total tested for lead 1/1/2012 to 12/31/2012:	146,142	7,008	3,112	15,460	1,386	630
Number of test results ≥5µg/dL 1/1/2012 to 12/31/12:	6,704	206	127	478	17	12
Total tested for lead 1/1/2013 to 12/31/2013:	145,813	6,986	3,077	13,897	1,241	566
Number of test results ≥5µg/dL 1/1/2013 to 12/31/13:	5,647	156	95	342	9	4
Total tested for lead 1/1/2014 to 12/31/2014:	141,355	6,690	3,045	12,936	913	428
Number of test results ≥5µg/dL 1/1/2014 to 12/31/14:	4,948	178	122	386	6	5
Total tested for lead 1/1/2015 to 11/13/2015:	120,699	5,778	2,704	10,841	1,197	765
Number of test results ≥5µg/dL 1/1/2015 to 11/13/2015:	4,200	149	101	309	10	8
Total tested for lead 10/1/2015 to 11/13/2015:	14,593	957	560	1,412	502	409
Number of test results ≥5µg/dL 10/1/2015 to 11/13/2015:	583	22	15	38	6	6

** Data for Quarter 4 of 2015 are incomplete and subject to change*

	Adults 18 Years and Older			Total Number of People of All Ages Tested		
	Michigan	Genesee County	Flint 48501-48507	Michigan	Genesee County	Flint 48501-48507
Total tested for lead 1/1/2010 to 12/31/2010:	13,853	602	195	184,424	8,401	4,218
Number of test results ≥5µg/dL 1/1/2010 to 12/31/10:	1,462	42	18	11,878	365	260
Total tested for lead 1/1/2011 to 12/31/2011:	13,259	542	139	178,404	8,247	2,726
Number of test results ≥5µg/dL 1/1/2011 to 12/31/11:	1,369	44	16	9,412	314	211
Total tested for lead 1/1/2012 to 12/31/2012:	13,059	556	155	174,661	8,950	3,907
Number of test results ≥5µg/dL 1/1/2012 to 12/31/12:	1,415	33	11	8,597	256	150
Total tested for lead 1/1/2013 to 12/31/2013:	12,199	498	136	171,909	8,725	3,779
Number of test results ≥5µg/dL 1/1/2013 to 12/31/13:	1,499	54	16	7,488	219	115
Total tested for lead 1/1/2014 to 12/31/2014:	12,684	441	112	166,975	8,044	3,585
Number of test results ≥5µg/dL 1/1/2014 to 12/31/14:	1,422	44	12	6,756	228	139
Total tested for lead 1/1/2015 to 11/13/2015:	11,685	860	526	143,225	7,835	3,995
Number of test results ≥5µg/dL 1/1/2015 to 11/13/2015:	1,195	30	15	5,704	204	124
Total tested for lead 10/1/2015 to 11/13/2015:	1,615	483	392	17,620	1,942	1,361
Number of test results ≥5µg/dL 10/1/2015 to 11/13/2015:	160	11	9	781	44	30

** Data for Quarter 4 of 2015 are incomplete and subject to change*

This Document is a Non-Responsive Attachment.

From: Wells, Eden (DHHS)
Sent: Friday, December 04, 2015 9:09 AM
To: Clifford Wells
Subject: Fw: FOR IMMEDIATE RELEASE: MDHHS releases latest data outlining blood lead levels in Flint; Follow-up care, case management resources continue for families

just so you can see my life

From: Wells, Eden (DHHS)
Sent: Friday, December 4, 2015 9:08 AM
To: Miller, Corinne (DHHS)
Subject: Fw: FOR IMMEDIATE RELEASE: MDHHS releases latest data outlining blood lead levels in Flint; Follow-up care, case management resources continue for families

---

From: Marc Edwards <edwardsm@vt.edu>
Sent: Thursday, December 3, 2015 3:44 PM
To: Wells, Eden (DHHS); 'Lawrence Reynolds'; 'Kirk Smith'; 'Mona Hanna-Attisha'; 'Peter Levine'; 'Laura Caravallah'; 'Kay Doerr'; 'Laura Sullivan'; 'Dr. Lawrence Reynolds, M.D.'; 'Laura Carravallah'; 'Valacak, Mark'; 'Andy Leavitt'; 'Base Camp Email'; Lasher, Geralyn (DHHS); Eisner, Jennifer (DHHS); Dykema, Linda D. (DHHS)
Subject: RE: FOR IMMEDIATE RELEASE: MDHHS releases latest data outlining blood lead levels in Flint; Follow-up care, case management resources continue for families

Eden,

I support frequent updates. Mona and her team can continue to do the GIS work and track progress (or lack thereof) in the blood leads. I think that overall, the latest data implies we are on the right track.
We can use the updates to reinforce the importance of using the filters and bottled water that are being provided....

Best Regards,

Marc

From: Wells, Eden (DHHS) [mailto:WellsE3@michigan.gov]
Sent: Thursday, December 03, 2015 3:39 PM
To: Lawrence Reynolds; Kirk Smith; Mona Hanna-Attisha; Peter Levine; Laura Caravallah; Kay Doerr; Laura Sullivan; Dr. Lawrence Reynolds, M.D.; Laura Carravallah; Marc Edwards; Valacak, Mark; Andy Leavitt; Base Camp Email; Lasher, Geralyn (DHHS); Eisner, Jennifer (DHHS); Dykema, Linda D. (DHHS)
Subject: Re: FOR IMMEDIATE RELEASE: MDHHS releases latest data outlining blood lead levels in Flint; Follow-up care, case management resources continue for families

Hi Dr. Reynolds,

I just got done with an email with Mona---

This is a general public report that is high level--not a technical report, and was not meant to represent a technical report. This is general information--of course our surveillance program is tracking by zip, Medicaid, locality, etc.

We can discuss further what type of reporting may be useful to a technical audience---as long as not identifiable (some zips have to be suppressed) I don't see why this can't be done (probably not every two weeks like this public one would be)

Warm Regards,

Eden

Eden V. Wells, MD, MPH, FACPM
Chief Medical Executive
Michigan Department of Health and Human Services
201 Townsend Street, 5th Floor CVB
Lansing, MI 48913
Phone: 517-335-8011
wellse3@michigan.gov

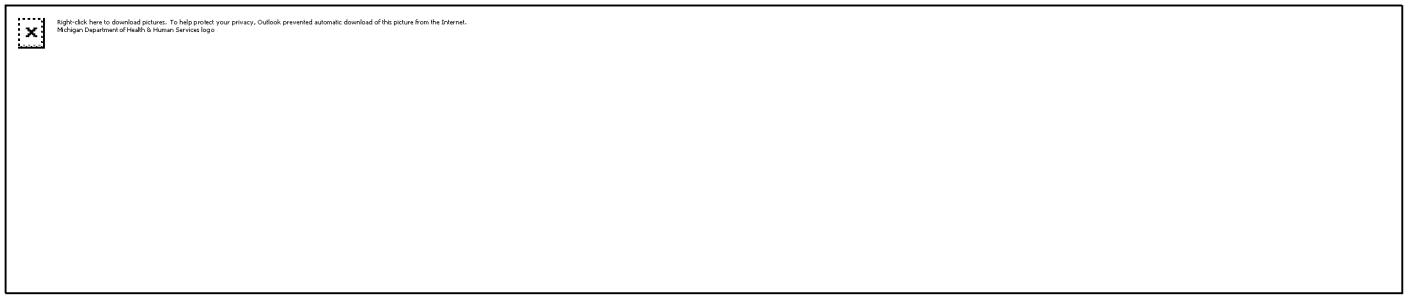
From: Lawrence Reynolds <lrey52@gmail.com>
Sent: Thursday, December 3, 2015 3:25 PM
To: Wells, Eden (DHHS); Kirk Smith; Mona Hanna-Attisha; Peter Levine; Laura Caravallah; Kay Doerr; Laura Sullivan; Dr. Lawrence Reynolds, M.D.; Laura Carravallah; Marc Edwards; Valacak, Mark; Andy Leavitt; Base Camp Email
Subject: Fwd: FOR IMMEDIATE RELEASE: MDHHS releases latest data outlining blood lead levels in Flint; Follow-up care, case management resources continue for families

This is a good start but maybe lacking context . Would GIS software identify clusters ? I am disappointed to see, at this moment , thatDr. Edward's study and Dr. Mona's study which have more granular reporting are given no credence. Is there a reason ?
---------- Forwarded message ----------
From: **Kirk Smith** <ksmith@flint.org>
Date: Thu, Dec 3, 2015 at 3:01 PM
Subject: Fwd: FOR IMMEDIATE RELEASE: MDHHS releases latest data outlining blood lead levels in Flint; Follow-up care, case management resources continue for families
To: "lrey52@gmail.com" <lrey52@gmail.com>, "MHanna1@hurleymc.com" <MHanna1@hurleymc.com>, "plevine@gcms.org" <plevine@gcms.org>, "lsulliva@kettering.edu" <lsulliva@kettering.edu>

Begin forwarded message:

> **From:** Michigan Department of Health and Human Services
> <MDHHS@govsubscriptions.michigan.gov>

Date: December 3, 2015 at 2:32:05 PM EST
To: <ksmith@flint.org>
Subject: FOR IMMEDIATE RELEASE: MDHHS releases latest data outlining blood lead levels in Flint; Follow-up care, case management resources continue for families
Reply-To: <MDHHS@govsubscriptions.michigan.gov>



Press Release

FOR IMMEDIATE RELEASE: December 3, 2015
CONTACT: Jennifer Eisner, (517) 241-2112

MDHHS releases latest data outlining blood lead levels in Flint

Follow-up care, case management resources continue for families

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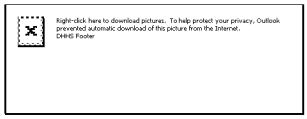
# # #

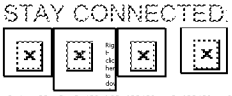
- Flint Blood Lead Level Summary Report December.pdf
- Flint EBL Data Press Release.pdf



Become a foster parent through Michigan Department of Health & Human Services foster care program.

Questions? Contact Us

STAY CONNECTED:



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This email was sent to ksmith@flint.org using GovDelivery, on behalf of: Michigan Dept of Health & Human Services · 235 S. Grand Ave W. · Lansing, MI 48909 · 1-855-275-6424

--

Lawrence Reynolds

From: Wells, Eden (DHHS)
Sent: Friday, December 04, 2015 9:44 AM
To: Bouters, Janese (DHHS)
Subject: Re: FOR IMMEDIATE RELEASE: MDHHS releases latest data outlining blood lead levels in Flint; Follow-up care, case management resources continue for families

Thanks much!

From: Bouters, Janese (DHHS)
Sent: Friday, December 4, 2015 9:40 AM
To: Wells, Eden (DHHS); Mona Hanna-Attisha
Cc: Miller, Corinne (DHHS)
Subject: RE: FOR IMMEDIATE RELEASE: MDHHS releases latest data outlining blood lead levels in Flint; Follow-up care, case management resources continue for families

Thank you. I'll go ahead and send the appt.

From: Wells, Eden (DHHS)
Sent: Friday, December 04, 2015 9:37 AM
To: Bouters, Janese (DHHS) <BoutersJ@michigan.gov>; Mona Hanna-Attisha <MHanna1@hurleymc.com>
Cc: Miller, Corinne (DHHS) <MillerC39@michigan.gov>
Subject: Re: FOR IMMEDIATE RELEASE: MDHHS releases latest data outlining blood lead levels in Flint; Follow-up care, case management resources continue for families

For now, yes...If Mona can't make it, she will let us know--her life is guided by patient care!

E

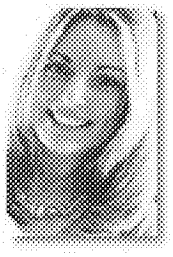
From: Bouters, Janese (DHHS)
Sent: Friday, December 4, 2015 9:24 AM
To: Wells, Eden (DHHS); Mona Hanna-Attisha
Cc: Miller, Corinne (DHHS)
Subject: RE: FOR IMMEDIATE RELEASE: MDHHS releases latest data outlining blood lead levels in Flint; Follow-up care, case management resources continue for families

Good morning,

We have a conference line available at 1PM this afternoon. Shall I schedule for 1-2PM?

Thank you,

Janese Bouters
Executive Secretary to Corinne Miller
Bureau of Disease Control, Prevention and Epidemiology
Michigan Department of Health & Human Services
201 Townsend Street
Lansing, Michigan 48913
Phone: (517) 335-8731
Fax: (517) 335-8263



From: Wells, Eden (DHHS)
Sent: Friday, December 04, 2015 9:15 AM
To: Mona Hanna-Attisha <MHanna1@hurleymc.com>
Cc: Miller, Corinne (DHHS) <MillerC39@michigan.gov>; Bouters, Janese (DHHS) <BoutersJ@michigan.gov>
Subject: Re: FOR IMMEDIATE RELEASE: MDHHS releases latest data outlining blood lead levels in Flint; Follow-up care, case management resources continue for families

Hi Mona,

I talked with Corinne just now.....do you still have time at 1? Janese can set up a conference call---

Eden

From: Mona Hanna-Attisha <MHanna1@hurleymc.com>
Sent: Thursday, December 3, 2015 7:30 PM
To: Wells, Eden (DHHS)
Subject: RE: FOR IMMEDIATE RELEASE: MDHHS releases latest data outlining blood lead levels in Flint; Follow-up care, case management resources continue for families

sounds good. as of now, I can talk tomorrow before 8:30am, 1-2pm, or after 3:30pm.

FYI I am working with Hurley Children's, MSU, and maybe the GCHD to create a sort of Pediatric Public Health Collaborative that would house the ongoing assessment/long term followup/research/continued monitoring that we are doing as well as some of the secondary prevention interventions which include all of peds public health. The team will include part of me (30%), research support, epidemiologist, GIS, toxic stress researchers, etc. The reason I wanted to include the health dept was primarily for access to data - like the BLLs - but also to prevent redundancy of interventions. MSU and the health dept already have an academic health dept relationship, but I don't think it includes data sharing.

From: Wells, Eden (DHHS) [WellsE3@michigan.gov]
Sent: Thursday, December 03, 2015 7:19 PM
To: Mona Hanna-Attisha
Subject: Re: FOR IMMEDIATE RELEASE: MDHHS releases latest data outlining blood lead levels in Flint; Follow-up care, case management resources continue for families

I like that idea- and I don't foresee an issue with such an agreement. I hope you understand that this is just one form of a surveillance report, and there can be others- but we really wanted to get the testing data started.

Shall we discuss with State Epidemiologist-/could set up call even tomorrow- will share your request with Nick right now

Sent from my iPhone

On Dec 3, 2015, at 6:59 PM, Mona Hanna-Attisha <MHanna1@hurleymc.com> wrote:

Do you think it would be possible to create a data sharing agreement so that we could do the real-time geocoding of kids with EBLL's? So whenever a EBLL comes in for Genesee county, my team can map it, trend it, etc? You guys may already be doing this, but we easily have the GIS support. This real time mapping will further help us identify hot spots for resource delivery and remediation.

Mona Hanna-Attisha MD MPH
Director, Pediatric Residency Program
Hurley Children's Hospital at Hurley Medical Center
Assistant Professor, Department of Pediatrics and Human Development
Michigan State University College of Human Medicine
mhanna1@hurleymc.com

From: Wells, Eden (DHHS) [WellsE3@michigan.gov]
Sent: Thursday, December 03, 2015 4:19 PM
To: Reynolds, Lawrence; Lawrence Reynolds; Kirk Smith; Mona Hanna-Attisha; Peter Levine; Laura Caravallah; Kay Doerr; Laura Sullivan; Laura Carravallah; Marc Edwards; Valacak, Mark; Andy Leavitt; Base Camp Email; Lasher, Geralyn (DHHS); Eisner, Jennifer (DHHS); Dykema, Linda D. (DHHS)
Subject: Re: FOR IMMEDIATE RELEASE: MDHHS releases latest data outlining blood lead levels in Flint; Follow-up care, case management resources continue for families

You are correct, Larry, that the MDHHS data is pulled out of the Data Warehouse by Flint zip.

Eden

From: Reynolds, Lawrence <LawrenceR@mottchc.org>
Sent: Thursday, December 3, 2015 3:49 PM
To: Wells, Eden (DHHS); Lawrence Reynolds; Kirk Smith; Mona Hanna-Attisha; Peter Levine; Laura Caravallah; Kay Doerr; Laura Sullivan; Laura Carravallah; Marc Edwards; Valacak, Mark; Andy Leavitt; Base Camp Email; Lasher, Geralyn (DHHS); Eisner, Jennifer (DHHS); Dykema, Linda D. (DHHS)
Subject: RE: FOR IMMEDIATE RELEASE: MDHHS releases latest data outlining blood lead levels in Flint; Follow-up care, case management resources continue for families

My understanding is that the other data set is by 9 Flint wards so only Flint homes are in the data set vs including those with Flint mailing addresses with zip codes.Please correct me if needed.

From: Wells, Eden (DHHS) [mailto:WellsE3@michigan.gov]
Sent: Thursday, December 03, 2015 3:39 PM
To: Lawrence Reynolds; Kirk Smith; Mona Hanna-Attisha; Peter Levine; Laura Caravallah; Kay Doerr; Laura Sullivan; Reynolds, Lawrence; Laura Carravallah; Marc Edwards; Valacak, Mark; Andy Leavitt; Base Camp Email; Lasher, Geralyn (DHHS); Eisner, Jennifer (DHHS); Dykema, Linda D. (DHHS)
Subject: Re: FOR IMMEDIATE RELEASE: MDHHS releases latest data outlining blood lead levels in Flint; Follow-up care, case management resources continue for families

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I just got done with an email with Mona---

This is a general public report that is high level--not a technical report, and was not meant to represent a technical report. This is general information--of course our surveillance program is tracking by zip, Medicaid, locality, etc.

We can discuss further what type of reporting may be useful to a technical audience---as long as not identifiable (some zips have to be suppressed) I don't see why this can't be done (probably not every two weeks like this public one would be)

Warm Regards,

Eden

Eden V. Wells, MD, MPH, FACPM
Chief Medical Executive
Michigan Department of Health and Human Services
201 Townsend Street, 5th Floor CVB
Lansing, MI 48913
Phone: 517-335-8011
wellse3@michigan.gov

From: Lawrence Reynolds <lrey52@gmail.com>
Sent: Thursday, December 3, 2015 3:25 PM
To: Wells, Eden (DHHS); Kirk Smith; Mona Hanna-Attisha; Peter Levine; Laura Caravallah; Kay Doerr; Laura Sullivan; Dr. Lawrence Reynolds, M.D.; Laura Carravallah; Marc Edwards; Valacak, Mark; Andy Leavitt; Base Camp Email
Subject: Fwd: FOR IMMEDIATE RELEASE: MDHHS releases latest data outlining blood lead levels in Flint; Follow-up care, case management resources continue for families

This is a good start but maybe lacking context . Would GIS software identify clusters ? I am disappointed to see, at this moment , thatDr. Edward's study and Dr. Mona's study which have more granular reporting are given no credence. Is there a reason ?

---------- Forwarded message ----------
From: **Kirk Smith** <ksmith@flint.org>
Date: Thu, Dec 3, 2015 at 3:01 PM
Subject: Fwd: FOR IMMEDIATE RELEASE: MDHHS releases latest data outlining blood lead levels in Flint; Follow-up care, case management resources continue for families
To: "lrey52@gmail.com" <lrey52@gmail.com>, "MHanna1@hurleymc.com" <MHanna1@hurleymc.com>, "plevine@gcms.org" <plevine@gcms.org>, "lsulliva@kettering.edu" <lsulliva@kettering.edu>

Begin forwarded message:
From: Michigan Department of Health and Human Services <MDHHS@govsubscriptions.michigan.gov>
Date: December 3, 2015 at 2:32:05 PM EST
To: <ksmith@flint.org>
Subject: FOR IMMEDIATE RELEASE: MDHHS releases latest data outlining blood lead levels in Flint; Follow-up care, case management resources continue for families
Reply-To: <MDHHS@govsubscriptions.michigan.gov>

Press Release

FOR IMMEDIATE RELEASE: December 3, 2015
CONTACT: Jennifer Eisner, (517) 241-2112

MDHHS releases latest data outlining blood lead levels in Flint

Follow-up care, case management resources continue for families

LANSING, Mich. – Preliminary data indicates that 30 of 1,361 adults and children tested in Flint since October 1 had elevated blood lead levels, according to a report issued today by the Michigan Department of Health and Human Services.

This marks the first summary report on lead testing called for in the state's action plan related to health concerns about Flint's water infrastructure.

"Our goal is to help families reduce their exposure to lead sources," said Dr. Eden Wells, MDHHS chief medical executive. "We have made progress in testing and identifying those with elevated blood lead levels, and the department will continue to work closely with the Genesee County Health Department to reach these families. We will remain diligent in our ongoing outreach and education efforts."

Information comes from tests administered citywide to 1,361 children and adults since October 1. Tests showed that 21 of 969 children age 17 or younger and 9 of 392 adults over the age 18 were identified with

elevated blood lead levels.

The report covers test results reported to MDHHS since the state action plan was put in place Oct. 2. It includes the number of tests and number of elevated blood lead levels greater than 5 micrograms per deciliter, and captures both capillary and venous blood tests that have been reported to MDHHS since the beginning of October. People who have had multiple tests are counted only once. Five micrograms per deciliter is the level that the Centers for Disease Control and Prevention considers elevated and triggers health care professional follow up with families.

The full report is posted online at www.michigan.gov/flintwater and will be updated as more data becomes available.

When reviewing historical trend data, the risk of lead exposure is highest during the third quarter of each year – July through September. Seasonal variation is the result of a number of factors including increased exposure to lead in dust and soil in the summer months.

In the third quarter of 2010, 8.3 percent of Flint children 6 and under showed elevated blood lead levels. The figure gradually decreased to 4.1 percent in the third quarter of 2013. During the same months in 2014, the figure increased to 7.5 percent and decreased to 6.4 percent in the third quarter of 2015.

Last month, MDHHS collaborated with the county health department and local partners to distribute educational resources and informational letters to Flint parents regarding lead testing. The state is providing funding for GCHD nurses to work with families when an elevated blood lead level has been detected. During these follow-up visits, nurses coordinate with environmental health investigators to meet with families in their homes to identify lead exposures, address questions and provide water filters. People can be exposed to lead from paint, soil, plumbing and other sources.

MDHHS continues to provide free water filters and replacement cartridges to Flint residents at four locations, including the MDHHS Flint offices and the Genesee County Community Action Resource Department. For a full list of locations and hours of distribution, visit www.michigan.gov/flintwater.

To help residents properly install water filters, and to demonstrate how to replace the original when it expires, MDHHS has created an instructional video on its YouTube channel. For updates, visit www.michigan.gov/flintwater.

# # #

- Flint Blood Lead Level Summary Report December.pdf
- Flint EBL Data Press Release.pdf

Become a foster parent through Michigan Department of Health & Human Services foster care program.

Questions? Contact Us

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This email was sent to ksmith@flint.org using GovDelivery, on behalf of: Michigan Dept of Health & Human Services · 235 S. Grand Ave W. · Lansing, MI 48909 · 1-855-275-6424

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Lawrence Reynolds

From: Wells, Eden (DHHS)
Sent: Wednesday, December 09, 2015 10:15 AM
To: Miller, Corinne (DHHS);Moran, Susan (DHHS);Dykema, Linda D. (DHHS)
Subject: Moran/Miller/Wells sections
Attachments: Intensified Screening Efforts for Children on Medicaid_GTF_1Response.docx

Medicaid/Blood Lead Testing and Provider Engagement-Moran/Miller/Wells combined.

E

From: Miller, Corinne (DHHS)
Sent: Wednesday, December 09, 2015 8:49 AM
To: Wells, Eden (DHHS) <WellsE3@michigan.gov>
Subject: FW: scanned document

Sorry!!!!!!!!!!!!!!!comment/edit if you can. This is in response to the first task force document.

Bullets 1 & 2 of first draft letter indicate

Bullet 1: MDHHS should set minimum BLL screening goals among Flint children < 6 years of age enrolled in Medicaid at 80% with a more aggressive target of 100 percent. Goals should be monitored weekly and if not met MDHHS should establish progressively intensified screening efforts if goals are not met. Intensified screening efforts should be coordinated with local providers to minimize disruption of children's medical homes to ensure appropriate clinical follow-up.

Response: The MDHHS Medicaid goal for BLL screening among Flint children < 6 years of age is 80%. 80% BLL testing is the first target for this age group. MDHHS met with Medicaid health plans during the week of November 30. Medicaid met with health plan CEOs that same week and a discussion of Flint was placed on the agenda. Dr. Wells participated by telephone in this meeting to describe the situation in Flint and the need for testing. MDHHS Medicaid leadership identified individuals to work with childhood lead poisoning epidemiology staff to develop methods for tracking testing of Flint children enrolled in Medicaid. Due to the data sources, measurement of the 80% goal is set at bi-weekly, not weekly as recommended by the task force. MDHHS developed a Health Alert Network (HAN) message to be distributed to providers after review by the local health department. The HAN recommends testing of any child < 6 in Flint who has not been tested, not only those who are 1 and 2 years of age. Medicaid health plan staff along with MDHHS childhood lead poisoning program staff are planning to host a meeting with Flint health care providers in early 2016. MDHHS will involve Flint-based primary care providers in the meeting planning to assure the meeting as a focus that represents community needs.

Bullet 2: Broaden blood lead level testing among infants (under 12 months of age in Flint), especially those infants living in high risk Zip codes. The most appropriate partners for this effort are primary care providers and WIC clinics.

Response: The HAN mentioned above particularly requests testing of infants in Flint. In addition, testing of this age group will be on the meeting agenda mentioned above. Testing of infants will be looked at separately in the metrics developed by the Medicaid and childhood lead poisoning epidemiology workgroup. In addition, the WIC program is committed to assuring that the youngest children are protected and will work closely with the MDHHS childhood lead poisoning project on messaging. The Medicaid and childhood lead poisoning workgroup will set a metric to the degree possible that identifies proportions of Flint infants in WIC who have been tested for elevated blood lead levels.

From: Dykema, Linda D. (DHHS)
Sent: Tuesday, December 08, 2015 8:35 AM
To: Miller, Corinne (DHHS) <MillerC39@michigan.gov>; Moran, Susan (DHHS) <MoranS@michigan.gov>; Wells, Eden (DHHS) <WellsE3@michigan.gov>; Peeler, Nancy (DHHS) <PeelerN@michigan.gov>
Cc: Bruneau, Michelle (DHHS) <BruneauM@michigan.gov>
Subject: RE: scanned document
Importance: High

Slightly revised timeline: please have your sections to me by 9:00 am on Wednesday. I'll pull them all together and send to Sue by Wed. noon. Thanks

---

From: Miller, Corinne (DHHS)
Sent: Monday, December 07, 2015 3:33 PM
To: Dykema, Linda D. (DHHS); Moran, Susan (DHHS); Wells, Eden (DHHS); Peeler, Nancy (DHHS)
Cc: Bruneau, Michelle (DHHS)
Subject: RE: scanned document
Importance: High

Despite the fact that we don't have the modified letter, Nick requested that we pull together our responses to this draft document. Nick/Geralyn would like this by tomorrow, so can we all get our drafts to Linda Dykema by noon tomorrow for consolidation.

From: Dykema, Linda D. (DHHS)
Sent: Thursday, December 03, 2015 5:37 PM
To: Moran, Susan (DHHS) <MoranS@michigan.gov>; Miller, Corinne (DHHS) <MillerC39@michigan.gov>; Wells, Eden (DHHS) <WellsE3@michigan.gov>; Peeler, Nancy (DHHS) <PeelerN@michigan.gov>
Cc: Bruneau, Michelle (DHHS) <BruneauM@michigan.gov>
Subject: FW: scanned document
Importance: High

As Sue indicates below, we'll likely receive something similar to the attached letter from the Task Force. Director Lyon would like a prepared response by Monday…which means we need to have drafts done by COB tomorrow (Friday 12/4/15).

Sue suggested we prepare responses to the final set of bullets on pages 2 and 3, and staff that can best respond as follows:

- Bullets 1 and 2, Corinne with help from Sue and Eden
- Bullet 3, Nancy Peeler for the case management response portion and myself for the EBL Env. Portion.
- Bullet 4, Michelle and I can describe our communication efforts
- Bullets 5 and 6, all me
- Bullet 7, Nancy Peeler

Sue, please correct if I didn't get this right.

From: Moran, Susan (DHHS)
Sent: Thursday, December 03, 2015 10:42 AM
To: Dykema, Linda D. (DHHS); Miller, Corinne (DHHS)

Cc: Wells, Eden (DHHS)
Subject: FW: scanned document

Heads Up: this is draft of letter that will likely be sent to MDHHS in the next day or so---it includes a number of recommendations from the Flint Water Advisory Task Force. We will need to respond the letter, and that effort will likely need to include input from several on the Flint Water Project Team- **will ask Linda to coordinate the drafting of the response letter.**

FYI: Eden and I have a call later today with Matt Davis- Matt has advocated for a number of actions including activating the "Division of Emergency Preparedness and Response". In our call today, we would like to update Matt on actions we have implemented or in process.

From: Anderson, Paula (DHHS)
Sent: Thursday, December 03, 2015 9:39 AM
To: Moran, Susan (DHHS)
Subject: scanned document

Here you go.

Intensified Screening Efforts for Children on Medicaid

It is well established from studies conducted during the 1980s and 1990s that that children eligible for Medicaid are at increased risk for lead exposure and that children living in poverty have higher levels of lead exposure than those who were not living in poverty. The primary purpose of childhood blood lead screening is to identify asymptomatic children with Elevated Blood Lead Levels (EBLL) so that they can promptly receive services to reduce lead exposure and improve health outcomes.

Regarding Bullet 1 of Governor's Task Force Draft Letter: MDHHS should set minimum BLL screening goals among Flint children < 6 years of age enrolled in Medicaid at 80% with a more aggressive target of 100 percent. Goals should be monitored weekly and if not met MDHHS should establish progressively intensified screening efforts if goals are not met. Intensified screening efforts should be coordinated with local providers to minimize disruption of children's medical homes to ensure appropriate clinical follow-up.

Response: The MDHHS Medicaid goal for BLL screening among Flint children < 6 years of age is 80%. 80% BLL testing is the first target for this age group. MDHHS met with Medicaid health plans during the week of November 30. Medicaid met with health plan CEOs that same week and a discussion of Flint was placed on the agenda. Dr. Wells participated by telephone in this meeting to describe the situation in Flint and the need for testing. MDHHS Medicaid leadership identified individuals to work with childhood lead poisoning epidemiology staff to develop methods for tracking testing of Flint children enrolled in Medicaid. Due to the data sources, measurement of the 80% goal is set at bi-weekly, not weekly as recommended by the task force. MDHHS developed a Health Alert Network (HAN) message to be distributed to providers after review by the local health department. The HAN recommends testing of any child < 6 in Flint who has not been tested, not only those who are 1 and 2 years of age. Medicaid health plan staff along with MDHHS childhood lead poisoning program staff are planning to host a meeting with Flint health care providers in early 2016. MDHHS will involve Flint-based primary care providers in the meeting planning to assure the meeting as a focus that represents community needs.

Bullet 2: Broaden blood lead level testing among infants (under 12 months of age in Flint), especially those infants living in high risk Zip codes. The most appropriate partners for this effort are primary care providers and WIC clinics.

Response: The HAN mentioned above particularly requests testing of infants in Flint. In addition, testing of this age group will be on the meeting agenda mentioned above. Testing of infants will be looked at separately in the metrics developed by the Medicaid and childhood lead poisoning epidemiology workgroup. In addition, the WIC program is committed to assuring that the youngest children are protected and will work closely with the MDHHS childhood lead poisoning project on messaging. The Medicaid and childhood lead poisoning workgroup will set a metric to the degree possible that identifies proportions of Flint infants in WIC who have been tested for elevated blood lead levels.

ENGAGEMENT OF COMMUNITY PROVIDERS< HEALTH PLANS AND THEIR PROVIDERS TO ENHANCE TESTING

Dr. Wells, Chief Medical Executive, has been working with local pediatrician, Dr. Mona Hanna-Attisha and Dr. Larry Reynolds, among others, to ensure that provider issues and concerns are being addressed.

- Dr. Hanna-Attisha has been part of the groups developed initial provider and parent letters to the community in October 2015.
- Dr. Wells has met with Dr. Dean Sienko, Dean of the MSU School of Public Health and MSU leaders along with Dr. Mona Hanna-Attisha and Marc Edwards to brainstorm aon community-0based efforts needed to address the event, as well as to discuss potential studies necessary to monitor health impacts and community needs.
- Dr. Wells serves on the Mayor's Technical Advisory Committee, as well as the weekly Mayor's meeting with MDEQ and MDHHS(along with Lind a Dykema from MDHHS Division of Environmental Health).
- Dr. Wells has addressed a number of issued form the Genesee County Board of Health regarding concerns regarding pregnant women, breast-feeding and people with Wilson's Disease.

HEALTH ALERT AND PROVIDER LETTER

Michigan Medicaid Early Periodic Screening, Diagnosis and Treatment (EPSDT) guidelines require children to be tested for blood lead poisoning at 12 months and 24 months, and between the ages of 36-72 months if not previously tested (http://www.mdch.state.mi.us/dch-medicaid/manuals/MedicaidProviderManual.pdf). Due to the enhanced public health issue of an increased risk for lead exposure in the City of Flint, providers have been advised to follow enhanced guidelines for lead testing in children:

- *Providers should screen ALL children (regardless of Medicaid/insurance status) aged 0-6 years of age exposed to Flint city drinking water after April 2014. Note: this includes all children younger than 1 year and children between the ages of 3-6 years.*

- *If the child has already been screened within the time period of April 2014-present by a capillary test, healthcare providers should follow-up on any elevated levels >5mcg/dl to ensure confirmatory venous testing is conducted.*

- *Utilize the standard Blood Lead Level (BLL) Quick Reference for Primary Care Providers at http://www.mi.gov/documents/deq/ProviderQuickReference_Sept2015_501831_7.pdf?2015120412273 9*

- *All clients with blood lead levels greater than 5mcg/dl should be referred for case management coordinated through Genesee County Health Department.*

- *Providers should inquire about use of a drinking water filter and/or bottled water in all clients residing in city limits.*

- *Healthcare providers should inquire about other potential sources of lead in the household per current recommendations (see: https://www.michigan.gov/documents/mdch/testing-screening071009_287511_7.pdf)*

The majority of children living in Flint exposed to Flint water supply have Medicaid as their source of health care coverage and are enrolled in one of the [redacted] Medicaid Health Plans that serve enrollees in Genesee County. Partnering with Medicaid Health Plans to accelerate lead testing efforts is a key strategy to increase the reach of blood lead testing in children 1-5 years of age. The Chief Medical Executive, Dr. Eden Wells, recently highlighted this imperative at a meeting with the Chief Executive Officers of the Medicaid Health Plans and the MDHHS Medicaid Director and his senior leadership team. The information outlined above will be sent to all hospitals and healthcare providers in Flint via Blast Fax and the Heath Alert Network system. Other provider liaison activities include the following:

Further, a technical workgroup comprised of Medicaid data analytic and public health surveillance experts are meeting to develop Medicaid specific EBLL dashboard that will utilized to measure an overall progress in blood lead testing of 1-5 year olds.

From: Wells, Eden (DHHS)
Sent: Wednesday, December 09, 2015 12:57 PM
To: Dykema, Linda D. (DHHS);Moran, Susan (DHHS);Miller, Corinne (DHHS)
Subject: RE: draft responses
Attachments: DRAFT - MDHHS Response to FWATF 9Dec2015 sm_EW.docx

Sorry, I moved that section….sentence struck now on this draft.

From: Dykema, Linda D. (DHHS)
Sent: Wednesday, December 09, 2015 12:51 PM
To: Moran, Susan (DHHS) <MoranS@michigan.gov>; Miller, Corinne (DHHS) <MillerC39@michigan.gov>; Wells, Eden (DHHS) <WellsE3@michigan.gov>
Subject: RE: draft responses

I think that paragraph came from Eden and I wasn't sure how to edit so I left it alone. Some of it seems to go with the HAN language. Eden?

From: Moran, Susan (DHHS)
Sent: Wednesday, December 09, 2015 12:42 PM
To: Dykema, Linda D. (DHHS) <DykemaL@michigan.gov>; Miller, Corinne (DHHS) <MillerC39@michigan.gov>; Wells, Eden (DHHS) <WellsE3@michigan.gov>
Cc: Bruneau, Michelle (DHHS) <BruneauM@michigan.gov>; Peeler, Nancy (DHHS) <PeelerN@michigan.gov>
Subject: RE: draft responses

This is very well done- nice job everyone, and thank you to Linda for pulling this together in "one voice".

A small edit- question—see attached. After this corrected /addressed, good to go to Geralyn.

From: Dykema, Linda D. (DHHS)
Sent: Wednesday, December 09, 2015 12:10 PM
To: Moran, Susan (DHHS); Miller, Corinne (DHHS); Wells, Eden (DHHS)
Cc: Bruneau, Michelle (DHHS); Peeler, Nancy (DHHS)
Subject: draft responses
Importance: High

I am 10 minutes late because I took a call from EPA re the thallium poisoning case…Eden I'll fill you in later.

Attached is a compilation of everything I received re response to the Task Force letter with 3 introductory paragraphs. Thanks to everyone who provided verbiage!

Linda D. Dykema, Ph.D.
Environmental Public Health Director
Division of Environmental Health
Michigan Department of Health & Human Services
517.335.8566
dykemal@michigan.gov

The Michigan Department of Health and Human Services (MDHHS) is in receipt of the letter dated [date] that conveys the recommendations of the Flint Water Advisory Task Force. This response provides MDHHS' proposed plans to implement and internally coordinate our response to the elevated levels of lead in the Flint water supply and the resulting concerns regarding elevated blood lead levels in city of Flint residents, particularly children under the age of six years who are most vulnerable to the harmful effects of exposure to lead.

The resources and expertise to respond to the Flint drinking water concerns resides within the MDHHS Population Health & Community Services Administration (PHCSA), which has implemented a Flint Water Lead Project organizational structure to manage project activities. The structure retains our current management chain with Susan Moran in the lead for PHCSA and Dr. Corinne Miller as the lead for the Bureau of Disease Control, Prevention and Epidemiology (BDCPE). Dr. Linda Dykema, Division of Environmental Health Director, has been designated as the Project Manager and liaison to Michigan Department of Environmental Quality (MDEQ). Dr. Eden Wells, MDHHS Chief Medical Executive, is designated as the liaison to all other stakeholders including the medical community in the city of Flint. Director Nick Lyon maintains overall accountability for the MDHHS Flint Water Action Plan, and Geralyn Lasher is the point of contact for communications with the Governor's office.

The organization structure further designates MDHHS staff as leaders for specific activities that include: promoting and increasing blood lead testing for city of Flint residents, case management services by nurses trained to provide education and assistance to families of Flint children with elevated blood lead levels, environmental investigation services to test household water and identify other sources of lead exposure in city of Flint homes, and the distribution of drinking water filters and replacement cartridges to city of Flint residents. In addition, the organizational structure includes experts in public health outreach and communication, toxicology, and epidemiological surveillance to ensure that we are monitoring the numbers of Flint residents tested and providing information and assistance to those with elevated blood lead levels.

Intensified Screening Efforts for Children on Medicaid

It is well established from studies conducted during the 1980s and 1990s that that children eligible for Medicaid are at increased risk for lead exposure and that children living in poverty have higher levels of lead exposure than those who were not living in poverty. The primary purpose of childhood blood lead screening is to identify asymptomatic children with Elevated Blood Lead Levels (EBLL) so that they can promptly receive services to reduce lead exposure and improve health outcomes.

Bullet 1 of Governor's Task Force Draft Letter: MDHHS should set minimum blood lead level (BLL) screening goals among Flint children < 6 years of age enrolled in Medicaid at 80 percent with a more aggressive target of 100 percent. Goals should be monitored weekly and if not met MDHHS should establish progressively intensified screening efforts if goals are not met. Intensified screening efforts should be coordinated with local providers to minimize disruption of children's medical homes to ensure appropriate clinical follow-up.

Response: The MDHHS Medicaid goal for BLL screening among Flint children less than 6 years of age is 80%. 80% BLL testing is the first target for this age group. MDHHS met with Medicaid health plans during the week of November 30, 2015. Medicaid met with health plan CEOs that same week and a discussion of Flint was placed on the agenda. Dr. Eden Wells participated by telephone in this meeting to describe the situation in Flint and the need for testing. MDHHS Medicaid leadership identified

individuals to work with childhood lead poisoning epidemiology staff to develop methods for tracking testing of Flint children enrolled in Medicaid. Due to the data sources, measurement of the 80% goal is set at bi-weekly, not weekly as recommended by the task force. MDHHS developed a Health Alert Network (HAN) message to be distributed to providers after review by the local health department. The HAN recommends testing of any child less than six years of age in Flint who has not been tested, not only those who are one and two years of age. Medicaid health plan staff along with MDHHS childhood lead poisoning program staff are planning to host a meeting with Flint health care providers in early 2016. MDHHS will involve Flint-based primary care providers in the meeting planning to assure the meeting as a focus that represents community needs.

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[This is the draft text of the HAN, not sure where you want this or whether to include]

HEALTH ALERT AND PROVIDER LETTER

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- *All clients with blood lead levels greater than 5mcg/dl should be referred for case management coordinated through Genesee County Health Department.*
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The majority of children living in Flint exposed to Flint water supply have Medicaid as their source of health care coverage and are enrolled in one of the [redacted] Medicaid Health Plans that serve enrollees in Genesee County. Partnering with Medicaid Health Plans to accelerate lead testing efforts is a key strategy to increase the reach of blood lead testing in children 1-5 years of age. The Chief Medical Executive, Dr. Eden Wells, recently highlighted this imperative at a meeting with the Chief Executive Officers of the Medicaid Health Plans and the MDHHS Medicaid Director and his senior leadership team. The information outlined above will be sent to all hospitals and healthcare providers in Flint via Blast Fax and the Heath Alert Network system. ~~Other provider liaison activities include the~~ following: Further, a technical workgroup comprised of Medicaid data analytic and public health surveillance experts are meeting to develop Medicaid specific EBLL dashboard that will utilized to measure ~~an~~ overall progress in blood lead testing of 1-5 year olds.

Comment [MS(1): Is there supposed to be a list here?

Bullet 3 of Governor's Task Force Draft Letter: Enhance follow up for children found to have blood lead levels ≥ 5 micrograms per deciliter. The increased case management capacity in Flint that has been implemented to date is a promising first step. This must be accompanied by assiduous implementation of the follow-up programs, to maximize the rate of follow up testing for children known to have had elevated lead levels and to optimize the in-home remediation for each child.

Response: MDHHS has established a contract with the Genesee County Health Department (GCHD) to provide Case Management services for children identified with elevated capillary or venous samples that were drawn after April 1, 2014. To date, GCHD has hired 2.5 FTE, with a third 1.0 FTE position posted. The current GCHD Case Management staff have received training, and are implementing an updated Case Management protocol that was modified to reflect the circumstances in Flint (added components related to water and filters). They are working closely with the contractors that will be providing the Elevated-Blood Lead level (EBL) investigations to facilitate their link to the families.

As of December 4, 2015, the Genesee County Health Department has attempted to establish contact with the families of all 171 children identified with elevated capillary or venous samples that were drawn after April 1, 2014. The GCHD has successfully contacted the families of 40% of these children. To date, ten families have accepted the offer of services and received visits, with another six visits

pending in the upcoming week. In addition, MDHHS has arranged for services in other counties for 3 families (4 children) who have re-located to those other counties.

MDHHS holds weekly status calls with the GCHD Case Management staff; those calls have thus far focused on initial implementation of the Case Management services. With implementation underway, we are now in a position to shift the focus to monitoring the outcomes, and begin to identify and implement improvements to find more families, work with more families, and deliver more services. We will adopted a Continuous Quality Improvement framework to support this work. In collaboration with GCHD staff, we have begun to analyze the barriers and challenges they are finding as they offer services to families. Next steps will be to review these challenges with our internal team to identify any policy or practices at the state level that can be clarified or modified to support greater success. Simultaneously, the GCHD staff are discussing these challenges internally, and identifying where they believe improvements can be made. We have an in-person meeting scheduled in December to review findings and discuss next steps. We anticipate that this cycle of analysis and improvement will continue on a regular basis, and we will monitor the Case Management data to assess whether the steps we are taking is yielding results.

The MDHHS Lead Safe Homes Program has entered into a contract with Michigan-based Environmental Testing & Consultants (ETC) to conduct an elevated blood level (EBL) environmental home inspection in every home of a Flint child with an elevated blood lead level, if the family allows the inspection. The Lead Safe Homes program staff overseeing the contract communicate almost daily with ETC and the GCHD Case Management staff to coordinate home visits with the goal of inconveniencing the families as little as possible while providing comprehensive outreach and services.

The purpose of the investigation is to identify all probable causes of the lead poisoning in order to protect the child from further exposure and physical harm. The scope of the investigation will focus on all sources of lead in the child's environment, including drinking water, dust and soil, as well as household items (i.e., ceramics, cultural/medicinal remedies, occupational take-home sources), and other places the child frequents such as day-care and other family members' homes. An extensive interview with the child's primary caretaker is conducted to take into account the child's behavior and other occupant use patterns.

At the conclusion of the EBL environmental investigation, ETC will develop an EBL Report of their findings and recommendations, which is provided to both MDHHS and the family. Every family will be provided with the application for the Lead Safe Homes program and if they qualify, the EBL Report will be used to guide abatement activities in that home. Some typical abatement activities include replacing doors and windows (a common source of lead-paint dust), encapsulating lead-based paint, and covering or removing lead-contaminated soil. Some sources of abatement funds (e.g., the U.S. Department of Housing and Urban Development) do not allow grant funding to be used to replace household plumbing components.

Services provided to each EBL child in Flint will be tracked by MDHHS staff to ensure families are offered all possible opportunities to avail themselves of the assistance provided by local and state agencies.

Bullet 4 of Governor's Task Force Draft Letter: Establish stronger communication with throughout the Flint community about the risks of lead in the environment for children, and toe explain the steps that are being taken and how the community can participate. Such communication would also help address misconceptions about contaminated water in Flint (i.e., there are anecdotal reports that some

residents are discontinuing use of filters even though the water sources have not yet been established as safe) and sustain communication from the public health authorities going forward.

Response: Since early in October 2015, MDHHS has been closely working with the Genesee County Health Department (GCHD) to find scientifically-defensible answers to the questions of the community, and communicate those answers in clear and simple terms. As the boots-on-the-ground representatives, employees of GCHD have been attending meetings and giving presentations on the lead in water issue and are greatly in tune with the with the needs of the community – from questions about safe uses of water for children, adults, and pets to proper use and efficacy of filters and replacement cartridges to limit lead exposure to health effects of lead for both children and adults, including an explanation as to why children are at higher risk from lead. In addition, MDHHS is working with GCHD to anticipate and preempt questions that may arise in the future – including topics as the addition of extra phosphates to Flint water and the potential health implications related this.

Fact sheets developed in partnership with Genesee County Health Department since October include:

- **FAQs: Lead in Flint Water** – this document details when one should use filtered water versus unfiltered water. Available at: http://www.michigan.gov/documents/deq/2015-10-21_-_Lead_-_Flint_Water_FINAL_504265_7.pdf?20151207171149

- **FAQs: Lead and Your Body** – this document explains the potential health effects of lead poisoning through all life stages, and includes information about exposure pathways of lead from water. Available at: http://www.michigan.gov/documents/deq/2015-10-29_-_Lead_and_your_Body_-_Flint_-_no_background_507727_7.pdf?20151207171149

- **Adding Phosphates to Flint Water** – this document explains the process by which adding extra phosphates can potentially reduce the lead levels in Flint homes' water and the health implications of the phosphates at the levels they're being added. Approved for publication by GCHD, MDHHS approval and posting pending.

- **Aerator Cleaning/Filter Maintenance Fact Sheet** – research for this document is underway by MDHHS. Questions regarding the efficacy of the filters to remove lead at the levels found in some Flint homes and the potential effect of additional phosphates on the filter's ability to function, amongst other similar topics are being researched.

In addition, MDHHS is developing a Lead-Safe Family Guidebook that will be provided to families in conjunction with case management and environmental investigations services. The guidebook will also be available to the general public as a one-stop resource to prevent lead exposure in their homes.

The Guidebook will assist families in understanding the report that they receive at the completion of their home's lead investigation. This stand-alone report is a technical, scientific document which can be daunting for anyone – let alone a family who is facing the unexpected reality that their child has been exposed to lead. A nurse case manager will walk the families through the report using the companion guide to explain in plain language what the technical report means and what follow-up steps the families can do to remediate the situation.

Bullet 5 of Governor's Task Force Draft Letter: In coordination with MDEQ, establish a plan for repeated testing of tap water and other sources of lead in the homes of children known to have

elevated blood lead levels, to maximize the case management response conducted at this time by community health nurses. This plan should also consider testing tap water and other sources of lead in the homes of children who have not been tested for blood lead, in order to broaden testing to identify children at risk.

Bullet 6 of Governor's Task Force Draft Letter: In coordination with MDEQ, establish a plan for repeated testing of water available in Flint city elementary schools vis water fountains and taps.

Dr. Linda Dykema is designated within the Flint Water Lead Project organization structure as the liaison to the MDEQ. She and her staff have worked with the MDEQ Office of Drinking Water and Municipal Assistance (ODWMA) in the development of drinking water testing protocols for city of Flint schools and private homes. The household drinking water testing protocol developed through these joint efforts is being implemented by ETC contractors as part of the EBL environmental investigation and the MDEQ laboratory is analyzing all water samples collected in these efforts.

Dr. Dykema consults weekly with ODWMA and Department of Licensing and Regulatory Affairs (LARA) staff to resolve problems that arise in the implementation of testing protocols, to convey test results as they become available, and to identify recommendations for abatement activities. Dr. Dykema and her staff remain available to MDEQ and LARA to assist on further efforts to reduce exposure to lead in Flint drinking water.

Bullet 7: Establish a long-range (i.e., 1-year , 3-year, 5-year) plan for clinical follow up of children know to have had elevated blood lead levels in this time period in Flint, including consideration of the role of neurodevelopment testing and readiness for preschool and kindergarten learning environments.

MDHHS has scheduled a meeting with the Office of Great Start to establish a plan related to developmental supports and services for children in Flint. We anticipate that the two agencies will review currently available programs and services through each agency, identify gaps, and identify potential funding streams and evidence-based approaches that will best support children's continued growth, development, and learning.

From: Wells, Eden (DHHS)
Sent: Friday, December 11, 2015 4:40 PM
To: Miller, Corinne (DHHS)
Subject: Re: Action items from yesterday's call

Thanks for forwarding!

Sent from my iPhone

On Dec 11, 2015, at 4:13 PM, Miller, Corinne (DHHS) <MillerC39@michigan.gov> wrote:

> Sent from my iPhone
>
> Begin forwarded message:
>
> **From:** "Cupal, Suzanne" <scupal@gchd.us>
> **Date:** December 11, 2015 at 4:11:01 PM EST
> **To:** "Garrison, Laurel (CDC/OID/NCIRD)" <lee5@cdc.gov>, "Collins, Jim (CDC michigan.gov)" <collinsj12@michigan.gov>, "'Lytle, Darren'" <Lytle.Darren@epa.gov>, "Fiedler, Jay (CDC michigan.gov)" <fiedlerj@michigan.gov>, "'LaRocco, Toni'" <tlarocco@gchd.us>, "'Henry, James'" <jhenry@gchd.us>, "Johnson, Mark (ATSDR/DCHI/CB)" <mkj5@cdc.gov>, "'Valacak, Mark'" <MVALACAK@gchd.us>, "'Johnson, Shannon (DHHS)'" <Johnson561@michigan.gov>, "Miller, Corinne (CDC michigan.gov)" <MillerC39@michigan.gov>
> **Cc:** "Yoder, Jonathan S. (CDC/OID/NCEZID)" <jey9@cdc.gov>, "Sarisky, John (CDC/ONDIEH/NCEH)" <zse1@cdc.gov>, "Moore, Matt (CDC/OID/NCIRD)" <zdn4@cdc.gov>, "Kutty, Preeta (CDC/OID/NCIRD)" <chz6@cdc.gov>, "Cooley, Laura A. (CDC/OID/NCIRD)" <whz3@cdc.gov>, "Kunz, Jasen M. (CDC/ONDIEH/NCEH)" <izk0@cdc.gov>, "Gargano, Julia Marie W. (CDC/OID/NCEZID)" <jgc5@cdc.gov>, "Raphael, Brian (CDC/OID/NCIRD)" <elx9@cdc.gov>
> **Subject: RE: Action items from yesterday's call**
>
> Thank you for the summary. Thank you for the opportunity to follow up our conversations of earlier this year. As we expressed, we have other water related concerns beyond Legionella. We previously discussed skin rashes, gastrointestinal illness, and TTHM. We are now addressing lead and phosphate and want to be prepared for new concerns as they present themselves.
>
> I want to share that I received an email today from Marc Edwards of Virginia Tech. They have detected very high levels of Legionella in two large buildings they have tested. He did not name them or the type of building. We are following up.
>
> We will also be following up with you for additional resources.
>
> Thank you again for the opportunity to express our concerns. We need access to all resources available to us.

Suzanne

Sent from my Windows Phone

From: Garrison, Laurel (CDC/OID/NCIRD)
Sent: 12/11/2015 11:21 AM
To: 'Cupal, Suzanne'; Collins, Jim (CDC michigan.gov); 'Lytle, Darren'; Fiedler, Jay (CDC michigan.gov); 'LaRocco, Toni'; 'Henry, James'; Johnson, Mark (ATSDR/DCHI/CB); 'Valacak, Mark'; 'Johnson, Shannon (DHHS)'; Miller, Corinne (CDC michigan.gov)
Cc: Yoder, Jonathan S. (CDC/OID/NCEZID); Sarisky, John (CDC/ONDIEH/NCEH); Moore, Matt (CDC/OID/NCIRD); Kutty, Preeta (CDC/OID/NCIRD); Cooley, Laura A. (CDC/OID/NCIRD); Kunz, Jasen M. (CDC/ONDIEH/NCEH); Gargano, Julia Marie W. (CDC/OID/NCEZID); Raphael, Brian (CDC/OID/NCIRD)
Subject: Action items from yesterday's call

Hi all,

Thanks for your participation on the call yesterday. To sum up, we think we agreed:

--The state and county health departments will work together to analyze the epi data around the increase in Legionnaires' disease cases to determine whether any additional interventions may be needed. They will contact CDC's Respiratory Diseases Branch for any additional subject matter expertise as needed. The state is comfortable with the county reaching out directly to CDC, but would like to be included in the communication.

--EPA will work directly with the county health department through the existing EPA task force to provide technical expertise related to community water systems as it applies to the Legionnaires' disease investigation as well as other diseases of concern.

--CDC's Environmental Health Services Branch and Waterborne Diseases Prevention Branch are available as needed for additional subject matter expertise involving other concerns related to water quality or communication about waterborne disease prevention. NCEH/EHSB will respond to the request from Genesee County for information on the 10 Essential Services of Environmental Health.

We were happy to hear that the message of prevention through establishing a water management plan (ASHRAE 188) has gotten out to the hospitals, and encourage the county to stay engaged with how this is working. We would appreciate hearing any feedback regarding the implementation of ASHRAE 188. We also encourage communication with other building owners to bring awareness and implementation of ASHRAE 188 in other healthcare and non-healthcare settings.

Please let us know if you have any modifications to these action items.

Best regards,
Laurel

Laurel Garrison, MPH
Legionellosis Surveillance & Outbreak Response
NCIRD/DBD/Respiratory Diseases Branch
Centers for Disease Control and Prevention
1600 Clifton Rd., NE MS C-25

Atlanta, GA 30329-4027
404.639.3424
Lee5@cdc.gov

From: Garrison, Laurel (CDC/OID/NCIRD)
Sent: Friday, December 04, 2015 9:09 AM
To: 'Cupal, Suzanne' <scupal@gchd.us>; Collins, Jim (CDC michigan.gov) <collinsj12@michigan.gov>; Lytle, Darren <Lytle.Darren@epa.gov>
Cc: Yoder, Jonathan S. (CDC/OID/NCEZID) <jey9@cdc.gov>; Sarisky, John (CDC/ONDIEH/NCEH) <zse1@cdc.gov>; Johnson, Mark (ATSDR/DCHI/CB) <mkj5@cdc.gov>; Valacak, Mark <MVALACAK@gchd.us>; Henry, James <jhenry@gchd.us>; LaRocco, Toni <tlarocco@gchd.us>; Fiedler, Jay (CDC michigan.gov) <fiedlerj@michigan.gov>

OK, let's go ahead and schedule for Thurs Dec. 10 at 9:00 AM Eastern.

Tel: PPI
Code: PPI

Here is a proposed agenda…feel free to weigh in on other items we should discuss.

Specific to Legionnaires' disease:
---What type of assistance (if any) is being requested? (State and County HD)
---What is the role of EPA and what assistance has been provided so far? (EPA)
---What is the role of ATSDR and what assistance has been provided so far? (ATSDR)
---If additional federal assistance is needed, what can CDC offer? (CDC)

Thanks everyone!
Laurel

From: Wells, Eden (DHHS)
Sent: Tuesday, December 15, 2015 11:03 AM
To: Stuart Batterman
Subject: Fwd: Model used for lead in water exposure
Attachments: draft deliberative TSG Subcommittee drinking water lead levels 10-16-2015.pdf; ATT00001.htm; 17Nov15 Executive Summary for Home Blood Lead Modeling Results with graphs.pdf; ATT00002.htm; 27Oct15 Executive Summary for Blood Lead Modeling Results (Rev 2).pdf; ATT00003.htm

FYI-

Sent from my iPhone

Begin forwarded message:

> **From:** "Dykema, Linda D. (DHHS)" <DykemaL@michigan.gov>
> **Date:** December 15, 2015 at 11:02:22 AM EST
> **To:** "Wells, Eden (DHHS)" <WellsE3@michigan.gov>
> **Subject: RE: Model used for lead in water exposure**
>
> Eden,
>
> Attached are the technical support document and the executive summaries for the modeling to share with Dr. Batterman.
>
> Linda
>
> -----Original Message-----
> From: Wells, Eden (DHHS)
> Sent: Thursday, December 10, 2015 12:31 PM
> To: Dykema, Linda D. (DHHS) <DykemaL@michigan.gov>
> Subject: Model used for lead in water exposure
>
> Stuart Batterman was asking about the bio exposure model---is that something he can see? He is working with a few in potential long term effects on health/IQ E
>
> Sent from my iPhone

Justification of the drinking water "no corrective action" lead level for use in the Flint school and daycare drinking water sample decision tree

The Michigan Department of Health and Human Services (MDHHS) requested that the Toxic Steering Group (TSG) provide endorsement of a health-based drinking water lead level that would require "no corrective action" to put back into service drinking water faucets and fountains used by Flint school and daycare children. Selection of the "corrective actions" was not included in the charge question and is not discussed in this document. A TSG subcommittee was convened to examine this issue. Subcommittee members included Deb Mackenzie-Taylor (Michigan Department of Environmental Quality [MDEQ]), Robert Sills (MDEQ), Eric Wildfang (MDEQ), Jennifer Gray (MDHHS), Christine Flaga (MDEQ), and Kory Groetsch (MDHHS).

Neither the Centers for Disease Control and Prevention's Agency for Toxic Substances and Disease Registry (ATSDR) nor the U.S. Environmental Protection Agency (EPA) have derived toxicity endpoints (e.g. reference dose, minimal risk level) for lead to be used in risk assessments. Both agencies have stated that no blood lead level has been found to be safe and precautionary actions to reduce exposure to lead, such as running tapwater briefly before use, should always be followed. Due to the pharmacokinetic data and initial acceptable blood lead, the EPA developed a biokinetic model for evaluating lead exposure from multiple media. Lead levels in air, soil, house dust, diet, drinking water, and maternal blood are used to estimate geometric mean blood lead levels for a population of children and the probability that a child would be above a specified blood lead level[1]. The model results are compared to an EPA population health protection goal for young children exposed to lead at residential properties of 5% or lower risk of a child having a blood level greater than the CDC reference value of 5 micrograms lead per deciliter blood (µg/dL)[2]. The model, however, does not include inputs to account for direct paint chip ingestion and assumes that children are not exposed to elevated lead in soil and house dust from lead based paint.

Use of the EPA's Integrated Exposure Uptake Biokinetic (IEUBK) Model

The EPA's Integrated Exposure Uptake Biokinetic (IEUBK) Model for Lead in Children version 1.1 Build 11 was used to evaluate exposure to children one year old or younger and children seven years old or younger. Default values were retained unless otherwise noted below. See Table 2-1 in the "User's Guide for the Integrated Exposure Uptake Biokinetic Model for Lead in Children (IEUBK) Windows©" for the listing of all the default values[3]. Values selected that are more appropriate for a Michigan urban area, Flint, are described briefly below.

[1] The modeling output includes the percent of children in a population that are above a specified blood lead level, but that value can be also be viewed as the probability (risk) that a certain child would be above the specified blood lead level.

[2] As stated on the EPA's Lead at Superfund Sites: Frequent Questions from Risk Assessors on the Integrated Exposure Uptake Biokinetic (IEUBK) Model webpage, found at http://www2.epa.gov/superfund/lead-superfund-sites-frequent-questions-risk-assessors-integrated-exposure-uptake#mean.

[3] The model itself and documentation, including the user's guide for the model can be found at http://www2.epa.gov/superfund/lead-superfund-sites-software-and-users-manuals.

Air data

MDEQ performs monitoring for lead in ambient air (as measured in Total Suspended Particulates; lead [TSP]) at a number of fixed stations in Michigan. Some of these monitoring stations (e.g., in Belding, Port Huron, and Vassar) were established to intentionally capture the influence of specific nearby industrial emissions, while others were established to provide data reflecting the general ambient air lead levels in urban areas. The TSG Subcommittee reviewed the ambient air monitoring data, focusing on urban ambient air lead data that would be representative of contemporary Flint conditions. The most recent MDEQ annual air monitoring report is for 2014[4]. The summary statistics provided in the MDEQ annual air quality reports include 3-month average (mean) levels, the highest value (24-hour sample), and the 2nd highest value (24-hour sample). The National Ambient Air Quality Standard (NAAQS) for lead (0.15 micrograms per cubic meter [$\mu g/m^3$]) has a 3-month averaging time.

Ambient air lead was monitored by MDEQ in Flint (Whaley Park; 3610 Iowa Ave.) until early 2007. The 2005 calendar quarter arithmetic mean values were 0.008, 0.010, 0.011, and 0.012 $\mu g/m^3$. The 2006 calendar quarter arithmetic mean values were 0.005, 0.007, 0.012, and 0.006 $\mu g/m^3$. Although Flint data more recent than 2007 are not available, MDEQ staff considered other urban lead monitoring sites to be fairly representative of Flint conditions. Grand Rapids, Allen Park, and Dearborn each had a highest rolling 3-month arithmetic mean lead (TSP) level of 0.01 $\mu g/m^3$ in 2013; for 2014, these values were 0.01 $\mu g/m^3$ for Grand Rapids and Allen Park and 0.02 $\mu g/m^3$ for Dearborn. These data indicate that the IEUBK model default value of 0.1 $\mu g/m^3$ is not the most appropriate air lead level for Flint, and support a representative value of 0.01 $\mu g/m^3$ for the air data model input assumption. While a slightly higher air lead level was obtained for Dearborn, the small difference between 0.01 and 0.02 $\mu g/m^3$, would not impact model outputs.

Water consumption

The default drinking water intakes are age-dependent and based on national averages[5]. These were updated to match the mean drinking water intakes (direct and indirect) in Table 3-1 from the U.S. EPA Exposure Factors Handbook: 2011 Edition[6].

- 0-1 years old - 0.32 liter/day (L/d) (age-adjusted from the values in Table 3-1)
- 1-2 years old - 0.271 L/d
- 2-3 years old - 0.317 L/d
- 3-4 years old - 0.327 L/d (3 to 6 years old in Table 3-1)
- 4-5 years old - 0.327 L/d (3 to 6 years old in Table 3-1)

[4] The MDEQ 2014 Annual Air Quality Report can be found at http://www.michigan.gov/documents/deq/deq-aqd-amu-2014_Annual_Air_Quality_Report_492732_7.pdf?20151014123800.

[5] Per the "User's Guide for the Integrated Exposure Uptake Biokinetic Model for Lead in Children (IEUBK) Windows©", "The default consumption rates are age-dependent and based on national averages. These consumption rates should be changed only when valid site-specific monitoring data is available."

[6] The U.S. EPA Exposure Factors Handbook: 2011 Edition can be found at file:///C:/Users/grayj/Downloads/EFH-COMPLETE.PDF.

- 5-6 years old - 0.327 L/d (3 to 6 years old in Table 3-1)
- 6-7 years old - 0.414 L/d (6 to 11 years old in Table 3-1)

Drinking water data for alternate drinking water sources

The alternate drinking water sources used for these modeling runs are listed below with a brief description.

- "Percent of Total Consumed as First Draw" – This value applies to household tap water. This was set to 0% as Genesee County issued an Public Health Emergency Advisory[7] recommending that no one drink the City of Flint water until it has been tested or unless it is being filtered through a filter meeting the National Sanitation Foundation (NSF)/American National Standards Institute (ANSI) standard 53.
- "Concentration of Lead in First Draw (µg/L)" – With the "Percent of Total Consumed as First Draw" set to 0%, this value will not alter the model run output so the default of 4 micrograms per liter (µg/L or parts per billion [ppb]) was retained.
- "Concentration of Lead in Flushed (µg/L)" – This value applies to household tap water. This was set to 1 µg/L (ppb) as filters meeting NSF/ANSI standard 53 are recommended for use in all households. The filters distributed remove greater than 99% of the lead and would result in filtered water containing lead levels of approximately 1 µg/L (ppb) or less.
- "Percentage of Total Consumed from Fountains" – This was set to 50%, as children in school and daycare settings spend around eight hours or more in those locations. Eight hours could be expected to be approximately half of their waking hours in a day. This value also assumes daily intake of drinking water from a school or daycare source. There could be variation in the amount of time children would actually be drinking water from these locations based on involvement in before- or after-school or daycare programs, activities, or events.
- "Concentration of Lead in Fountain Water (µg/L)" – Modeling runs were carried out for every 1 µg/L (ppb) step between zero and 15 µg/L, and also 30 and 100 µg/L (ppb). Modeling runs for the zero to 15 µg/L (ppb) steps were carried out to perform a sensitivity analysis to evaluate how a one µg/L (ppb) change in lead water concentrations alters the outputs of the model. The 30 and 100 µg/L (ppb) levels were included as preliminary representatives of high-end lead levels obtained from school drinking water fountains.

Site-specific soil data

Soil lead levels on residential properties vary greatly[8]. The primary influence is from pre-1978 use of lead paint on the outside of buildings[9,10,11]. Lead-paint was banned in 1978. In addition, the age of

[7] The Genesee County Public Health Emergency Declaration can be found at http://www.gchd.us/docs/public_health_emergency_announcement_10_1_15.pdf.

[8] Datko-Williams, L., A. Wilkie, et al. (2014). "Analysis of U.S. soil lead (Pb) studies from 1970 to 2012." Science of The Total Environment **468-469**: 854-863.

[9] Francek, M. A. (1992). "Soil lead levels in a small town environment: a case study from Mt Pleasant, Michigan." Environ Pollut **76**(3): 251-257.

housing[8,9], paint condition, and distance from the building can greatly impact the concentration of lead in soil. The soil lead concentrations near the foundation of houses with lead paint are frequently over 1,000 ppm[9,11,12,13]. Historic vehicle emissions from leaded gasoline are another source of residential soil lead, so distance from road and traffic volume at the time leaded gasoline was in use are also influential factors on residential soil concentrations[10,11,13]. Other potential influences are fill material (e.g., foundry sand, smelter slag), and/or local industrial emission sources. The highest soil lead concentrations are typically found in urban areas with high population density.

Soil lead data for residential soils in Flint are not currently available. Flint park data and other relevant residential soil lead studies were reviewed to evaluate appropriate surrogate concentrations for this assessment.

The MDEQ[14] reported soil lead concentrations from urban parks including Flint. This data set included 12 sample locations from 10 Flint parks. Surface soil samples were collected at 0-2 inches and subsurface samples were collected at 4-6 inches. This dataset may not adequately represent residential soil samples with a lead paint contribution from buildings. Other studies have shown that open spaces may have much lower soil lead concentrations than areas near residential buildings that were built prior to 1978[11,15]. The geometric mean and geometric mean plus two standard deviation surface soil concentrations (see below) from this Flint park dataset were used for this assessment. The geometric mean plus two standard deviation surface soil concentration represents an upper percentile value that may partially account for the higher soil lead levels expected around buildings with lead paint.

Another data source is from soil samples collected from the Rouge River watershed between 1992 and 2002[16]. This dataset was compiled from MDEQ files and Clayton Group Services files for the Rouge River watershed area in southeast Michigan. Although some data is from Part 201 sites of environmental contamination, most of the samples were collected as a result of other regulatory or real estate due diligence requirements. Sites with known industrial metal sources or that had near surface soil with unknown fill material were excluded from the dataset. The dataset included 28 residential sites that had

---

[10] Francek, M. A., B. Makimaa, et al. (1994). "Small town lead levels: a case study from the homes of pre-schoolers in Mt. Pleasant, Michigan." Environ Pollut **84**(2): 159-166.
[11] Schwarz, K., S. T. Pickett, et al. (2012). "The effects of the urban built environment on the spatial distribution of lead in residential soils." Environ Pollut **163**: 32-39.
[12] Andra, S. S., D. Sarkar, et al. (2006). "Lead in Soils in Paint Contaminated Residential Sites at San Antonio, Texas, and Baltimore, Maryland." Bulletin of Environmental Contamination and Toxicology **77**(5): 643-650.
[13] Yesilonis, I. D., R. V. Pouyat, et al. (2008). "Spatial distribution of metals in soils in Baltimore, Maryland: role of native parent material, proximity to major roads, housing age and screening guidelines." Environ Pollut **156**(3): 723-731.
[14] "Draft Michigan Urban Park Topsoil Survey 1997, MDEQ" David Slayton, Office of Waste Management and Radiological Protection, MDEQ
[15] Zahran, S., H. W. Mielke, et al. (2013). "Determining the relative importance of soil sample locations to predict risk of child lead exposure." Environ Int **60**: 7-14.
[16] Murray, K. S., D. T. Rogers, et al. (2004). "Heavy metals in an urban watershed in southeastern Michigan." J Environ Qual **33**(1): 163-172.

535 surface soil samples with data reported for lead. Sample depth was 0 – 0.5 meters. The geometric mean value for residential surface soils reported from this study (see below) was used for this assessment.

The current Part 201 residential direct contact risk-based soil level was also used for this assessment for comparison. This value was generated from the IEUBK model using an acceptable blood lead concentration of 10 µg/dL, a drinking water concentration of 4 µg/L (ppb) and an Michigan-specific average air concentration of 0.04 µg/m^3 were used in the model at the time of criteria development.

Soil levels examined in the model runs were:

- 47.5 parts per million (ppm) – based on the geometric mean of 0-2 inch soil concentrations in Flint urban parks.
- 155 ppm – based on the geometric mean + two standard deviations of 0-2 inch soil concentrations in Flint urban parks.
- 160 ppm – based on the geometric mean for residential surface soil (0-0.5 meter) from Rouge River water shed[17].
- 400 ppm - the MDEQ Residential Direct Contact Risk-Based Screening Level for soil.

Both the residential soil geometric mean from the Rouge River watershed and the upper percentile from the Flint park data appear to represent the best surrogates for residential soil concentrations in Flint for this assessment. Although not from Flint, the Rouge River watershed residential soil data appears to be a fairly robust data set for urban residential soils in Michigan. The Flint park data upper percentile (geometric mean plus two standard deviations is approximately equivalent to the 97.5 percentile) may better account for potential building paint contributions to soil concentrations for urban residential soils than the geometric mean concentration of this dataset. The Flint park upper percentile (155 ppm) reported as two significant digits is equivalent to the Rouge River watershed residential soil lead geometric mean (160 ppm). The soil lead concentration of 160 ppm was selected for use in the calculation of the TSG Subcommittee's recommended health-based drinking water lead levels.

Maternal data

Maternal blood lead levels were changed to 0.8 µg/dL to match the NHANES (2011-2012) geometric mean lead level for women[18].

Blood level of concern (cutoff) for risk estimation

A cutoff value of 5 µg/dL was selected as the current Centers for Disease Control and Prevention blood reference level to identify children with blood lead levels that require follow-up actions. It is based on the blood lead level for the 97.5th percentile for the U.S. population of children, ages one to five[19].

[17] The value is from Table 5 in Murray, K. S., D. T. Rogers, et al. (2004). "Heavy metals in an urban watershed in southeastern Michigan." J Environ Qual **33**(1): 163-172.

[18] The Fourth National Report on Human Exposure to Environmental Chemicals, dated February 2015, can be found at http://www.cdc.gov/biomonitoring/pdf/FourthReport_UpdatedTables_Feb2015.pdf.

Outputs of the modeling runs and recommendation of drinking water lead levels for use during the evaluation of Flint school and daycare drinking water samples

The soil lead level of 160 ppm was selected as being the best surrogate for soil lead levels in the city of Flint. In the event that site-specific soil data is collected, the drinking water lead levels may need to be reevaluated. The entire set of modeling runs and graphs can be found in Attachment 1.

The recommended drinking water lead levels resulted in a 5% risk or lower that a child had a blood lead level above 5 µg/dL. The 5% is an EPA health protection goal for young children exposed to lead at residential properties.

Evaluating school and daycare drinking water samples together

The recommended lead screening level for use while evaluating both school and daycare drinking water samples is 2 µg/L (ppb). This lead level in drinking water samples results in no more than a 5% risk that children age 7 or younger would have blood lead levels above 5 µg/dL.

Age range	Blood lead geometric mean (in micrograms per deciliter [µg/dL])	Risk that a child could have a blood lead level above 5 µg/dL
0-1 year olds	2.308	5.004%
0-7 year olds	2.056	2.934%

Assumptions integral to the use of the health-based school and daycare drinking water lead level
This calculation includes two assumptions. One is that people have lead levels in home drinking water of no more than 1 µg/L (ppb) or are using filters to reduce lead levels to 1 µg/L (ppb) or below. The second is that children do not live in homes with highly elevated levels of lead in home dust or soil. The modeled lead dust levels do not account for lead coming from pre-1978 paint. Eighty-two percent of city of Flint houses were built before 1970[20]. Soil highly impacted with lead paint may have lead levels higher than the 160 ppm used in this calculation. If children are not drinking filtered water at home, are ingesting lead paint chips, or have elevated levels of lead in home dust or soil, a lead level lower than the one recommended above may need to be selected for the evaluation of school and daycare drinking water samples.

Evaluating school and daycare drinking water samples separately

The recommended lead screening level for use while evaluating daycare drinking water samples is

[19] The blood reference level and additional information can be found at http://www.cdc.gov/nceh/lead/ACCLPP/blood_lead_levels.htm.
[20] As determined by the U.S. Census and can be found at http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_14_1YR_S1101&prodType=table.

2 µg/L (ppb). This lead level in drinking water samples results in no more than a 5% risk that children age 1 or younger would have blood lead levels above 5 µg/dL.

Age range	Blood lead geometric mean (in micrograms per deciliter [µg/dL])	Risk that a child could have a blood lead level above 5 µg/dL
0-1 year olds	2.308	5.004%
0-7 year olds	2.056	2.934%

Assumptions integral to the use of the health-based daycare drinking water lead level
This calculation includes two assumptions. One is that people have lead levels in home drinking water of no more than 1 µg/L (ppb) or are using filters to reduce lead levels to 1 µg/L (ppb) or below. The second is that children do not live in homes with highly elevated levels of lead in home dust or soil. The modeled lead dust levels do not account for lead coming from pre-1978 paint. Eighty-two percent of city of Flint houses were built before 1970. Soil highly impacted with lead paint may have lead levels higher than the 160 ppm used in this calculation. If children are not drinking filtered water at home, are ingesting lead paint chips, or have elevated levels of lead in home dust or soil, a lead level lower than the one recommended above may need to be selected for the evaluation of school and daycare drinking water samples.

The recommended lead screening level for use while evaluating K-12 school drinking water samples is 11 µg/L (ppb). This lead level in drinking water samples results in no more than a 5% risk that children age 7 or younger would have blood lead levels above 5 µg/dL. However, when evaluating a population of children age 1 or younger, their risk of having a blood lead level above 5 µg/dL was 8.335%. The 11 µg/L (ppb) screening level is not adequately protective for children under the age of 1.

Age range	Blood lead geometric mean (in micrograms per deciliter [µg/dL])	Risk that a child could have a blood lead level above 5 µg/dL
0-1 year olds	2.61	8.335%
0-7 year olds	2.299	4.917%

Assumptions integral to the use of the health-based school drinking water lead level
This calculation includes two assumptions. One is that people have lead levels in home drinking water of no more than 1 µg/L (ppb) or are using filters to reduce lead levels to 1 µg/L (ppb) or below. The second is that children do not live in homes with highly elevated levels of lead in home dust or soil. The modeled lead dust levels do not account for lead coming from pre-1978 paint. Eighty-two percent of city of Flint houses were built before 1970. Soil highly impacted with lead paint may have lead levels higher than the 160 ppm used in this calculation. If children are not drinking filtered water at home, are ingesting lead paint chips, or have elevated levels of lead in home dust or soil, a lead level lower than the one recommended above may need to be selected for the evaluation of school and daycare drinking water samples.

		0-1 year olds		0-7 year olds	
Soil lead levels (ppm)	Fountain water (ppb)	Geometric mean Blood lead level (ug/dL)	%>5 ug/dL	Geometric mean Blood lead level (ug/dL)	%>5 ug/dL
47.6	0	1.184	0.109	0.92	0.016
155.3	0	2.198	4.014	1.958	2.302
160	0	2.24	4.381	2.002	2.573
400	0	4.268	36.82	4.135	34.306
2000	0	13.431	98.224	14.549	98.847
47.6	1	1.22	0.135	0.949	0.02
155.3	1	2.232	4.306	1.985	2.468
160	1	2.274	4.687	2.029	2.75
400	1	4.298	37.376	4.16	34.772
2000	1	13.447	98.235	14.564	98.954
47.6	2	1.257	0.165	0.977	0.026
155.3	2	2.266	4.609	2.012	2.64
160	2	2.308	5.004	2.056	2.934
400	2	4.327	37.929	4.184	35.236
2000	2	13.464	98.247	14.579	98.86
47.6	3	1.293	0.201	1.006	0.032
155.3	3	2.3	4.923	2.039	2.82
160	3	2.342	5.332	2.083	3.126
400	3	4.357	38.48	4.209	35.699
2000	3	13.48	98.258	14.595	98.867
47.6	4	1.33	0.241	1.034	0.04
155.3	4	2.334	5.248	2.067	3.007
160	4	2.376	5.671	2.11	3.324
400	4	4.386	39.029	4.233	36.161
2000	4	13.496	98.269	14.61	98.874
47.6	5	1.366	0.288	1.063	0.049
155.3	5	2.368	5.585	2.094	3.201
160	5	2.41	6.02	2.138	3.53
400	5	4.416	39.575	4.258	36.622
2000	5	13.513	98.28	14.625	98.88
47.6	6	1.402	0.341	1.091	0.06
155.3	6	2.401	5.932	2.121	3.402
160	6	2.443	6.381	2.165	3.743
400	6	4.445	40.118	4.282	37.082
2000	6	13.529	98.29	14.641	98.887
47.6	7	1.438	0.401	1.12	0.073
155.3	7	2.435	6.289	2.148	3.611
160	7	2.477	6.752	2.192	3.964
400	7	4.474	40.659	4.307	37.54
2000	7	13.545	98.301	14.656	98.893
47.6	8	1.474	0.468	1.148	0.087
155.3	8	2.468	6.658	2.175	3.827
160	8	2.51	7.133	2.219	4.191
400	8	4.504	41.196	4.331	37.997

		0-1 year olds		0-7 year olds	
Soil lead levels (ppm)	Fountain water (ppb)	Geometric mean Blood lead level (ug/dL)	%>5 ug/dL	Geometric mean Blood lead level (ug/dL)	%>5 ug/dL
2000	8	13.561	98.312	14.671	98.9
47.6	9	1.51	0.542	1.176	0.104
155.3	9	2.502	7.036	2.202	4.05
160	9	2.544	7.524	2.245	4.426
400	9	4.533	41.731	4.355	38.453
2000	9	13.577	98.323	14.686	98.906
47.6	10	1.546	0.625	1.205	0.123
155.3	10	2.535	7.425	2.229	4.28
160	10	2.577	7.925	2.272	4.668
400	10	4.562	42.263	4.38	38.907
2000	10	13.594	98.333	14.702	98.912
47.6	11	1.581	0.715	1.233	0.145
155.3	11	2.569	7.823	2.256	4.518
160	11	2.61	8.335	2.299	4.917
400	11	4.591	42.792	4.404	39.359
2000	11	13.61	98.344	14.717	98.919
47.6	12	1.617	0.815	1.261	0.169
155.3	12	2.602	8.231	2.283	4.762
160	12	2.643	8.755	2.326	5.174
400	12	4.62	43.317	4.428	39.81
2000	12	13.626	98.354	14.732	98.925
47.6	13	1.652	0.924	1.289	0.197
155.3	13	2.635	8.648	2.309	5.014
160	13	2.677	9.183	2.353	5.437
400	13	4.649	43.84	4.453	40.259
2000	13	13.642	98.364	14.747	98.931
47.6	14	1.688	1.043	1.317	0.227
155.3	14	2.668	9.075	2.336	5.273
160	14	2.71	9.621	2.38	5.707
400	14	4.677	44.359	4.477	40.707
2000	14	13.658	98.374	14.763	98.937
47.6	15	1.723	1.171	1.346	0.261
155.3	15	2.701	9.51	2.363	5.539
160	15	2.743	10.067	2.406	5.984
400	15	4.706	44.875	4.501	41.153
2000	15	13.674	98.385	14.778	98.944
47.6	30	2.243	4.406	1.762	1.325
155.3	30	3.188	16.918	2.76	10.313
160	30	3.228	17.593	2.803	10.908
400	30	5.131	52.202	4.861	47.608
2000	30	13.914	98.528	15.005	99.031
47.6	100	4.451	40.23	3.603	24.294
155.3	100	5.267	54.406	4.521	41.511
160	100	5.302	54.957	4.56	42.227

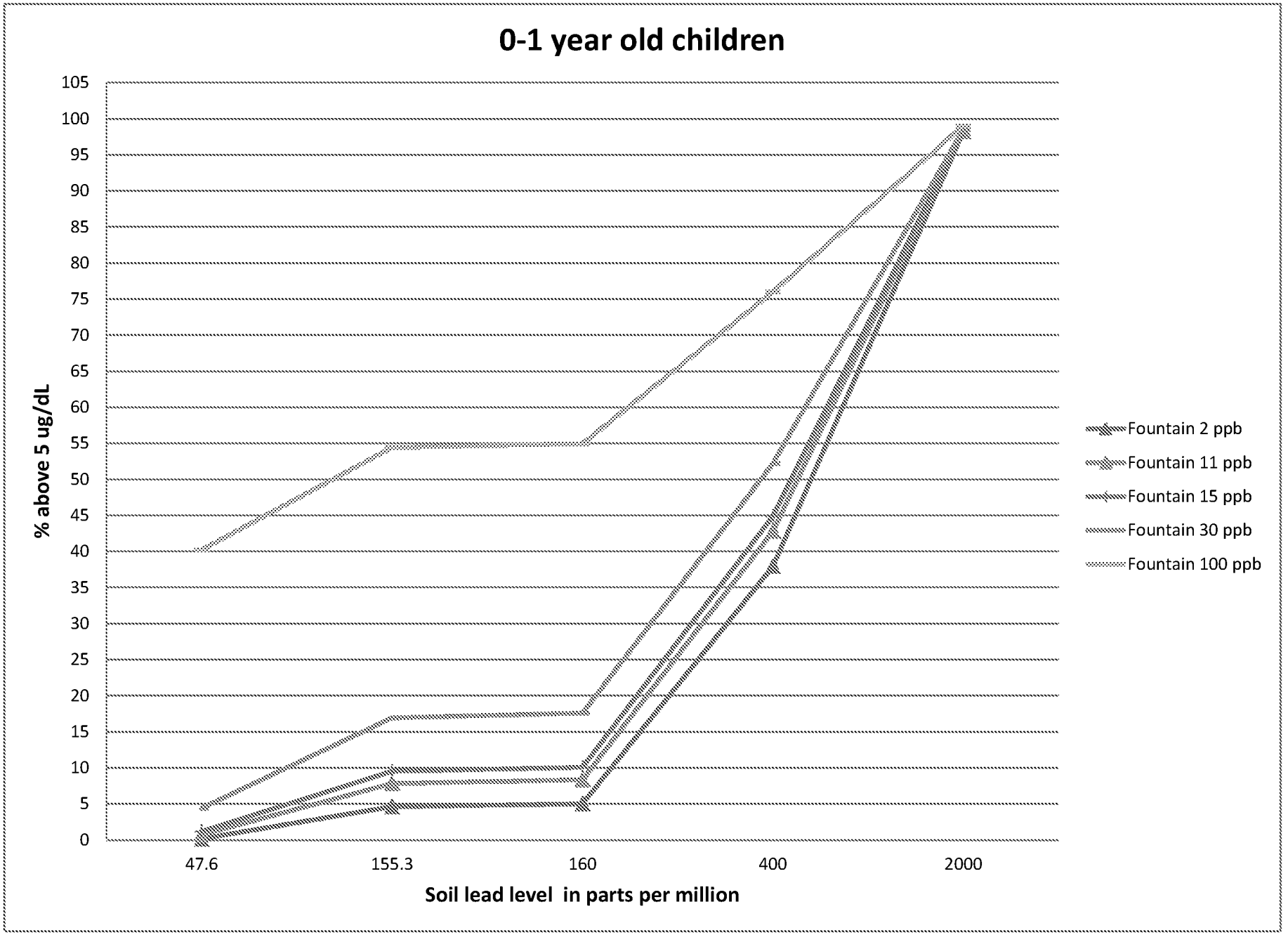
Attachment 1 IEUBK model outputs - sorted by water lead concentrations

		0-1 year olds		0-7 year olds	
Soil lead levels (ppm)	Fountain water (ppb)	Geometric mean Blood lead level (ug/dL)	%>5 ug/dL	Geometric mean Blood lead level (ug/dL)	%>5 ug/dL
400	100	6.967	75.99	6.463	70.746
2000	100	14.992	99.026	16.034	99.342

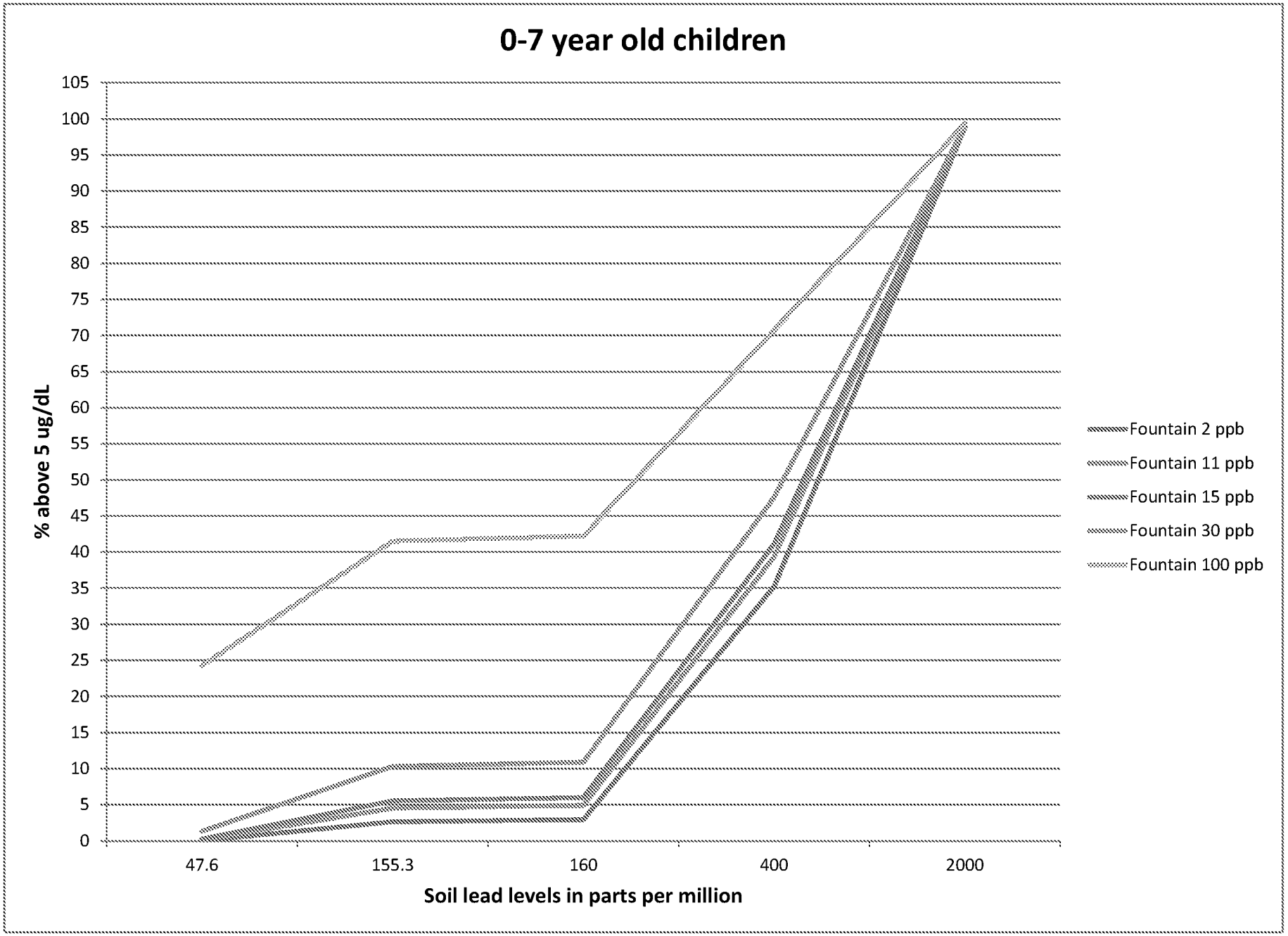
		0-1 year olds		0-7 year olds	
Soil lead levels (ppm)	Fountain water (ppb)	Geometric mean Blood lead level (ug/dL)	%>5 ug/dL	Geometric mean Blood lead level (ug/dL)	%>5 ug/dL
47.6	0	1.184	0.109	0.92	0.016
47.6	1	1.22	0.135	0.949	0.02
47.6	2	1.257	0.165	0.977	0.026
47.6	3	1.293	0.201	1.006	0.032
47.6	4	1.33	0.241	1.034	0.04
47.6	5	1.366	0.288	1.063	0.049
47.6	6	1.402	0.341	1.091	0.06
47.6	7	1.438	0.401	1.12	0.073
47.6	8	1.474	0.468	1.148	0.087
47.6	9	1.51	0.542	1.176	0.104
47.6	10	1.546	0.625	1.205	0.123
47.6	11	1.581	0.715	1.233	0.145
47.6	12	1.617	0.815	1.261	0.169
47.6	13	1.652	0.924	1.289	0.197
47.6	14	1.688	1.043	1.317	0.227
47.6	15	1.723	1.171	1.346	0.261
47.6	30	2.243	4.406	1.762	1.325
47.6	100	4.451	40.23	3.603	24.294
155.3	0	2.198	4.014	1.958	2.302
155.3	1	2.232	4.306	1.985	2.468
155.3	2	2.266	4.609	2.012	2.64
155.3	3	2.3	4.923	2.039	2.82
155.3	4	2.334	5.248	2.067	3.007
155.3	5	2.368	5.585	2.094	3.201
155.3	6	2.401	5.932	2.121	3.402
155.3	7	2.435	6.289	2.148	3.611
155.3	8	2.468	6.658	2.175	3.827
155.3	9	2.502	7.036	2.202	4.05
155.3	10	2.535	7.425	2.229	4.28
155.3	11	2.569	7.823	2.256	4.518
155.3	12	2.602	8.231	2.283	4.762
155.3	13	2.635	8.648	2.309	5.014
155.3	14	2.668	9.075	2.336	5.273
155.3	15	2.701	9.51	2.363	5.539
155.3	30	3.188	16.918	2.76	10.313
155.3	100	5.267	54.406	4.521	41.511
160	0	2.24	4.381	2.002	2.573
160	1	2.274	4.687	2.029	2.75
160	2	2.308	5.004	2.056	2.934
160	3	2.342	5.332	2.083	3.126
160	4	2.376	5.671	2.11	3.324
160	5	2.41	6.02	2.138	3.53
160	6	2.443	6.381	2.165	3.743
160	7	2.477	6.752	2.192	3.964
160	8	2.51	7.133	2.219	4.191
160	9	2.544	7.524	2.245	4.426
160	10	2.577	7.925	2.272	4.668
160	11	2.61	8.335	2.299	4.917
160	12	2.643	8.755	2.326	5.174
160	13	2.677	9.183	2.353	5.437
160	14	2.71	9.621	2.38	5.707
160	15	2.743	10.067	2.406	5.984
160	30	3.228	17.593	2.803	10.908
160	100	5.302	54.957	4.56	42.227

		0-1 year olds		0-7 year olds	
Soil lead levels (ppm)	Fountain water (ppb)	Geometric mean Blood lead level (ug/dL)	%>5 ug/dL	Geometric mean Blood lead level (ug/dL)	%>5 ug/dL
400	0	4.268	36.82	4.135	34.306
400	1	4.298	37.376	4.16	34.772
400	2	4.327	37.929	4.184	35.236
400	3	4.357	38.48	4.209	35.699
400	4	4.386	39.029	4.233	36.161
400	5	4.416	39.575	4.258	36.622
400	6	4.445	40.118	4.282	37.082
400	7	4.474	40.659	4.307	37.54
400	8	4.504	41.196	4.331	37.997
400	9	4.533	41.731	4.355	38.453
400	10	4.562	42.263	4.38	38.907
400	11	4.591	42.792	4.404	39.359
400	12	4.62	43.317	4.428	39.81
400	13	4.649	43.84	4.453	40.259
400	14	4.677	44.359	4.477	40.707
400	15	4.706	44.875	4.501	41.153
400	30	5.131	52.202	4.861	47.608
400	100	6.967	75.99	6.463	70.746
2000	0	13.431	98.224	14.549	98.847
2000	1	13.447	98.235	14.564	98.954
2000	2	13.464	98.247	14.579	98.86
2000	3	13.48	98.258	14.595	98.867
2000	4	13.496	98.269	14.61	98.874
2000	5	13.513	98.28	14.625	98.88
2000	6	13.529	98.29	14.641	98.887
2000	7	13.545	98.301	14.656	98.893
2000	8	13.561	98.312	14.671	98.9
2000	9	13.577	98.323	14.686	98.906
2000	10	13.594	98.333	14.702	98.912
2000	11	13.61	98.344	14.717	98.919
2000	12	13.626	98.354	14.732	98.925
2000	13	13.642	98.364	14.747	98.931
2000	14	13.658	98.374	14.763	98.937
2000	15	13.674	98.385	14.778	98.944
2000	30	13.914	98.528	15.005	99.031
2000	100	14.992	99.026	16.034	99.342

Graph of IEUBK model outputs for selected water lead levels for 0-1 year old children



Graph of IEUBK model outputs for selected water lead levels for 0-7 year old choldren



This Document is a Non-Responsive Attachment.

Objective: Identify the risk of elevated blood lead levels in children exposed to lead in drinking water and in household dust.

Public Health Assumptions - The model estimates are only accurate if the following assumptions are met:

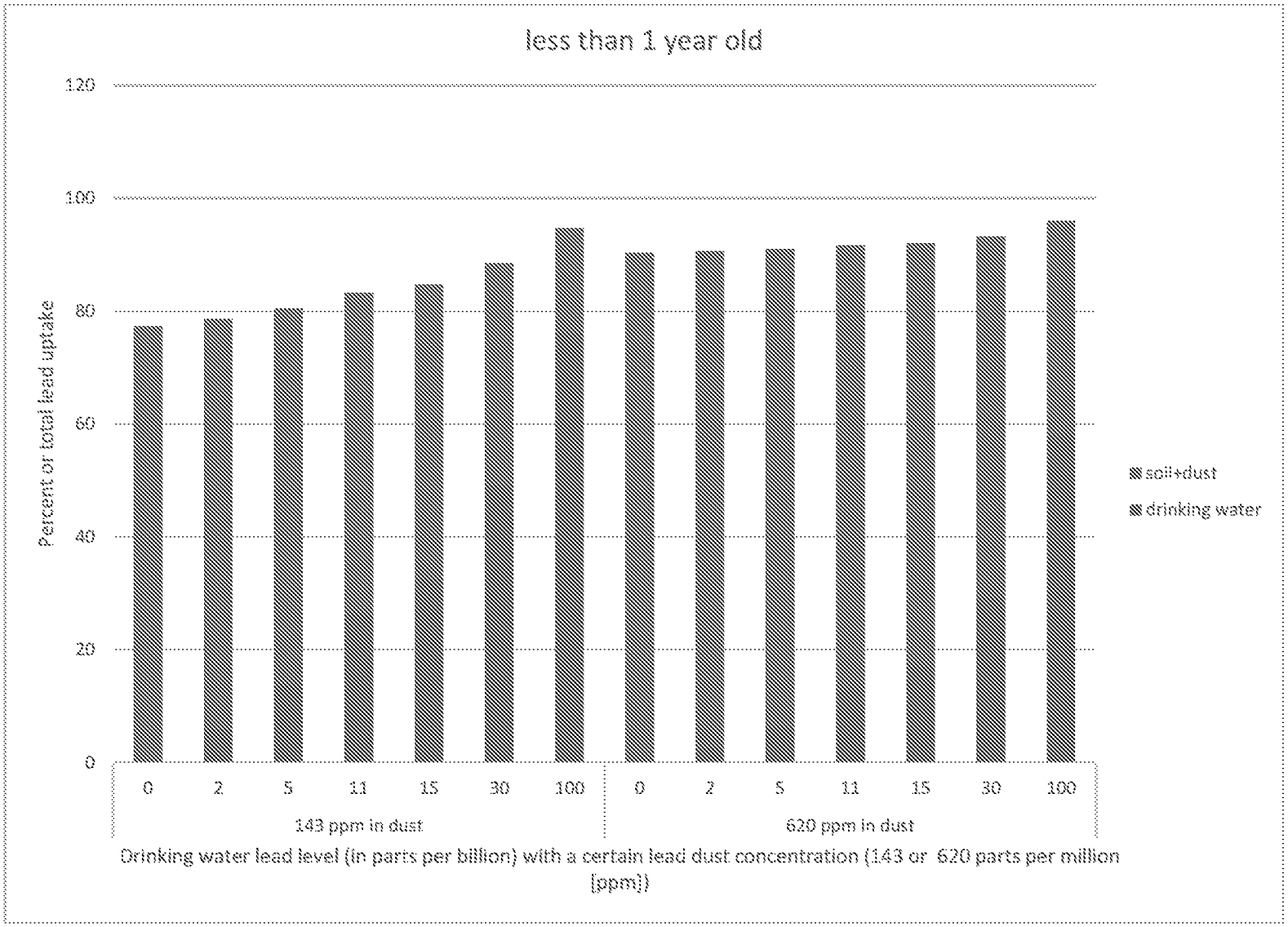
1. The concentration of lead in all drinking water sources (e.g., home, school or other location) is equal to the modeled concentration.
2. Lead dust concentrations are consistent with those used here: either 143 ppb for homes 30-60 years of age or 620 ppb for homes older than 60 years.
3. Children are not exposed to lead paint chips.
4. Children are exposed to lead soil concentrations typical of the urban environment in Flint (i.e. soil has not been impacted by lead-based paint).

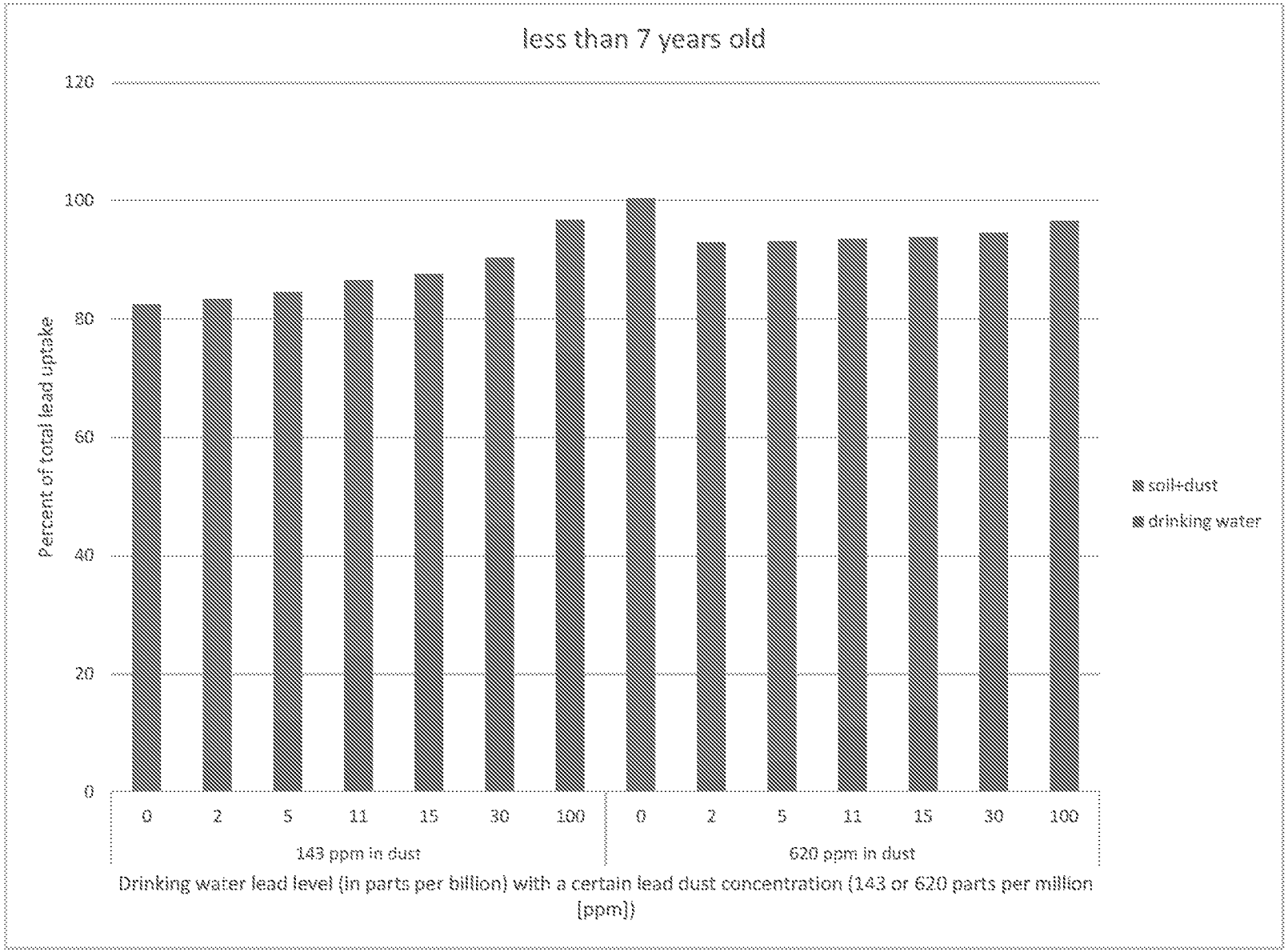
Children's risk of having an elevated blood lead level will be greater than the model estimates if these assumptions are not met.

Resulting risk from drinking water with the following lead concentrations: The goal is that a child should have ***no more than a 5 percent risk*** of having a blood lead level greater than 5 micrograms per deciliter.

	less than 1 year old		**less than 7 years old**	
Lead Drinking Water Concentration	**Lead Dust = 143 ppm**	**Lead Dust = 620 ppm**	**Lead Dust = 143 ppm**	**Lead Dust = 620 ppm**
0 ppb	5.8	49	3.7	48
2 ppb	7.2	51	4.6	50
5 ppb	9.7	54	6.2	52
11 ppb	16	59	10	57
15 ppb	20	62	13	59
30 ppb	37	72	27	69
100 ppb	84	92	76	90

The graphs below illustrate the relative contribution to total exposure of lead in drinking water (0 to 100 ppb), compared to soil (160 ppm) plus household dust (143 ppm and 620 ppm). Other exposures, such as ingestion of lead in food and inhalation of lead in ambient air, contribute additional lead uptake to equal 100% of total modeled exposure.




less than 7 years old
120
100
80
60
40
20
0
Percent of total lead uptake
0
2
5
11
15
30
100
0
2
5
11
15
30
100
143 ppm in dust
620 ppm in dust
soil+dust
drinking water
Drinking water lead level (in parts per billion) with a certain lead dust concentration (143 or 620 parts per million [ppm])

This Document is a Non-Responsive Attachment.

Executive Summary for a Health-Based Drinking Water Lead Level

October 26, 2015

Objective: Identify health-based drinking water lead level(s) to allow re-opening of school and/or daycare water fountains/faucets for student use.

Public Health Assumptions Included in the Model

The model estimates are only accurate if the following assumptions are met:

1. Children are not exposed to lead paint chips or lead paint dust (at home or elsewhere).
2. Children's drinking water at home is filtered and contains no more than 1 ppb of lead.
3. Children are exposed to lead soil concentrations typical of the urban environment in Flint (i.e. soil has not been impacted by lead-based paint).

Children's risk of having an elevated blood lead level will be greater than the model estimates if these assumptions are not met.

Resulting risk from drinking water with the following lead concentrations:

The goal is that a child should have ***no more than a 5 percent risk*** of having a blood lead level greater than 5 micrograms per deciliter.

Risk of a child having an elevated blood lead level		
Daycare or School Drinking Water Lead Levels	less than 1 year old	less than 7 years old
0 ppb	**4.4 percent**	**2.5 percent**
2 ppb	**5.0 percent**	**2.9 percent**
5 ppb	**6.0 percent**	**3.5 percent**
11 ppb	**8.3 percent**	**4.9 percent**
15 ppb	**10 percent**	**6.0 percent**
30 ppb	**18 percent**	**11 percent**
100 ppb	**55 percent**	**42 percent**

This Document is a Non-Responsive Attachment.

From: Wells, Eden (DHHS)
Sent: Sunday, December 20, 2015 1:43 PM
To: LaRocco, Toni
Subject: Re: Newborn

I so know it....

From: LaRocco, Toni <tlarocco@gchd.us>
Sent: Sunday, December 20, 2015 1:03 PM
To: Wells, Eden (DHHS)
Subject: Re: Newborn

Yes I understand however sometimes the common sense doesn't rule the contract.

Toni LaRocco MS, RN
Director of Nursing Services
Genesee County Health Department

On Dec 20, 2015, at 12:30 PM, Wells, Eden (DHHS) <WellsE3@michigan.gov> wrote:

Right, of interest is that this is cord blood from a newly born baby....!!! There should be NO lead...

From: LaRocco, Toni <tlarocco@gchd.us>
Sent: Sunday, December 20, 2015 11:53 AM
To: July, Jori; STAYLOR@gchd.us; knoble@gchd.us; jwenstrom@gchd.us
Cc: Wells, Eden (DHHS)
Subject: Fwd: Newborn

Jori and Eden,
Please see below. Please note that this is a result below 5. We are happy in this extended circumstance to follow this family. I am off next week and will need you Eden, to advocate with state for the follow up by case managers as it does not fit the specified criteria.
Merry Christmas!

Toni

Toni LaRocco MS, RN
Director of Nursing Services
Genesee County Health Department

Begin forwarded message:

From: "Wells, Eden (DHHS)" <WellsE3@michigan.gov>
Date: December 20, 2015 at 11:46:15 AM EST
To: Mona Hanna-Attisha <MHanna1@hurleymc.com>
Cc: "Miller, Corinne (DHHS)" <MillerC39@michigan.gov>, "Dykema, Linda D. (DHHS)" <DykemaL@michigan.gov>, "Peeler, Nancy (DHHS)" <PeelerN@michigan.gov>, "Priem, Wesley F. (DHHS)" <priemw@michigan.gov>, "LaRocco, Toni" <tlarocco@gchd.us>, "Valacak, Mark" <MVALACAK@gchd.us>, "Moran, Susan (DHHS)" <MoranS@michigan.gov>
Subject: Re: Newborn

Great info- !!! Thanks- and we shall close the loop in this quickly!
E

Sent from my iPhone

On Dec 20, 2015, at 11:14 AM, Mona Hanna-Attisha <MHanna1@hurleymc.com> wrote:

Looking forward to hearing from a case manager.

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Hurley delivers about 3000 babies/yr. Most of city of flint babies.

Mona Hanna-Attisha MD MPH FAAP
Director, Pediatric Residency Program
Hurley Children's Hospital
Michigan State University

On Dec 20, 2015, at 11:05 AM, Wells, Eden (DHHS) <WellsE3@michigan.gov> wrote:

Good to know- we shall be sure one of the case managers contacts you directly for information-- how many babies are born at Hurley each mint? I.e., how many cord bloods are being tested?

Sent from my iPhone

On Dec 20, 2015, at 10:57 AM, Mona Hanna-Attisha <MHanna1@hurleymc.com> wrote:

Yes we are planning to contact mom, test mom, test baby (venous), test siblings, and contact PMD.

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Linda, can you coordinate the point person to contact Dr. Mona- Hanna-Attisha regarding name, address, etc on this cord blood for investigation ASAP. Should be coordinated per usual case management between GCHD and MDHHS.

Eden V. Wells, MD, MPH, FACPM
Chief Medical Executive
Michigan Department of Health and Human Services
201 Townsend Street, 5th Floor CVB
Lansing, MI 48913
Phone: 517-335-8011
wellse3@michigan.gov

From: Mona Hanna-Attisha <MHanna1@hurleymc.com>
Sent: Sunday, December 20, 2015 9:02 AM
To: Wells, Eden (DHHS)
Subject: Newborn

Eden, in our cord blood lead research project, we just got a 4.8 result on a newborn's cord blood. Who can I contact to make sure they get a proper home/water investigation? I doubt these labs get into the lead program.

Mona Hanna-Attisha MD MPH FAAP
Director, Pediatric Residency Program
Hurley Children's Hospital
Michigan State University

From: Wells, Eden (DHHS)
Sent: Sunday, December 20, 2015 4:32 PM
To: LaRocco, Toni
Subject: Re: Newborn

Toni- that is an excellent point as well- and will discuss with heads of Medicaid and Population health first thing in AM!

Sent from my iPhone

On Dec 20, 2015, at 1:03 PM, LaRocco, Toni <tlarocco@gchd.us> wrote:

Yes I understand however sometimes the common sense doesn't rule the contract.

Toni LaRocco MS, RN
Director of Nursing Services
Genesee County Health Department

On Dec 20, 2015, at 12:30 PM, Wells, Eden (DHHS) <WellsE3@michigan.gov> wrote:

Right, of interest is that this is cord blood from a newly born baby....!!! There should be NO lead...

From: LaRocco, Toni <tlarocco@gchd.us>
Sent: Sunday, December 20, 2015 11:53 AM
To: July, Jori; STAYLOR@gchd.us; knoble@gchd.us; jwenstrom@gchd.us
Cc: Wells, Eden (DHHS)
Subject: Fwd: Newborn

Jori and Eden,
Please see below. Please note that this is a result below 5. We are happy in this extended circumstance to follow this family. I am off next week and will need you Eden, to advocate with state for the follow up by case managers as it does not fit the specified criteria.
Merry Christmas!

Toni

Toni LaRocco MS, RN
Director of Nursing Services
Genesee County Health Department

Begin forwarded message:

From: "Wells, Eden (DHHS)" <WellsE3@michigan.gov>
Date: December 20, 2015 at 11:46:15 AM EST
To: Mona Hanna-Attisha <MHanna1@hurleymc.com>
Cc: "Miller, Corinne (DHHS)" <MillerC39@michigan.gov>, "Dykema, Linda D. (DHHS)" <DykemaL@michigan.gov>, "Peeler, Nancy (DHHS)" <PeelerN@michigan.gov>, "Priem, Wesley F. (DHHS)" <priemw@michigan.gov>, "LaRocco, Toni" <tlarocco@gchd.us>, "Valacak, Mark" <MVALACAK@gchd.us>, "Moran, Susan (DHHS)" <MoranS@michigan.gov>
Subject: Re: Newborn

Great info- !!! Thanks- and we shall close the loop in this quickly!
E

Sent from my iPhone

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Mona Hanna-Attisha MD MPH FAAP
Director, Pediatric Residency Program
Hurley Children's Hospital
Michigan State University

From: Wells, Eden (DHHS)
Sent: Monday, December 21, 2015 9:45 AM
To: Stanbury, Martha (DHHS)
Subject: Re: Pb in Flint-TIME SENSITIVE

Can talk by pone but just got off phone with Corinne. will respond back to all---

---

From: Stanbury, Martha (DHHS)
Sent: Monday, December 21, 2015 9:41 AM
To: Wells, Eden (DHHS)
Subject: RE: Pb in Flint-TIME SENSITIVE

Can we talk about this?

From: Wells, Eden (DHHS)
Sent: Sunday, December 20, 2015 5:40 PM
To: Dykema, Linda D. (DHHS) <DykemaL@michigan.gov>
Cc: Stanbury, Martha (DHHS) <stanburym@michigan.gov>; Miller, Corinne (DHHS) <MillerC39@michigan.gov>
Subject: Re: Pb in Flint-TIME SENSITIVE

Agree! All good- I do not think he will be getting into methodology, just recommending increased frequency---

Sent from my iPhone

On Dec 20, 2015, at 5:19 PM, Dykema, Linda D. (DHHS) <DykemaL@michigan.gov> wrote:

> I absolutely agree that we have to define the task with full knowledge of what's feasible. No more chasing our tails on these reports. It's unproductive.
>
> Sent from my iPhone
>
> On Dec 20, 2015, at 2:51 PM, Wells, Eden (DHHS) <WellsE3@michigan.gov> wrote:
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> > I agree- and also think he will go with whatever the EPIds feel is best for the denominator--
> > E
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sense. For example, our conclusion on Friday was that if Medicaid metrics are going to be used, then only Medicaid kids should be in the numerator. Dr. Davis would need to be made aware of that recommendation and the rationale for it. Sending emails back and forth may not be the best way to come up with a long term data dissemination plan that meets everyone's expectations, so I would hope there could be a conference call or, better yet, an in person discussion including our epidemiology and BL surveillance SMEs. Your thoughts?

From: Wells, Eden (DHHS)
Sent: Sunday, December 20, 2015 10:37 AM
To: Stanbury, Martha (DHHS)
Cc: Dykema, Linda D. (DHHS)
Subject: Fw: Pb in Flint-TIME SENSITIVE

Martha- Looping you in--

E

From: Wells, Eden (DHHS)
Sent: Saturday, December 19, 2015 5:13 PM
To: Miller, Corinne (DHHS); Dykema, Linda D. (DHHS)
Cc: Lasher, Geralyn (DHHS); Moran, Susan (DHHS)
Subject: Fw: Pb in Flint-TIME SENSITIVE

Corinne, please review Matt's email below and my response--- while increased frequency of reporting to weekly is possible, I am not sure of the current time frame for obtaining the Medicaid denominators and if making those weekly works. We can discuss by phone if necessary.

From: Eden Wells <ewells@umich.edu>
Sent: Saturday, December 19, 2015 4:54 PM
To: Davis, Matthew (Matt)
Cc: Wells, Eden (DHHS)
Subject: Re: Pb in Flint

Good afternoon, Matt,

Thank you for the information. Currently the data is being pulled from the Data Warehouse every two weeks---I believe that the discussion then was the time it would take then to

clean, de-duplicate and organize the information made the two-week frame workable. I do know that Corinne and her staff are working with Medicaid to address the denominator issue, so let me run this by her. Right off the bat, once the process has become routinized, increased frequency should be possible--

Eden

Eden V. Wells, MD, MPH, FACPM
Clinical Associate Professor, Epidemiology
Director, Preventive Medicine Residency
University of Michigan School of Public Health
1415 Washington Heights,
Ann Arbor, MI 48109
Tel: 734-647-5306
Fax: 734-936-2084
ewells@umich.edu

On Sat, Dec 19, 2015 at 4:30 PM, Davis, Matthew (Matt) <mattdav@med.umich.edu> wrote:

> Hi Eden -
>
> I hope you're doing well!
>
> I'm writing to give you a friendly heads up ….
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> The Flint Water Advisory Task Force will likely, within the next week or two, be sending Gov Snyder a set of recommended metrics for the dashboard that we alluded to in our initial Task Force letter to the Governor earlier this month.
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> Several of these metrics fall under the purview of MDHHS and tie directly to data (and corresponding data sources) that MDHHS shared on Dec 11 in the "Flint Blood Testing Report". Others relate to metrics that you, Sue, and I discussed in our phone call that same week — i.e., related to connecting CLPPP data (numerator) to Medicaid data (denominator) for the Flint zip codes — or that appeared in the Sit Rep reports that Geralyn shared with the Task Force from Nov 30 and Dec 1.
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In the interest of building and sustaining public trust in part with data transparency, there is strong interest on the Task Force in recommending weekly updates (similar to weekly updates on enrollment from the Healthy Michigan Plan). Given the current testing rate in Flint (~200-300 children per week, based on the Dec 11 report) and the hope of elevating that rate, that frequency seems reasonable to me in terms of data robustness. I would be interested to hear your thoughts on this.

Thanks very much,
Matt

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My cell is PPI -- I cannot locate your signature line for your number!!

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Thanks very much,
Matt

****

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From: Wells, Eden (DHHS)
Sent: Tuesday, December 22, 2015 9:21 AM
To: Marc Edwards;Mona Hanna-Attisha;LawrenceR@mottchc.org;Chris Kolb;Andy Leavitt
Subject: Re: DHHS Document in MDEQ FOIA

Found the source--back to you in a bit-

From: Marc Edwards <edwardsm@vt.edu>
Sent: Tuesday, December 22, 2015 8:40 AM
To: Wells, Eden (DHHS); Mona Hanna-Attisha; LawrenceR@mottchc.org; Chris Kolb; Andy Leavitt
Subject: DHHS Document in MDEQ FOIA

Eden,

Since you reached out to me yesterday, I am going to contact you directly, because I am disturbed about the attached document just provided to me in a FOIA of MDEQ.

Even as I was being given the runaround on my request September 2nd to get blood lead data for Flint, DHHS staff were preparing a "campaign" to downplay lead in water as a health concern.
The date on the DHHS Flint water communications plan is September 9th.

Why wasn't this produced in my FOIA of DHHS? Certainly it was 100% responsive. There are also obviously other documents and e-mails missing as well.

Marc

From: Wells, Eden (DHHS)
Sent: Tuesday, December 22, 2015 8:36 PM
To: Clifford Wells
Subject: State failed to sound alarm when it knew of rising Flint blood lead levels | MLive.com

http://www.mlive.com/news/flint/index.ssf/2015/12/documents_show_state.html

Sent from my iPhone

From: Wells, Eden (DHHS)
Sent: Monday, December 28, 2015 3:05 PM
To: Stanbury, Martha (DHHS)
Subject: Re: Pb in Flint

Yes, just hammering away....
!

From: Stanbury, Martha (DHHS)
Sent: Monday, December 28, 2015 2:59 PM
To: Wells, Eden (DHHS); Miller, Corinne (DHHS); Dykema, Linda D. (DHHS)
Subject: RE: Pb in Flint

Corinne needs to work that out with Medicaid. She's reached out but I don't think she's heard back yet – she reached out again today.

From: Wells, Eden (DHHS)
Sent: Monday, December 28, 2015 2:56 PM
To: Stanbury, Martha (DHHS) <stanburym@michigan.gov>; Miller, Corinne (DHHS) <MillerC39@michigan.gov>; Dykema, Linda D. (DHHS) <DykemaL@michigan.gov>
Subject: Re: Pb in Flint

I will be speaking to him at 4:30, and can. Will this data be part of our weekly reports then? (Now biweekly, but to become weekly asap?)

From: Stanbury, Martha (DHHS)
Sent: Monday, December 28, 2015 2:32 PM
To: Miller, Corinne (DHHS); Dykema, Linda D. (DHHS); Wells, Eden (DHHS)
Subject: RE: Pb in Flint

Is there any way Eden can reiterate to Dr. Davis that our Medicaid metric (currently under development) will have Medicaid data in the numerator, not CLPP data?

From: Miller, Corinne (DHHS)
Sent: Monday, December 28, 2015 2:02 PM
To: Dykema, Linda D. (DHHS) <DykemaL@michigan.gov>; Stanbury, Martha (DHHS) <stanburym@michigan.gov>
Subject: Fwd: Pb in Flint

FYI

Sent from my iPhone

Begin forwarded message:

From: Eden Wells <ewells@umich.edu>
Date: December 28, 2015 at 12:47:34 PM EST
To: morans <morans@michigan.gov>, "Lasher, Geralyn (DCH)" <lasherg@michigan.gov>, "Becker, Timothy (DCH)" <Beckert1@michigan.gov>, "Lyon, Nick (DCH)" <LyonN2@michigan.gov>, "Hertel, Elizabeth (DCH)" <HertelE@michigan.gov>, Miller Corinne <MillerC39@michigan.gov>
Subject: Fwd: Pb in Flint

Forwarding to ensure ou all got this

E

Eden V. Wells, MD, MPH, FACPM
Clinical Associate Professor, Epidemiology
Director, Preventive Medicine Residency
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Tel: 734-647-5306
Fax: 734-936-2084
ewells@umich.edu

---------- Forwarded message ----------
From: **Davis, Matthew (Matt)** <mattdav@med.umich.edu>
Date: Sat, Dec 19, 2015 at 4:30 PM
Subject: Pb in Flint
To: Eden Wells <ewells@umich.edu>

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From: Wells, Eden (DHHS)
Sent: Tuesday, December 29, 2015 11:33 AM
To: ewells@umich.edu
Subject: FW: MEDIA CLIPS for 12.29.15

From: CommOffice
Sent: Tuesday, December 29, 2015 10:49 AM
To: CommOffice <CommOffice@michigan.gov>
Subject: MEDIA CLIPS for 12.29.15

Michigan Gov. Rick Snyder, legislative leaders name biggest disappointments of 2015

Auditor general findings set off Flint water debate

Bill Berry: Safe drinking water a sure bet no longer

Michigan Gov. Rick Snyder, legislative leaders name biggest disappointments of 2015

MLive.com – December 29, 2015, By Jonathan Oosting

LANSING, MI — The Flint drinking water crisis was the biggest disappointment of 2015, according to Gov. Rick Snyder and Senate Minority Leader Jim Ananich, who have very different perspectives on the situation.
Snyder says the state acted swiftly once it was alerted to the link between elevated blood-lead levels in children and Flint's switch to a local river for drinking water.
But the state did too little too late, according to Ananich, D-Flint, who continues to criticize the administration and call for legislative hearings on the crisis.
MLive.com, in a series of year-end interviews and media roundtables, asked the governor and legislative leaders to describe their biggest disappointment of 2015.
Read their responses below, click here to find out what they described as their biggest accomplishments of the year and check back tomorrow to learn about their top priorities for 2016.

Michigan Gov. Rick Snyder: Flint water crisis
The biggest challenge, the thing that you really would have liked to see not be an issue, would have been the Flint water situation. Again, that's not something you'd ever want to see in terms of elevated lead levels, and as we were alerted to those issues, we became proactive and worked hard to address them by offering free water testing, free water filters, free blood testing, follow-up work, helping in the transition back to the Great Lakes Water Authority. This whole issue, we've gone into the schools now to do testing of the water down to the particular fixture. That surprised me that there was no federal or state requirement to do water testing in schools if you didn't happen to be on your own well. We found the issues tend to be isolated, actually, at the fixture. The drinking fountain itself. So the water doesn't have an issue in the system itself, coming in, and even throughout the school until it happens to hit a fixture that has particular problems, so far, in terms of what we've found.

Senate Majority Leader Arlan Meekhof: Courser-Gamrat affair and expulsion

The fact that you all had months and months of coverage on a couple House members that didn't end up very well. That light shines on all of us, and it was unfortunate, those poor choices on their part. (Editor's note: State Reps. Todd Courser and Cindy Garmat were forced out of office in September over allegations they misused taxpayer resources to hide their extra-marital affair. The House voted to expel Gamrat roughly an hour after Courser resigned.)

Senate Minority Leader Jim Ananich: Flint water response
That's an easy one: the governor and his administration's total lack of urgency when it comes to the poisonous water in my community. Even today, they still seem to be missing the boat on the crisis in my community, the credibly that a number of individuals and departments have. This is not a political issue, this is a public health — basically an emergency disaster — issue, and that's how it should be treated. I think if everybody treated it that way, we'd have a lot more work and cooperation, we'd have a lot more action that would be moving in the right direction a lot quicker, and unfortunately that's not be the tact that they've taken.

House Speaker Kevin Cotter: Partisanship
The biggest disappointment, I would say overall, has been partisanship on a number of issues. For me, I think this really started, or at least it reared it's head during another disappointing process or development, which was the expulsion hearings (of Courser and Gamrat). That became very partisan. It was a situation where there was unanimous support on the Republican side to expel two of our members, and unfortunately we went until the wee hours of the morning to get the 2/3 votes we needed because there was political gamesmanship going on that then continued into other areas — third-grade reading — it then continued to the bills we just passed (in December) regarding the data centers. It is something that is very prevalent, and it is disappointing. I certainly understand that we're going to have differences on policy, and that is to be expected, but to the extent that it is holding up things. Take the third-grade reading, for example. Take the expulsion vote. That wasn't about the subject matter of the vote, but rather that was how do we clobber each other. In this case, how do we clobber Republicans and try to take back control of the chamber.

House Minority Leader Tim Greimel: Lack of bipartisan solutions
I think there were some really great bipartisan solutions that we reached in the previous term. We saw Medicaid expansion. We saw the approach to provide assistance to the city of Detroit and allow it to emerge successfully from bankruptcy. Those are the kinds of bipartisan solutions that the people of Michigan expect and deserve, and it's disappointing that under the current House leadership, we have not seen those kinds of bipartisan solutions. I think the House Republicans have become increasingly dominated by the far right-wing conservative elements of their caucus and of the Republican party more broadly. As a result, I think we've seen more partisanship from them, and I think we've seen more ideology and less pragmatism and bipartisanship.

http://www.mlive.com/lansing-news/index.ssf/2015/12/michigan_gov_rick_snyder_legis_1.html

Auditor general findings set off Flint water debate

The Detroit News – December 28, 2015, By Jim Lynch

Findings compiled by Michigan's Office of the Auditor General have set off another debate about who is to blame for Flint's 18-month-long water crisis.

Two state lawmakers are blaming Flint's contaminated water on state environmental officials based on the auditor general's letter. A state spokesman, however, said the findings of state Auditor General Doug Ringler merely confirm what has already been reported.

The document, a set of answers to detailed questions from Senate Minority Leader Jim Ananich, D-Flint, and Rep. Sheldon Neeley, D-Flint, was released late last week. On Monday, Ananich and Sheldon charged state officials with being behind the 2014 decision to have Flint change the source of its drinking water to the Flint River from the Detroit Water and Sewerage Department's Lake Huron.

"This is another example of how the state failed, initially, and continues to fail, by not treating this situation like the emergency it is," Neeley said in a statement. "We need answers, we need action and we need them sooner rather than later."

In the letter, though, Ringler indicates that when Flint and the Detroit water system officials failed to reach an interim agreement on water supply after Flint decided to build its own water authority, "the City of Flint notified DEQ through a permit request of its intent to operate the Flint WTP (Water Treatment Plant) full time using the Flint River."

While under the control of an emergency manager appointed by Gov. Rick Snyder, the city began drawing its drinking water from the Flint River in April 2014. The cost-saving move immediately led to complaints from residents about the taste, color and smell of the water coming from their taps.

In July, August and September, testing results began to paint a darker picture — children in certain areas of the city were beginning to show signs of lead contamination.
The city has since switched back to its previous water supplier, the Detroit water department. A task force is charged with figuring out how Flint's water situation went wrong, including an examination of how corrosion controls were not used in bringing the river water into homes.

Corrosion controls, like phosphates, are added before water leaves the treatment plant to help coat pipelines to prevent lead from leaching in. Following the switch to the Flint River, no such corrosion controls were added. And many of the questions surrounding the problems in Flint center on who decided to omit corrosion controls.

For months, DEQ officials have been under the microscope for their handling of the issue. Some of the harshest criticism has come from those who believe state workers purposely misled the U.S. Environmental Protection Agency over whether corrosion controls were in use.

Critics point to a Feb. 27 email from a state employee to the federal agency contending that a corrosion control program was in place. The Auditor General's report lays out the resulting situation.

■"It appears the EPA interpreted corrosion control program to mean that corrosion control treatment was in place."

■"On April 23, 2015, the EPA again inquired as to what the Flint WTP was doing for corrosion control treatment."

■"DEQ responded on April 24, 2015 that the Flint WTP was not practicing control treatment."

"Based on our review of this and other emails, we have no specific reason to believe that DEQ willingly misrepresented the information to the EPA," the report reads.
On Monday, Ananich contended the Auditor General findings put the blame on state officials.

"What's clear is that corrosion control should have been used, and there are serious failings in our system that must be addressed," Ananich said in a press release. He added that city officials voted in 2013 to switch to the Karegondi Water Authority — a new regional water supply system that is still under construction — but never addressed the issue of using the Flint River.

State environmental and health officials got a measure of support from the office of Snyder, a Republican.

"The letter from the Office of the Auditor General includes some criticisms, but also reflects that state officials were following accepted protocols, or in one case, an interpretation of the corrosion control program that the EPA later clarified," said David Murray, the governor's spokesman.

"But we need to do better in ensuring Flint residents have safe water and tracking children affected by elevated lead levels. We continue to work with the bipartisan task force that is reviewing all the actions at the state, local and federal level and is expected to offer recommendations in a month or so. Gov. Snyder is committed to working with Flint Mayor Weaver and officials on these issues."

On Monday, DEQ Spokesman Brad Wurfel addressed the auditor general's letter.
"The findings of the Auditor General are consistent with our findings at DEQ in our own internal review," Wurfel said. "We appreciate their careful consideration of the issues they were asked to look at."

http://www.detroitnews.com/story/news/politics/2015/12/28/michigan-auditor-general-flint-water-debate/77982594/

Bill Berry: Safe drinking water a sure bet no longer

The Cap Times – December 28, 2015, By Bill Berry

STEVENS POINT — There was a time when people in states like Wisconsin and Michigan could be sure that their drinking water was safe. Not anymore.

The stories of bad water in Kewaunee County in northeast Wisconsin and Flint, Michigan, in the Lower Peninsula differ in detail but are eerily similar on some important basics. And those basics point to state administrations that put business interests and government spending cuts above the health and well-being of their most vulnerable citizens.

Flint's troubles began when it was being run by a state-appointed emergency manager. It changed its drinking water source from Detroit's water system to the Flint River to save money. In a massive regulatory failure, state officials never required that the river water be treated to make it less corrosive, causing lead from plumbing and pipes to leach into the water supply.

Soon residents learned of rising levels of lead in the blood of Flint children. Lead poisoning can cause irreversible health and behavioral problems, and children exposed to too much can permanently lose IQ points.

As we learned last week, the state ignored conclusive evidence of lead poisoning and publicly dismissed research findings that linked lead in children's blood to Flint water. Those findings were sent directly to Gov. Rick "Austerity" Snyder's office. Now the state is claiming it made an honest

mistake. Mistake? You bet. Honest? Come on. The city reconnected to the Detroit water system in October, but local officials are still advising residents not to drink the water unless they're using a lead-clearing filter.

There was a time when this kind of malfeasance would be enough to end the political career of the likes of Snyder, but not in today's world.

Meanwhile, people in Kewaunee County are dealing with unsafe wells and a regulatory agency, the Department of Natural Resources, run by political appointees who are more interested in being "open for business" than protecting human health. It got so bad that citizens in Kewaunee County have petitioned the Environmental Protection Agency to step in and enforce clean water laws where the DNR has refused or claimed it doesn't have the authority to do so.

The problem in Kewaunee County is too many cows and too much manure. The county has nearly 100,000 cows, up 64 percent from 59,800 cattle in 1983. Large-scale farms have proliferated. The county is perched atop fragile karst topography, which allows pollutants to make their way to groundwater through cracks and fissures. So while large-farm operators might be doing everything according to current rules, the current rules aren't enough. And in the current framework of failing rules, the land has exceeded its carrying capacity.

Results of a study released this month show that more than one-third of wells in the county were found to be unsafe because they failed to meet health standards for drinking water. The study is significant because unlike previous ones, it was random. While the researchers caution that cow manure can't be blamed for the unsafe wells just yet, would anyone like to venture a bet?

Rather than stepping into the picture on behalf of citizens whose wells are tainted, state officials and Gov. Scott Walker have ignored or danced around the issue. What's clear about this administration is regardless of the environmental issue — metallic mining in northern Wisconsin, frac sand mining in western Wisconsin, cow manure in eastern Wisconsin — this administration will err on the wrong side of the rights of the little people.

But times may be changing. Local people are acting where their state has failed. In April, voters in the Kewaunee County OK'd a groundwater protection ordinance prohibiting manure spreading from Jan. 1 to April 15 on land with 20 feet or less of soil before reaching bedrock.

The trend in the Legislature, meanwhile, has been to reduce local powers. Flint, Michigan, might have some advice on that.

http://host.madison.com/ct/opinion/column/bill-berry-safe-drinking-water-a-sure-bet-no-longer/article_5b16a1c6-f680-57f4-b37a-5d98e081820b.html

From: Wells, Eden (DHHS)
Sent: Tuesday, December 29, 2015 3:21 PM
To: Eden Wells
Subject: Fwd: NEWS RELEASE: Gov. Rick Snyder takes action on initial findings from Flint Water Task Force

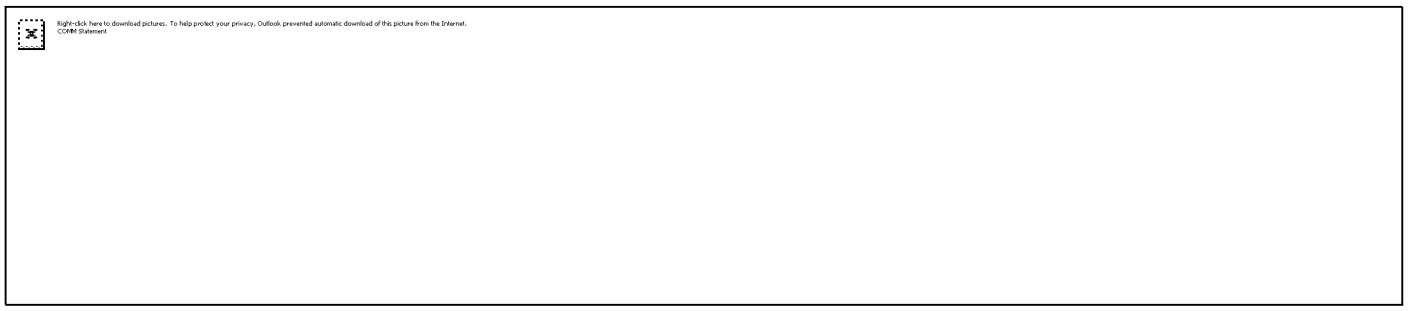
Sent from my iPhone

Begin forwarded message:

From: "Grijalva, Nancy (DHHS)" <GrijalvaN@michigan.gov>
Date: December 29, 2015 at 2:48:52 PM EST
To: "Becker, Timothy (DHHS)" <beckert1@michigan.gov>, "Beurer, Terrence (DHHS)" <BeurerT@michigan.gov>, "Collins, Joseph (DHHS)" <CollinsJ@michigan.gov>, "Dye, Carol (DHHS)" <DyeC1@michigan.gov>, "Freiburger, Kimberly (DHHS)" <FreiburgerK@michigan.gov>, "Frost, Erik (DHHS)" <FrostE@michigan.gov>, "Granger, Patricia (DHHS)" <GrangerP@michigan.gov>, "Grijalva, Nancy (DHHS)" <GrijalvaN@michigan.gov>, "Hanley, Farah (DHHS)" <hanleyf@michigan.gov>, "Hardiman, Bill (DHHS)" <HardimanB@michigan.gov>, "Harkins, Cynthia (DHHS)" <HarkinsC@michigan.gov>, "Hawks, Orlene (DTMB)" <HawksO@michigan.gov>, "Hertel, Elizabeth (DHHS)" <HertelE@michigan.gov>, "Joyce, Shavaughn (DHHS)" <JoyceS@michigan.gov>, "Kimichik, Alan (DHHS)" <KimichikA@michigan.gov>, "Krause, Kurt (DHHS)" <KrauseK2@michigan.gov>, "Lasher, Geralyn (DHHS)" <lasherg@michigan.gov>, "Lyon, Nick (DHHS)" <LyonN2@michigan.gov>, "Minicuci, Angela (DHHS)" <MinicuciA@michigan.gov>, "Moran, Susan (DHHS)" <MoranS@michigan.gov>, "Otis, Genevieve (DHHS)" <OtisG@michigan.gov>, "Parker, Karen (DHHS)" <ParkerK7@michigan.gov>, "Priest, Chris (DHHS)" <PriestC1@michigan.gov>, "Ridley, Nancy (DHHS)" <RidleyN@michigan.gov>, "Rockefeller, Cheryl (DHHS)" <RockefellerC@michigan.gov>, "Ruest, Karla (DHHS)" <RuestK@michigan.gov>, "Sederburg, Kari (DHHS)" <SederburgK@michigan.gov>, "Sims, Teri (DHHS)" <SimsT2@michigan.gov>, "Spitzley, Maureen (DHHS)" <SpitzleyM@michigan.gov>, "Titus, Laura (DHHS)" <TitusL@michigan.gov>, "Vorce, Donna (DHHS)" <VorceD@michigan.gov>, "Wells, Eden (DHHS)" <WellsE3@michigan.gov>, "Yager, Steve (DHHS)" <YagerS@michigan.gov>, "Zeller, Lynda (DHHS)" <ZELLERL2@michigan.gov>
Subject: FW: NEWS RELEASE: Gov. Rick Snyder takes action on initial findings from Flint Water Task Force

FYI...

From: GOV Newsroom [mailto:govnewsroom@govsubscriptions.michigan.gov]
Sent: Tuesday, December 29, 2015 2:45 PM
To: Grijalva, Nancy (DHHS) <GrijalvaN@michigan.gov>
Subject: NEWS RELEASE: Gov. Rick Snyder takes action on initial findings from Flint Water Task Force



Contacts: Dave Murray, Anna Heaton or Laura Biehl

517-335-6397

FOR IMMEDIATE RELEASE
Tuesday, Dec. 29, 2015

Gov. Rick Snyder takes action on initial findings from Flint Water Task Force

Changes to take place at DEQ, meeting planned with Mayor Karen Weaver

In response to initial findings from the Flint Water Task Force, Gov. Rick Snyder today issued the following statement:

"When I became aware that the city of Flint's water showed elevated lead levels and that the state's handling of the situation was being questioned, I requested funding to switch the source back to the Great Lakes Water Authority and appointed an independent task force to identify possible missteps and areas for improvement.

"The task force has done an exceptional job, reviewing stacks of documents and interviewing scores of Flint, Genesee County, state and federal officials. Although the task force's final report is not yet completed, members have made me aware of some interim findings and corrective steps that I have decided to take immediately in order to restore trust in how the state keeps its citizens safe and informed.

"We'll continue to work with the community members to make sure we hear and respond to their concerns.

"In addition, MDEQ Director Dan Wyant has offered his resignation, and I've determined that it's appropriate to accept it. I'm also making other personnel changes at MDEQ to address problems cited by the task force.

"But changes in leadership and staff are not enough. I understand there can be disagreements within the scientific community. That is why I have directed both the departments of Environmental Quality and Health and Human Services to invite every external scientist who has worked on this issue to be our partners in helping us improve

Flint water. Let's share research on water and blood lead level testing so we can arrive at accurate and mutually supported conclusions. Together, we should work to affirm that we're using the very best testing protocols to ensure Flint residents have safe drinking water and that we're taking steps to protect their health over the short and long term.

"I want the Flint community to know how very sorry I am that this has happened. And I want all Michigan citizens to know that we will learn from this experience, because Flint is not the only city that has an aging infrastructure.

"I know many Flint citizens are angry and want more than an apology. That's why I'm taking the actions today to ensure a culture of openness and trust. We've already allocated $10 million to test the water, distribute water filters, and help in other ways. Last week, I called Flint Mayor Karen Weaver, and we're going to meet soon to discuss other ways the state can offer assistance.

"These are only initial steps - we fully expect to take more actions following the recommendations of our task force. When it comes to matters of health and quality of life, we're committed to doing everything we can to protect the well-being of our citizens."

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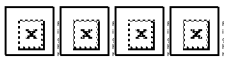
STAY CONNECTED



This email was sent to grijalvan@michigan.gov on behalf of: The Executive Office of the Governor · 111 South Capitol Avenue · Lansing, MI 48909 · 517-335-7858

From: Wells, Eden (DHHS)
Sent: Wednesday, December 30, 2015 3:51 PM
To: Reynolds, Lawrence
Subject: RE: DHHS Document in MDEQ FOIA
Attachments: Draft Comms Plan-EHS Tox 9_15.pdf

Yes, Marc sent it to me last week…

E

From: Reynolds, Lawrence [mailto:LawrenceR@mottchc.org]
Sent: Wednesday, December 30, 2015 3:30 PM
To: Wells, Eden (DHHS) <WellsE3@michigan.gov>
Subject: RE: DHHS Document in MDEQ FOIA

Do you have a copy of that document that you can send ?

From: Wells, Eden (DHHS) [mailto:WellsE3@michigan.gov]
Sent: Wednesday, December 30, 2015 2:48 PM
To: Marc Edwards; Reynolds, Lawrence; 'Chris Kolb'; 'Andy Leavitt'; 'Mona Hanna-Attisha'
Subject: RE: DHHS Document in MDEQ FOIA

Marc,

Let me know if you think my email timed at 2:33 today was helpful? It regards genesis and from where it arose.

E

From: Marc Edwards [mailto:edwardsm@vt.edu]
Sent: Wednesday, December 30, 2015 2:25 PM
To: Wells, Eden (DHHS) <WellsE3@michigan.gov>; LawrenceR@mottchc.org; 'Chris Kolb' <chris@environmentalcouncil.org>; 'Andy Leavitt' <aleavitt@senatedems.org>; 'Mona Hanna-Attisha' <MHanna1@hurleymc.com>
Subject: RE: DHHS Document in MDEQ FOIA

Eden,

Thanks. The key is that the e-mails and all other documents that would give insight to its genesis are being withheld.

Obviously, I have the plan because I sent it to you….and I was only aware of its existence because it was in an MDEQ FOIA.

So is it the position of DHHS, that the e-mails and documents associated with the Flint Water Lead Communications Plan, and the meetings associated with that document it up to September 9th, are not responsive to my FOIA? Or, is it the position of DHHHS, that the plan appeared out of nowhere, and there is no documents to indicate who wrote it or where it came from and why?

If it is the former, I have to call you out on that. If it is the latter, I need to know that too, because it is very hard to believe that a document like that just appears out of thin air.

Marc

From: Wells, Eden (DHHS) [mailto:WellsE3@michigan.gov]
Sent: Wednesday, December 30, 2015 12:33 PM
To: Marc Edwards; LawrenceR@mottchc.org; 'Chris Kolb'; 'Andy Leavitt'; Mona Hanna-Attisha
Subject: RE: DHHS Document in MDEQ FOIA

Good afternoon,

I now have a copy of this (this was drafted before I became part of the response, and was never implemented by Toxicology) and there are no concerns in sharing this draft Communications Plan that Toxicology had pulled together--- previous email was just stating why it was not part of FIOA package. It is attached, and again, do not hesitate to contact me anytime,

Eden

Eden V. Wells, MD, MPH, FACPM
Chief Medical Executive
Michigan Department of Health and Human Services
201 Townsend St., 5th Floor CVB
Lansing, MI 48913

From: Marc Edwards [mailto:edwardsm@vt.edu]
Sent: Wednesday, December 30, 2015 10:54 AM
To: Wells, Eden (DHHS) <WellsE3@michigan.gov>; LawrenceR@mottchc.org; 'Chris Kolb' <chris@environmentalcouncil.org>; 'Andy Leavitt' <aleavitt@senatedems.org>; Mona Hanna-Attisha <MHanna1@hurleymc.com>
Subject: RE: DHHS Document in MDEQ FOIA

Hi Eden,

Today I received what DHHS FOIA claims is the rest of my FOIA documents. But still missing is the document on Flint Water Lead Communication Plan from September 9th, 2015, which is clearly responsive to my FOIA because it discusses the work of Virginia Tech. I also e-mailed you and argued that all documents associated with the genesis, writing and conceptualization of the Flint Water Communications plan would be clearly responsive, as are anything associated with the meetings about the document. Bob's e-mail to me mentioned a meeting on the water lead issue on September 8th...which I assume was associated with this document.

There is nothing in what was provided to me at all, about the September 9th document or the September 8th meeting. As far as DHHS is concerned, they are apparently taking the position the document does not exist...and it just came to MDEQ out of thin air. Obviously this is unacceptable to me. Is this the position of DHHS? If not, why do not have either the communications plan, or the documents that help understand where it came from? I do not even know who wrote it.

I also do not believe that Karen's entire body of e-mails has been produced. When I called out the fact that an e-mail from Mona was not in what was provided to me, she simply sent that 1 e-mail to the FOIA officer. I still feel an electronic

search of her e-mails is going to be required if the task force is ever going to understand what DHHS was doing before you were involved.

Thanks in advance for looking into this disturbing problem. The letter today says that all responsive documents were produced, and that my only option is to appeal or sue DHHS.

Marc

9/11/15.

Kory
Michelle

consumer awareness

campaign needs a dedicated resource/FTE funding?

vision for what would the work be?

- analytical website meets SDWA reqts.
- community is concerned
- coalition building
- information/message

reactions at this point
Michelle - suggests we need to meet

need agreement re: direction
Dan W. ?
Nick L.

- still need to contact Genesee County EHD.
EH Director
interest?
trusted party?

Michigan Department of Community Health

Flint Water Lead Communication Plan

September 9, 2015

Presented by:

MDHHS-DEH Toxicology & Response Section

Plan Overview

Project:	Flint Water Lead
Name of Campaign:	To be Determined (e.g. Lead us to Water: Flint Clean Water)

Objective

The Michigan Department of Health & Human Services has a mission to protect, preserve, and promote the health and safety of the people of Michigan with particular attention to providing for the needs of vulnerable and under-served populations. The residents of Flint currently perceive problems related to the usage of the Flint River as their temporary water source until a pipeline is completed which will bring water from Lake Huron. Problems – both substantiated and unsubstantiated included excess TTHM, discolored water, and high levels of lead in tap water. These problems have given rise to a well-organized community group Water You Fighting For (wateryoufightingfor.com) and has gotten the attention of water activists/researchers from Virginia Tech University (flintwaterstudy.org).

Given there is no safe level of lead for young children, a public health outreach campaign to inform the public of the sources of lead in their community is recommended. MDHHS will promote collaboration between the City of Flint, the County Health Department, community members, and other interested parties to halt human exposure of lead through development and proactive delivery of scientifically accurate information delivered in multiple formats at a literacy level that is accessible to all.

Background

Drinking water analytical reports find that the water meets the federal drinking water standards and is safe for public consumption. The aesthetic quality of the water, which may make the water unappealing to drink or use, does not make the water unsafe. Poor aesthetic quality, if true, will be a barrier to conducting an effective public health outreach campaign.

Lead is not found to be elevated in the drinking water at the source; however, citizens have reported high lead levels in their tap water. Sources of lead to the tap water are likely from lead piping or solder in or entering the home. Lead piping and solder are sources that the home-owner needs to know how to address. Additionally, older homes (pre-1978) can have lead containing paint and homes near historic high-traffic areas can have elevated lead levels in soil.

Target Markets

- Citizens of Flint who use Flint City Water
- Citizens of Flint who live in homes built in 1987 or before
- Citizens of Flint who are pregnant or have children living in the home that are 6 or

1st bullet - qualify it to say residents that have lead plumbing, service lines or high lead solder.

Message Summary

- There are personal actions individuals can take to prevent exposure to lead.
- Lead exposure does not just occur through water.
- You can be tested for blood lead levels to determine if you or your children been exposed.
- There are resources available to assist with remediation.

Call to Action

Exposure to lead through pipes, paint, and soil are preventable. There are steps people can take to be proactive in preventing their exposure and potential health issues. MDHHS notes that this problem is also not limited to Flint. This campaign will be created and piloted with the City of Flint, but may be expanded statewide.

Project Plan

Public Meetings –

- Begin with small groups to identify key stakeholders
- Plan larger meeting addressing
    - the lifespan of water from source to treatment center to home
    - how people can identify if their home may be affected
    - what the VTU results really mean
    - what can be done on an individual, city, and state level

e-Toolkits, Social Media & Print Outreach

- Compile existing information on being lead-safe
- Create easily shared infographics – what can be done, what are signs and symptoms
- Create brochures about health effects of lead

Project Timeline

Responsibilities	Target Date	Objective	Tasked to:
TBD	TBD	TBD	TBD

Current Media Review

http://www.washingtontimes.com/news/2015/sep/2/flint-water-is-risky-in-old-homes-researchers-say/

http://www.mlive.com/news/flint/index.ssf/2015/07/marchers_continue_drumbeat_for.html

- great photos

http://www.washingtontimes.com/news/2015/jul/10/activists-rally-about-water-in-flint-after-weeklon/

http://www.deadlinedetroit.com/articles/12697/scary_leaded_water_and_one_flint_family_s_toxic_nightmare#.VfCCoBFVhBc

http://flintwaterstudy.org/about-page/about-us/

http://www.wateryoufightingfor.com/

http://www.mlive.com/news/flint/index.ssf/2015/09/flint_mayoral_challenger_calls.html

http://www.mlive.com/news/flint/index.ssf/2015/09/mayor.html

http://michiganradio.org/post/team-testing-flint-water-lead-sample-sample#stream/0

http://www.mlive.com/news/flint/index.ssf/2015/09/new_testing_shows_flint_water.html

- On Monday, Aug. 31, the researchers reported 42 percent of 120 initial samples from Flint had lead levels that were more than 5 parts per billion, "which suggests a serious lead-in-water problem, according to our experience and criteria."
- The EPA requires water systems like Flint's to collect tap samples from sites that are more likely to have plumbing materials containing lead.
- If more than 10 percent of samples exceed 15 ppb, then water systems are required to take action, including steps to optimize corrosion control treatment.
- "The city of Flint has offered free and independent testing to residents since spring, and I encourage people to use this service if they have questions," Walling's statement said.
- Edwards, a professor of civil and environmental engineering, said the elevated lead levels he has seen in Flint tap water are tied to a corrosive water source that contains about eight times more chloride than Detroit water does.
- "Chloride is generally considered to be very corrosive to iron. For instance, chloride present in road salts applied in the winter causes iron in cars and bridges to rust," the Virginia Tech team's website says.
- "This could be a huge public health problem. ... The Flint water just ate the pipe up," Edwards said of the testing he has overseen so far.
- "If it were me, I would not be using (Flint River water) for cooking or drinking unless I had it tested for lead," said Edwards, who previously mounted a six-year campaign that succeeded in forcing the U.S. Centers for Disease Control and Prevention to admit it had misled the public about the risk of lead in the Washington, D.C., area's drinking water, according to The

Washington Post.

- Since the switch, the city has been plagued by issues such as water main breaks and boil water advisories because of bacteria and has been in violation of the Safe Drinking Water Act because of high levels of total trihalomethanes (TTHM), a byproduct of chlorinating river water.
- The Rev. Allen Overton, who hand-delivered petitions to Walling on Monday, asking that city officials reconnect the Flint water system to Detroit, said Wednesday that the Virginia Tech experiment is more evidence Flint is not using the best quality of water available.
- "We have a major health issue here, (and) they are not being honest with the citizens of Flint," Overton said.

Flint Water Petition:

https://secure3.convio.net/fww/site/Advocacy;jsessionid=7266B35978FAD2EFBD3A57D87D5085AB.app334b?pagename=homepage&page=UserAction&id=2199&autologin=true&s_src=blg&s_subsrc=070915a

Dear [Flint Mayor Dayne Walling and Flint City Council],

Water is a basic human right. The United Nations General Assembly recognizes that access to safe drinking water and sanitation are essential to the realization of all human rights.

In 2014, Flint's emergency manager disconnected the city from the Detroit Water and Sewerage Department (DWSD) and started providing residents with water from the Flint River. Since that time, residents have been struggling to maintain access to a clean, safe drinking water supply.

Residents of Flint report having tap water with high levels of copper, lead, THMs (chemicals that result when chlorine mixes with organic matter), tin, lime and iron. The water is often brown or bluish-green in color and contains sediment. As a result, people are experiencing symptoms including hair loss, lead poisoning and diseases related to consuming high levels of copper (to name a few).

The Flint River clearly is not a safe, reliable source for the city's drinking water. It was as easy as pushing a button to disconnect from DWSD; it's time to push the button again, reconnecting Flint to DWSD and providing Flint residents with the clean, safe water they deserve.

Please reconnect Flint to the Detroit Water and Sewerage Department immediately and make water safe and clean for all.

Sincerely,
[Your Name]
[Your Address]
[City, State ZIP]

Washington DC

https://www.dcwater.com/lead/

- Sources of lead in drinking water

- **Lead service pipe**
  In the U.S., lead service pipes were installed until the mid-1950s. Older properties may still have lead service pipes, which connect the water main in the street to household plumbing. The service pipe is owned by the property owner. Under certain conditions, DC Water is authorized to repair, maintain or renew the portion of the service pipe in public space. The maintenance of the portion of the service pipe on private property is the exclusive responsibility of the property owner. A "partial" lead service pipe replacement is where a portion of the service pipe is replaced, but a portion made of lead remains in public or private space.

  Lead service pipes were installed until the mid-1950s.

- **Lead solder**
  This connects pipes in household plumbing. In 1987, lead solder was banned from use in household plumbing. If your house was built before 1987, your plumbing may have lead solder.

- **Brass faucets, valves or fittings**
  Almost all faucets, valves and fittings have brass components. Until 2014, brass faucets and fittings sold in the U.S. and labeled "lead-free" could contain up to eight percent lead. Effective January 2014, the Reduction of Lead in Drinking Water Act specifies that these materials may not contain more than 0.25 percent lead.

- **Galvanized iron pipes**
  Household galvanized pipes are old, corroded pipes that were installed in many homes before the 1960s. These pipes can release lead in water if the property has, or previously had, a lead service pipe. Galvanized pipes are made with a protective layer of zinc. However, the zinc layer erodes over time and results in corrosion. When lead is released from a lead service pipe and passes through galvanized plumbing (particularly over decades of use), lead can accumulate on the inside, corroded walls of this plumbing.

  Lead release from galvanized pipes can vary from home to home and can continue to occur even after a lead service pipe is replaced. Galvanized pipes can cause other water quality problems, such as low water pressure and discolored water. For additional information on household plumbing, click here.

https://www.sciencenews.org/article/stillbirth-rates-tied-lead-drinking-water

From: Wells, Eden (DHHS)
Sent: Wednesday, December 30, 2015 5:08 PM
To: Scott, Robert L. (DCH);Peeler, Nancy (DHHS)
Cc: Moran, Susan (DHHS);Miller, Corinne (DHHS);Fink, Brenda (DHHS)
Subject: FW: Flint Water
Attachments: UnitedHealthcare Community Plan Enhanced Blood Lead Level Screening and Education.docx; ATT00001.htm

Importance: High

Follow Up Flag: Follow up
Flag Status: Flagged

HI Bob and Nancy,

Is MCIR a good way for health plans to track their kids lead test results in a timely (real-time) fashion? Would MCIR post the results as fast as you post them to the Warehouse?

Eden

From: Priest, Chris (DHHS)
Sent: Wednesday, December 30, 2015 4:27 PM
To: Wells, Eden (DHHS) <WellsE3@michigan.gov>; Moran, Susan (DHHS) <MoranS@michigan.gov>
Cc: Lyon, Nick (DHHS) <LyonN2@michigan.gov>; Becker, Timothy (DHHS) <beckert1@michigan.gov>; Stiffler, Kathleen A. (DHHS) <StifflerK@michigan.gov>
Subject: Fwd: Flint Water

Sue and Dr. Wells - see below and attached. We wanted to share what UnitedHealth is doing in Flint. Thought you may find this a helpful example of what our health plan partners are implementing after our discussions. We will be following up with the other plans shortly and will pass along what we get from them too. If there is anything in here that is concerning, please let us know.

The L letter to all providers in Flint, which was sent to you both for sign off, will be going today. I also understand that we have a plan on metrics/data reporting too.

Please let us know if there is anything else Medicaid can do to be helpful.

Happy New Year!

Chris

Sent from my iPhone

Begin forwarded message:

From: "Kennedy, Brian J" <bkennedy@uhc.com>
Date: December 30, 2015 at 10:37:14 AM EST
To: "priestc1@michigan.gov" <priestc1@michigan.gov>
Cc: "Debera (egglestond@michigan.gov)" <egglestond@michigan.gov>, "stifflerk@michigan.gov" <stifflerk@michigan.gov>, "Mouras, Dennis J" <dmouras@uhc.com>
Subject: Flint Water Concerns

Chris,
In recognition of the need for an all-hands-on-deck response to the Flint Water concerns, I want to share with you the UnitedHealthcare Community Plan outline (attached) for how we will address the identification, outreach, education, and care coordination for our members in the Flint area. Critical to such efforts is coordinating care with primary care providers (PCPs) where possible, working with other agencies, and keeping our message consistent with the public health leaders at MDHHS and Genesee County Health Department.

We will convey the public health messages regarding water testing, free water filters, and dietary choices that reduce lead absorption. It is also important to communicate with the Genesee County Health Department for those children at higher risk to arrange nurse home visits to evaluate and specifically educate families. We will follow-up and coordinate with PCPs to follow blood levels and respond accordingly.

We will leverage our current relationships with the local health department, primary care providers, and our CSHCS care managers to make sure that we complete an effective outreach, education, and care coordination. Though our current membership in the Flint area is small, we expect that with the new contract, it will grow and we are prepared to continue to assist this growing customer base as they come on board.
All of this is consistent with our broader efforts for the health of our member population.
Thanks,
Brian

Brian J Kennedy, MD MBA | Chief Medical Officer, UnitedHealthcare Community Plan Michigan
T 248-331-4488 | Fax 866-291-2773
bkennedy@uhc.com | uhccommunityplan.com

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UnitedHealthcare Community Plan Enhanced Blood Lead Level Screening and Education

Identify and verify those at risk

- UHCCP Eligible Members in Flint zip codes, 48501-48507
- Focus on households with Children 6 years old and younger
- MCIR search to see if blood level since April 2014
- Continue to monitor our list to account for additional at-risk members

Outreach

- Letters to all eligible members
- Direct phone outreach to households with children 6 and under
- LHD or CHW to homes of those we cannot reach by phone
- CMO to contact PCPs to ensure follow-up

Consistent Message

- Source materials from MDHHS, and GCHD
- Education to all members
    - Water testing
    - Diet to reduce blood lead absorption
    - Potable water
        - Free filters
        - Bottled water
- Focused education to households with children 6 and under
    - Blood lead testing
    - Need for consistent follow up with PCP
    - PCP appointment scheduling as needed
    - Transportation assistance as needed

Follow-up/Care Coordination

- Follow blood levels through MCIR for identified children
- Care Coordination with PCP to ensure consistent follow up
- Genesee County Health Department care coordination of Nurse Home Visits for those at higher risk

This Document is a Non-Responsive Attachment.

From: Wells, Eden (DHHS)
Sent: Monday, January 04, 2016 5:57 PM
To: Stanbury, Martha (DHHS)
Subject: Re: Newborn

If I remember correctly – there was some concern that she is under IRB for her study at Hurley. And that that data is not subject on our reportable to public health under the code. The S – actually – she does not need additional IRB – she just needs parental consent to share the information with public health. I will clarify that with her.

Sent from my iPhone

On Jan 4, 2016, at 5:35 PM, Stanbury, Martha (DHHS) <stanburym@michigan.gov> wrote:

Come to think of it, why would Mona need IRB approval for supplemental information for her research study on cord blood? (This is a different project than her study with MDHHS and our lead registry data, of course)

From: Wells, Eden (DHHS)
Sent: Monday, January 04, 2016 4:24 PM
To: LaRocco, Toni <tlarocco@gchd.us>; Stanbury, Martha (DHHS) <stanburym@michigan.gov>; July, Jori <jjuly@gchd.us>; Taylor, Sherry <STAYLOR@gchd.us>; Noble, Kim <knoble@gchd.us>; Wenstrom, Janet <jwenstrom@gchd.us>; Miller, Corinne (DHHS) <MillerC39@michigan.gov>
Subject: RE: Newborn

When I talked with Dr. Mona Hanna-Attisha last Wednesday, they are still working on the IRB supplemental information requested.

E

From: LaRocco, Toni [mailto:tlarocco@gchd.us]
Sent: Monday, January 04, 2016 3:01 PM
To: Stanbury, Martha (DHHS) <stanburym@michigan.gov>; Wells, Eden (DHHS) <WellsE3@michigan.gov>; July, Jori <jjuly@gchd.us>; Taylor, Sherry <STAYLOR@gchd.us>; Noble, Kim <knoble@gchd.us>; Wenstrom, Janet <jwenstrom@gchd.us>; Miller, Corinne (DHHS) <MillerC39@michigan.gov>
Subject: RE: Newborn

Where are we with this issue? Both the case management and how it is being sent to the state data base?

Toni L LaRocco MS, RN
Director of Nursing Services
Genesee County Health Department
810.237.4544
tlarocco@gchd.us

"Gratitude unlocks the fullness of life. It turns what we have into enough, and more. It turns denial into acceptance, chaos to order, confusion to clarity. It can turn a meal into a feast, a house into a home, a stranger into a friend. Gratitude makes sense of our past, brings peace for today, and creates a vision for tomorrow." ~ Melody Beattie

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From: Stanbury, Martha (DHHS) [mailto:stanburym@michigan.gov]
Sent: Sunday, December 20, 2015 2:19 PM
To: Wells, Eden (DHHS); LaRocco, Toni; July, Jori; Taylor, Sherry; Noble, Kim; Wenstrom, Janet; Miller, Corinne (DHHS)
Subject: Re: Newborn

Given that this is a research study, the Hurley lab may not be handling the results in the same way as they handle other lead tests. Can the lab be contacted and asked about that, by someone on Dr. Hanna-Attisha's team? If the results are handled under a research protocol, would the results be required to be reported under the Public Health Code, or would they be considered confidential under the terms of the consent form signed by the research participants? In other words, what does the research protocol and the consent form say? I assume/hope the family would would welcome a home intervention, but need to be sure the research protocol re confidentiality isn't being violated. If it appears that way, then someone on the research team should get consent from the family for public health followup, I would think.

From: Wells, Eden (DHHS)
Sent: Sunday, December 20, 2015 12:30 PM
To: LaRocco, Toni; July, Jori; STAYLOR@gchd.us; knoble@gchd.us; jwenstrom@gchd.us; Miller, Corinne (DHHS); Stanbury, Martha (DHHS)
Subject: Re: Newborn

Right, of interest is that this is cord blood from a newly born baby....!!! There should be NO lead...

From: LaRocco, Toni <tlarocco@gchd.us>
Sent: Sunday, December 20, 2015 11:53 AM
To: July, Jori; STAYLOR@gchd.us; knoble@gchd.us; jwenstrom@gchd.us
Cc: Wells, Eden (DHHS)
Subject: Fwd: Newborn

Jori and Eden,

Please see below. Please note that this is a result below 5. We are happy in this extended circumstance to follow this family. I am off next week and will need you Eden, to advocate with state for the follow up by case managers as it does not fit the specified criteria.
Merry Christmas!

Toni

Toni LaRocco MS, RN
Director of Nursing Services
Genesee County Health Department

Begin forwarded message:

From: "Wells, Eden (DHHS)" <WellsE3@michigan.gov>
Date: December 20, 2015 at 11:46:15 AM EST
To: Mona Hanna-Attisha <MHanna1@hurleymc.com>
Cc: "Miller, Corinne (DHHS)" <MillerC39@michigan.gov>, "Dykema, Linda D. (DHHS)" <DykemaL@michigan.gov>, "Peeler, Nancy (DHHS)" <PeelerN@michigan.gov>, "Priem, Wesley F. (DHHS)" <priemw@michigan.gov>, "LaRocco, Toni" <tlarocco@gchd.us>, "Valacak, Mark" <MVALACAK@gchd.us>, "Moran, Susan (DHHS)" <MoranS@michigan.gov>
Subject: Re: Newborn

Great info- !!! Thanks- and we shall close the loop in this quickly!
E

Sent from my iPhone

On Dec 20, 2015, at 11:14 AM, Mona Hanna-Attisha <MHanna1@hurleymc.com> wrote:

Looking forward to hearing from a case manager.

We started our cord blood lead research project about three weeks ago. We've tested about 150 cord bloods. Every mom (except 2) has consented to the research. We are only getting back results now and we have not analyzed anything yet. It would be interesting to confirm if these cord blood results get to the state program.

Hurley delivers about 3000 babies/yr. Most of city of flint babies.

Mona Hanna-Attisha MD MPH FAAP
Director, Pediatric Residency Program
Hurley Children's Hospital
Michigan State University

On Dec 20, 2015, at 11:05 AM, Wells, Eden (DHHS) <WellsE3@michigan.gov> wrote:

Good to know- we shall be sure one of the case managers contacts you directly for information-- how many babies are born at Hurley each mint? I.e., how many cord bloods are being tested?

Sent from my iPhone

On Dec 20, 2015, at 10:57 AM, Mona Hanna-Attisha <MHanna1@hurleymc.com> wrote:

Yes we are planning to contact mom, test mom, test baby (venous), test siblings, and contact PMD.

Mona Hanna-Attisha MD MPH FAAP
Director, Pediatric Residency Program
Hurley Children's Hospital
Michigan State University

On Dec 20, 2015, at 10:19 AM, Wells, Eden (DHHS) <WellsE3@michigan.gov> wrote:

Good morning, Mona,

All lead tests (negative or positive) get into the program, no matter the age or source...but always good to check, as this is a cord blood (Hurley Lab?) and this one needs tracked. Mom and family should be tested as well. By virtue of this email I am looping in the State EPid and our CLPP program as well as the Healthy Homes folks, and our GCHD leads. Thank you, Mona!

Linda, can you coordinate the point person to contact Dr. Mona- Hanna-Attisha regarding name, address, etc on this cord blood for investigation ASAP. Should be coordinated per usual case management between GCHD and MDHHS.

Eden V. Wells, MD, MPH, FACPM
Chief Medical Executive
Michigan Department of Health and Human Services
201 Townsend Street, 5th Floor CVB
Lansing, MI 48913
Phone: 517-335-8011
wellse3@michigan.gov

From: Mona Hanna-Attisha <MHanna1@hurleymc.com>
Sent: Sunday, December 20, 2015 9:02 AM
To: Wells, Eden (DHHS)
Subject: Newborn

Eden, in our cord blood lead research project, we just got a 4.8 result on a newborn's cord blood. Who can I contact to make sure they get a proper home/water investigation? I doubt these labs get into the lead program.

Mona Hanna-Attisha MD MPH FAAP
Director, Pediatric Residency Program

Hurley Children's Hospital
Michigan State University

From: Wells, Eden (DHHS)
Sent: Tuesday, January 05, 2016 10:27 AM
To: moran@StateofMichigan.onmicrosoft.com
Subject: Fwd: Whaley Childrens Center 1201 N. Grand Traverse

Sent from my iPhone

Begin forwarded message:

From: "Dykema, Linda D. (DHHS)" <DykemaL@michigan.gov>
Date: January 5, 2016 at 9:15:05 AM EST
To: "Valacak, Mark" <MVALACAK@gchd.us>, "Wells, Eden (DHHS)" <WellsE3@michigan.gov>
Cc: "Henry, James" <jhenry@gchd.us>
Subject: RE: Whaley Childrens Center 1201 N. Grand Traverse

Excellent work Jim (I also note the 12:46 am time on your e-mail).

I would not expect significant exposure for adults from hand to mouth behavior or skin adsorption during hand washing. Please be sure they sample any kitchen taps that are used for food preparation. There could be some concern for effectiveness of the tap filters if lead concentrations are outside the range tested by NSF when certifying the filters.

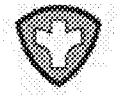
Linda

From: Valacak, Mark [mailto:MVALACAK@gchd.us]
Sent: Tuesday, January 05, 2016 9:07 AM
To: Dykema, Linda D. (DHHS) <DykemaL@michigan.gov>; Wells, Eden (DHHS) <WellsE3@michigan.gov>
Cc: Henry, James <jhenry@gchd.us>
Subject: FW: Whaley Childrens Center 1201 N. Grand Traverse

Linda & Eden,

Jim Henry our EH supervisor went out to Whaley last night after we got your call. Here is what he found and the actions taken.

Mark Valacak, MPH, Health Officer
Genesee County Health Department,
630 S. Saginaw St. Suite 4 Flint, MI 48502-1540
Phone 810-257-3588 Fax 810 257-3147
E-mail mvalacak@gchd.us



Public Health

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From: Henry, James
Sent: Tuesday, January 05, 2016 12:46 AM
To: Valacak, Mark; Brickey, Tamara; LaRocco, Toni; Johnson, M.D., Gary; July, Jori
Subject: Re: Whaley Childrens Center 1201 N. Grand Traverse

I met with Michelle Johnson, Director of Operations.

- On 10/16 United Way delivered filters to Whaley.
- Whaley recently replaced filter cartridges, because red indicator light.
- Children drink only bottled water from many donated sources.
- Whaley maintenance crew sampled water, but mistakenly only filled the liter bottles 1/2 way to top.
- The 2.516ppm is the employee restroom @ admin building. It's a newer hand sink fixture, but old plumbing. I couldn't remove aerator to check for lead particulate, because of the fixture design. No valve, so posted "Do Not Use." At the extreme level, I want to check with MDHHS toxicology regarding potential risks from lead residual from hands to mouth (not skin absorption)
- .213 is off site at Rotary and no children are there. It will be posted or made inaccessible until demonstrated to be safe.
- .029 is a classroom and concerning. Michelle will check in morning to see if it is drinking water and follow up with me.
- Tomorrow appropriate resampling is scheduled by Whaley staff. I recommended sampling drinking fountains also and make them inaccessible until demonstrated safe.
- Michelle estimated 27 children at Whaley,

A. None age 0-5,
B. One age 6,
C. One age 8
D. Twenty-five age 11-16.

- Michelle indicated most children have same Hurley doctor, but not sure who physician's name.
- She referred me to Michelle Shamel, Whaley's Director of Clinical for information regarding blood testing and physician. I'll follow up with her in morning.

Jim

Sent from my phone.

------ Original message------
From: Henry, James
Date: Mon, Jan 4, 2016 6:36 PM
To: Valacak, Mark;Brickey, Tamara;LaRocco, Toni;Johnson, M.D., Gary;July, Jori;
Cc: Henry, James;
Subject:RE: Whaley Childrens Center 1201 N. Grand Traverse

Thanks, I'm stopping by Whaley tonight to make sure that no one is drinking the water and the concerns below are addressed.

I received the attached water results this afternoon and I will bring a copy to help me identify the fixture locations at Whaley. I intend to have the manager shut off the valve at 2.516ppm, p.39 of the attachment. Results on p. 19, 29, 32, 39, 48 are all elevated at Whaley and others are concerning.

It is not common for us to receive the MDEQ daily report with this many lead results or the number of elevated in one location. We commonly receive between 1-15 general water results, which most are usually bacteria, partial chemistry and arsenic, mixed in with a few lead and copper.

I'll report back what I find at Whaley.

Jim Henry RS, MBA
Environmental Health Supervisor
Genesee County Health Department www.gchd.us
630 S. Saginaw St., Suite 4
Flint, MI 48502-1540
Phone (810) 257-3618 Fax (810) 257-3125
E-mail jhenry@gchd.us

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From: Valacak, Mark
Sent: Monday, January 4, 2016 5:00 PM
To: Henry, James; Brickey, Tamara; LaRocco, Toni; Johnson, M.D., Gary; July, Jori
Subject: Whaley Childrens Center 1201 N. Grand Traverse

Jim,

I just got a call from Eden Wells and DEQ just told her Whaley CC was given sample results of 213ppm and 2516ppm from two fixtures. As this is a center for foster kids it would be a good idea if we verify they are not using those fixtures. Find out if they have filters or are using bottled water. Are the kids there seen by a physician and tested for lead? Have they notified their physician(s) of the problem? Thanks

Mark Valacak, MPH, Health Officer
Genesee County Health Department,
630 S. Saginaw St. Suite 4 Flint, MI 48502-1540
Phone 810-257-3588 Fax 810 257-3147
E-mail mvalacak@gchd.us

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From: Wells, Eden (DHHS)
Sent: Tuesday, January 05, 2016 10:29 AM
To: Moran, Susan (DHHS)
Subject: Fwd: Enhanced Blood Level Screening Provider Message

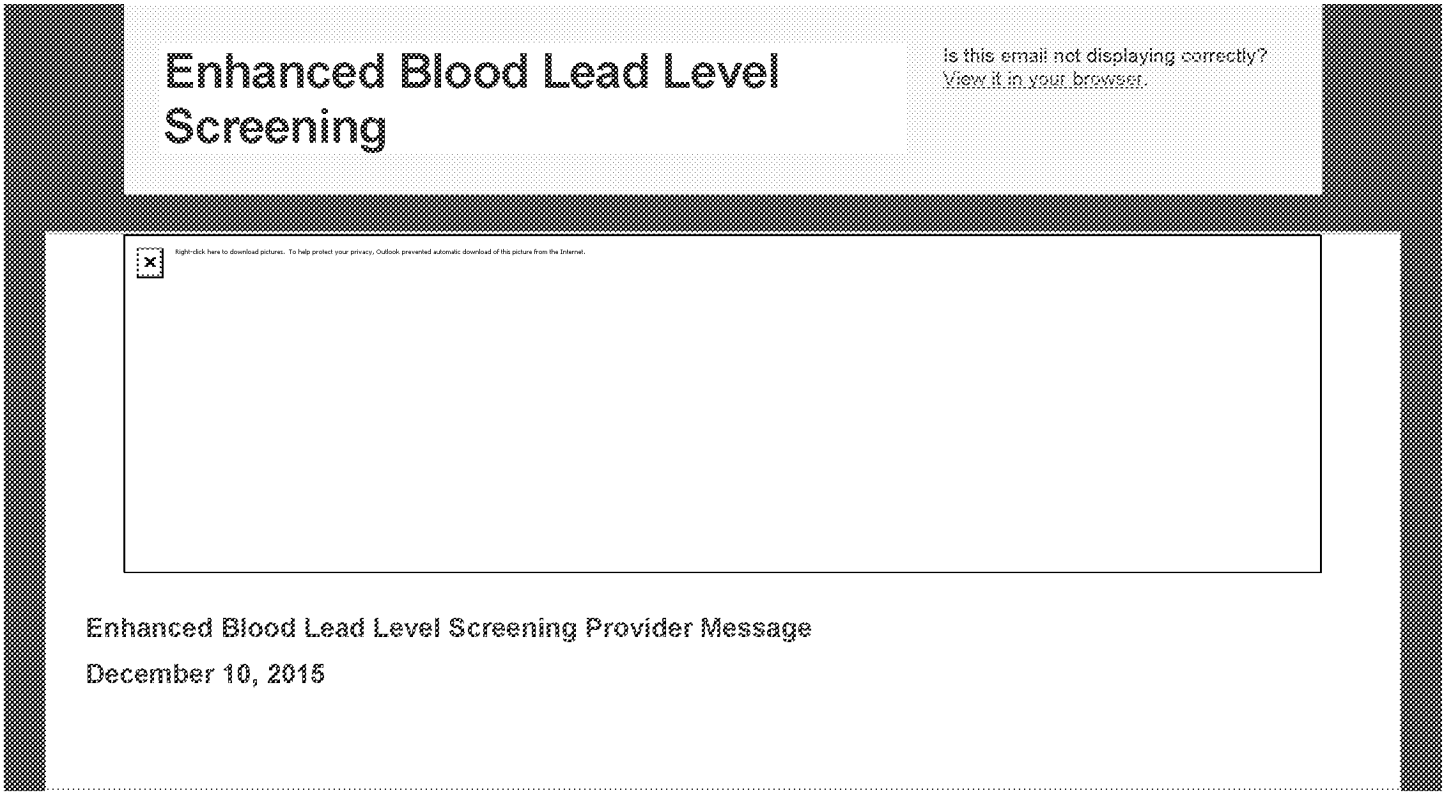
Sent from my iPhone

Begin forwarded message:

From: "Johnson, M.D., Gary" <GJOHNSON@gchd.us>
Date: January 5, 2016 at 9:36:36 AM EST
To: "Wells, Eden (DHHS)" <WellsE3@michigan.gov>
Cc: "LaRocco, Toni" <tlarocco@gchd.us>, "Brickey, Tamara" <tbrickey@gchd.us>, "Valacak, Mark" <MVALACAK@gchd.us>, "Swartout, April" <ASWARTOUT@gchd.us>
Subject: FW: Enhanced Blood Level Screening Provider Message

I received this from the Genesee County Medical Society yesterday. I am thinking this went out to all members.

From: GCMS [mailto:ssmith=gcms.org@mail80.atl111.rsgsv.net] **On Behalf Of** GCMS
Sent: Monday, January 04, 2016 2:55 PM
To: Johnson, M.D., Gary
Subject: Enhanced Blood Level Screening Provider Message



Michigan Medicaid Early Periodic Screening, Diagnosis and Treatment (EPSDT) guidelines require children to be tested for blood lead poisoning at 12 months and 24 months, and between the ages of 36-72 months if not previously tested (http://www.mdch.state.mi.us/dch-medicaid/manuals/MedicaidProviderManual.pdf). Due to the enhanced public health issue of an increased risk for lead exposure in the City of Flint, providers have been advised to follow enhanced guidelines for lead testing in children:

- Providers should screen ALL children (regardless of Medicaid/insurance status) aged 0-6 years of age exposed to Flint city drinking water after April 2014. Note: this includes all children younger than 1 year and children between the ages of 3-6 years.
- If the child has already been screened within the time period of April 2014-present by a capillary test, healthcare providers should follow-up on any elevated levels >5mcg/dl to ensure confirmatory venous testing is conducted.
- Utilize the standard Blood Lead Level (BLL) Quick Reference for Primary Care Providers at http://www.mi.gov/documents/deq/ProviderQuickReference_Sept2015_501831_7.pdf?20151204122739
- All clients with blood lead levels greater than 5mcg/dl should be referred for case management coordinated through Genesee County Health Department. Providers can make referrals for case management at 810-257-3833
- Providers should inquire about use of a drinking water filter and/or bottled water in all clients residing in city limits. Clients and providers can call 2-1-1 for locations for filter distribution.
- All people with Flint water should be advised to eat regular meals with a diet high in calcium, iron and Vitamin C to decrease lead absorption, mitigate the effects of lead exposure and to enhance the excretion of lead.
- Healthcare providers should inquire about other potential sources of lead in the household per current recommendations (see: https://www.michigan.gov/documents/mdch/testing-screening071009_287511_7.pdf)
- Additional information and updates on Flint water are available at: www.michigan.gov/flintwater and www.gchd.us

Eden V. Wells, MD, MPH, FACPM
Chief Medical Executive
Michigan Department of Health and Human Services
201 Townsend Street, 5th Floor CVB
Lansing, MI 48913
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wellse3@michigan.gov

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4438 Oak Bridge Drive, Suite B, Flint, MI 48532 *Monday - Thursday*
810-733-9923 *Closed on Fridays*

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From: Wells, Eden (DHHS)
Sent: Tuesday, January 05, 2016 10:42 AM
To: Mona Hanna-Attisha;Toni LaRocco;Valacak, Mark;lrey52@gmail.com
Subject: RE: Genesee County Health Department- EOC 1/4/16

LOVE IT- all good

From: Mona Hanna-Attisha [mailto:MHanna1@hurleymc.com]
Sent: Tuesday, January 05, 2016 9:42 AM
To: Wells, Eden (DHHS) <WellsE3@michigan.gov>; Toni LaRocco <tlarocco@gchd.us>; Valacak, Mark <MVALACAK@gchd.us>; lrey52@gmail.com
Subject: RE: Genesee County Health Department- EOC 1/4/16

When we did the lead-focused cooking class at the farmer's market, we had filters on hand as well. We stored them in the clinic to take down the next day for the class, but then it dawned on me, why the heck didn't we always have filters in the clinic. So now we have filters in the clinic to give to families.

There are 4 practices that see most exposed kids (Hurley, Mott, Hamilton, Akpinar) - rather than webinars or things that people have to go to (extra work and just seen as noise), I would suggest people go to those practices - arrange with office managers, buy the practice lunch, give them a very short presentation, leave them handouts, our nutrition books, share what they are supposed to do, and bring boxes of filters. If you could even bring provider-specific data with you, that would be great - people are motivated by personal performance metrics. Then you will see behavior change. I would be more than happy to help.

Mona Hanna-Attisha MD MPH FAAP
Program Director Pediatric Residency
Hurley Children's Hospital at Hurley Medical Center
Michigan State University College of Human Medicine
Department of Pediatrics and Human Development
Mhanna1@hurleymc.com

From: Wells, Eden (DHHS) [WellsE3@michigan.gov]
Sent: Tuesday, January 05, 2016 9:33 AM
To: Mona Hanna-Attisha; LaRocco, Toni
Cc: Valacak, Mark; lrey52@gmail.com
Subject: RE: Genesee County Health Department- EOC 1/4/16

Good morning ,

I will relay, with your permission of course, this email to our Medical Services Administration, with whom I have had the same discussions. Rest assured that I saw a multi-point plan from this health plan about how to address the issues in their patient population, and these community engagement pieces are just one part.

One issue all are trying to capture is the urgency under which the enhanced testing needs to be conducted, so this is one of a number of strategies the health plans are utilizing.

Another part is of utmost concern, that I know is also in multiple health plans' strategic approaches, is that of provider engagement. Despite the news and the blast faxes and the Health Alerts and the Provider Letters and the Toolkits, we continue to hear from citizens, the Governor's Task Force and EBL case investigators and case managers, that providers

are not asking about lead exposure to Flint water since April 2014, nor asking about testing/screening, or whether families have filters. I tried to set up a provider forum in Nov-Dec to little or no interest, but am now working to get one rolling regardless, in partnership with health plans, by end of this month.

It would really be helpful if you could be there to speak about this very issue and give the perspective of a local physician responding to the crisis, and a leader of best practices. We will webinar it and archive it as well (I am wondering if I can make it CME-able as well), and Dr. Reynolds, it would be great to have you involved as well---

Eden

Eden V. Wells, MD, MPH, FACPM
Chief Medical Executive
Michigan Department of Health and Human Services
201 Townsend St., 5th Floor CVB
Lansing, MI 48913

From: Mona Hanna-Attisha [mailto:MHanna1@hurleymc.com]
Sent: Monday, January 04, 2016 10:16 PM
To: Wells, Eden (DHHS) <WellsE3@michigan.gov>; LaRocco, Toni <tlarocco@gchd.us>
Cc: Valacak, Mark <MVALACAK@gchd.us>; lrey52@gmail.com
Subject: RE: Genesee County Health Department- EOC 1/4/16

Thanks for your reply, Eden. Yes, I have had discussions with Matt Davis about this as well and it was my understanding that it was recommended to expand screening, but still to push kids to their medical homes as you said. If we all agree to drive kids to their medical homes first, the primacy of the medical home, why is that not being done first?

What are the medicaid HMOs doing to push kids to their medical homes? How are they incentivizing visits, providing case management, partnering with practices, enhanced transportation, etc? This is what needs to happen - not only will all of this improve lead screening rates, but also immun rates and all other HEDIS measure that HMOs (and providers) care about.

Mona Hanna-Attisha MD MPH FAAP
Program Director Pediatric Residency
Hurley Children's Hospital at Hurley Medical Center
Michigan State University College of Human Medicine
Department of Pediatrics and Human Development
Mhanna1@hurleymc.com

From: Wells, Eden (DHHS) [WellsE3@michigan.gov]
Sent: Monday, January 04, 2016 9:03 PM
To: LaRocco, Toni
Cc: Mona Hanna-Attisha; Valacak, Mark
Subject: Re: Genesee County Health Department- EOC 1/4/16

Hi Mona,
The Governor's Task Force has made a number of preliminary recommendations to MDHHS last month, and a major one is to maximize blood lead screening. The primary care home is best, all agree, and health plans are identifying any children that have not been tested. Current thoughts are that there could be thousands. Health plans will be closely monitoring the provider follow up as well post initial screens. And, while it does not pick up potential lead exposure prior to Oct 1, water is still a potential source if public health measures are not being used, or used appropriately. Also there is a need to establish the prevalence of EBL in this impacted community-

I have had long discussions with Matt Davis about this, and Larry is aware as well. I can discuss further if needed. But all, including Medicaid, agree with the primacy of the patient primary care home.
E

Sent from my iPhone

On Jan 4, 2016, at 8:38 PM, LaRocco, Toni <tlarocco@gchd.us> wrote:

> At the request of MDHHS, we are working with the Medicaid health plans to screen kids that have not been screened. There are many kids that, for a multitude of reasons, have not been screened.
>
> Toni LaRocco MS, RN
> Director of Nursing Services
> Genesee County Health Department
>
> Begin forwarded message:
>
> > **From:** Mona Hanna-Attisha <MHanna1@hurleymc.com>
> > **Date:** January 4, 2016 at 5:07:02 PM EST
> > **To:** Toni LaRocco <tlarocco@gchd.us>
> > **Subject: Fwd: Genesee County Health Department- EOC 1/4/16**
> >
> > Why are we still doing mass lead screenings?
> >
> > Mona Hanna-Attisha MD MPH FAAP
> > Hurley Children's Hospital
> > Michigan State University
> > mhanna1@hurleymc.com
> >
> > Begin forwarded message:
> >
> > > **From:** "McShane, Hilda" <hmcshane@gchd.us>
> > > **Date:** January 4, 2016 at 4:59:54 PM EST
> > > **To:** <kboles@valleyaaa.org>, "Boyer, Jenifier" <jboyer@co.genesee.mi.us>, "Jamie Gaskin" <jgaskin@unitedwaygenesee.org>, "Holmes, Virginia (DHHS)" <HolmesV@michigan.gov>, <showard@co.genesee.mi.us>, Sean Kammer <skammer@cityofflint.com>, Andy Leavitt <aleavitt@senatedems.org>, <moses@mi.gov>, <neeleyrep34@gmail.com>, <ioliver@cfgf.org>, <mpurcell@co.genesee.mi.us>, <schoenowk@michigan.gov>, <thelenr4@michigan.gov>, "Valacak, Mark" <MVALACAK@gchd.us>, "Jamie-Lee Venable" <jvenable@unitedwaygenesee.org>, "Cupal, Suzanne" <scupal@gchd.us>, "Henry, James" <jhenry@gchd.us>, "Hallwood, Dawn" <dhallwood@gchd.us>, "Swartout, April" <ASWARTOUT@gchd.us>, "LaRocco, Toni" <tlarocco@gchd.us>, "Brickey, Tamara" <tbrickey@gchd.us>, "Eisner, Jennifer (DHHS)" <EisnerJ@michigan.gov>, "Wells, Eden (DHHS)" <WellsE3@michigan.gov>, <millerm1@michigan.gov>, <roachb@michigan.gov>, "Thompson, Sheryl D. (DHHS)" <ThompsonS2@michigan.gov>, "Johnson, M.D., Gary"

<GJOHNSON@gchd.us>, "Sitko, Anthony M" <tsitko@flintschools.org>, <plevine@gcms.org>, Kirk Smith <ksmith@flint.org>, <mhanna1@hurleymc.com>, <gonzalezj6@michigan.gov>, <morans@michigan.gov>, <robinsonm18@michigan.gov>, <doerrkay@gmail.com>, <lrey52@gmail.com>, <Lcarrav1@yahoo.com>, Dayne Walling <dwalling@cityofflint.com>, <krisztiang@michigan.gov>, <nhenderson@cityofflint.com>, <edgerton51@michigan.gov>, <tommasulok@michigan.gov>, "Stickler, Lisa" <STICKLER@gchd.us>, <BanerjeeA@mottchc.org>, <CDevriendt@co.genesee.mi.us>, "July, Jori" <jjuly@gchd.us>, <ebenning@MTAFLINT.ORG>, GCHD-Management Team <GCHD-ManagementTeam@gchd.us>
Subject: Genesee County Health Department- EOC 1/4/16

This is an informational update and the Genesee County Health Department will provide these updates on a daily basis after 4 pm. We are asking all partners included in this email to provide any pertinent updates **DAILY** to Hilda McShane by 2:00pm. If you have nothing new to share, please inform Hilda that you have no updates at this time.

- In an upcoming broadcast, abc 12 will reinforce the need for water filters, availability of replacement filters and distribution locations:
  MDHHS, 125 E. Union Street, Flint, 48501
  MDHHS, 4809 Clio Road, Flint, 48504
  GCCARD, 601 N. Saginaw Street, Suite A, Flint 48502
  GCCARD, 2727 Lippincott Blvd, Flint, 48507
  Flint City Hall, 1101 South Saginaw Street, 48502
- In partnership with Flint Community Schools and Molina Health Care, Genesee County Health Department will work with these organizations to host a lead screening event on January 12, 3:00 pm at Freeman Elementary school. Freeman Elementary school is located at 4001 Omega Avenue, Flint, MI 48507.
- As of January 4, 2016 **23,879** water filters have been distributed to residents in the City of Flint, Burton and Flint Township.

Michigan Department of Health and Human Services Water Filter Distribution As of December 31, 2015

	Distributed	Remaining
Water Filters	458	**3,585**
Water Pitchers	51	**485**
Replacement Cartridges - Brita	544	**7,525**
Replacement Cartridges - PUR	74	**5,632**

Replacement Cartridges - Zero	5	**370**

Michigan Department of Health and Human Services
Water Filter Distribution
Summary total from October- December 31, 2015

	Distributed	Remaining
Water Filters	11,415	**3,585**
Water Pitchers	235	**485**
Replacement Cartridges - Brita	1,475	**7,525**
Replacement Cartridges – PUR*	74	**5,632**
Replacement Cartridges - Zero	5	**370**

*Please note that MDHHS did not buy the current PUR filters being distributed. Once these are exhausted if needed DHHS will purchase PUR replacements.

FOR IMMEDIATE RELEASE
GENESEE COUNTY COMMISSIONERS DECLARE EMERGENCY

Flint, MI -- January 4, 2016 – During their first board meeting of the year, Monday morning, Genesee County Commissioners declared a state of emergency in Genesee County. The move a sign that county leaders support Flint Mayor Dr. Karen Weaver and her efforts to get resources and relief to the residents suffering from the ongoing water situation in the city.

Mayor Weaver declared a state of emergency in Flint last month to raise awareness about the severity of the problems surrounding the water situation that continues to effect residents. The problems a result of the man-made disaster caused by the city switching to the Flint River as a water source in 2014.

Following the board's vote today, Genesee County Commission Chairperson, Jaime Curtis said, "This is a state, man-made disaster and we're going to ask the state to fix their disaster. Curtis also said, "Genesee County is the fifth largest county in Michigan and we will not be ignored."

Mayor Weaver hopes the county's show of support will convince the Governor to provide the City of Flint with financial support to help leaders address immediate infrastructure needs. Those needs include more than $45 million to replace every identified lead pipe in the city, reimbursement of the $2 million spent to switch back to the Detroit Water Sewerage Department, $6 million to help with the transfer to the Karegnondi pipeline and additional resources to support the city's Heath Initiative to assist affected adults and children in Flint who have consumed water contaminated with lead.

In an interview with media after the board's emergency declaration Mayor Weaver said, "It's a victory and a step in the right

direction." The mayor plans to meet with Governor Snyder in Lansing Thursday of this week to discuss the state's response and next steps.

###

From: McShane, Hilda
Sent: Wednesday, December 23, 2015 5:05 PM
To: 'kboles@valleyaaa.org'; 'Boyer, Jenifier'; 'Jamie Gaskin'; 'Holmes, Virginia (DHHS)'; 'showard@co.genesee.mi.us'; 'Sean Kammer'; 'Andy Leavitt'; 'moses@mi.gov'; 'neeleyrep34@gmail.com'; 'ioliver@cfgf.org'; 'mpurcell@co.genesee.mi.us'; 'schoenowk@michigan.gov'; 'thelenr4@michigan.gov'; Valacak, Mark; 'Jamie-Lee Venable'; Cupal, Suzanne; Henry, James; Hallwood, Dawn; Swartout, April; LaRocco, Toni; Brickey, Tamara; 'Eisner, Jennifer (DHHS)'; 'Wells, Eden (DHHS)'; 'millerm1@michigan.gov'; 'roachb@michigan.gov'; 'Thompson, Sheryl D. (DHHS)'; Johnson, M.D., Gary; 'Sitko, Anthony M'; 'plevine@gcms.org'; 'Kirk Smith'; 'mhanna1@hurleymc.com'; 'gonzalezj6@michigan.gov'; 'morans@michigan.gov'; 'robinsonm18@michigan.gov'; 'doerrkay@gmail.com'; 'irey52@gmail.com'; 'l.carrav1@yahoo.com'; 'Dayne Walling'; 'krisztiang@michigan.gov'; 'nhenderson@cityofflint.com'; 'edgerton51@michigan.gov'; 'tommasulok@michigan.gov'; Stickler, Lisa; 'BanerjeeA@mottchc.org'
Subject: RE: Genesee County Health Department EOC 12/23/15

American Red Cross, Genesee-Lapeer chapter in conjunction with their fire education and prevention program is working with the Genesee County Health Department to develop a community outreach program around lead concerns.
The daily water crisis update will not be distributed on December 24 or 25. The next update will be distributed on Monday, December 28.

Happy Holidays to you and yours!

From: McShane, Hilda
Sent: Tuesday, December 22, 2015 4:27 PM
To: 'kboles@valleyaaa.org'; 'Boyer, Jenifier'; 'Jamie Gaskin'; 'Holmes, Virginia (DHHS)'; 'showard@co.genesee.mi.us'; 'Sean Kammer'; 'Andy Leavitt'; 'moses@mi.gov'; 'neeleyrep34@gmail.com'; 'ioliver@cfgf.org'; 'mpurcell@co.genesee.mi.us'; 'schoenowk@michigan.gov'; 'thelenr4@michigan.gov'; Valacak, Mark; 'Jamie-Lee Venable'; Cupal, Suzanne; Henry, James; Hallwood, Dawn; Swartout, April; LaRocco, Toni; Brickey, Tamara; 'Eisner, Jennifer (DHHS)'; 'Wells, Eden (DHHS)'; 'millerm1@michigan.gov'; 'roachb@michigan.gov'; 'Thompson, Sheryl D. (DHHS)'; Johnson, M.D., Gary; 'Sitko, Anthony M'; 'plevine@gcms.org';

'Kirk Smith'; 'mhanna1@hurleymc.com'; 'gonzalezj6@michigan.gov'; 'morans@michigan.gov'; 'robinsonm18@michigan.gov'; 'doerrkay@gmail.com'; 'irey52@gmail.com'; 'Lcarrav1@yahoo.com'; 'Dayne Walling'; 'krisztiang@michigan.gov'; 'nhenderson@cityofflint.com'; 'edgerton51@michigan.gov'; 'tommasulok@michigan.gov'; Stickler, Lisa; 'BanerjeeA@mottchc.org'
Subject: RE: Genesee County Health Department EOC 12/22/15

This is an informational update and the Genesee County Health Department will provide these updates on a daily basis after 4 pm. We are asking all partners included in this email to provide any pertinent updates **DAILY** to Hilda McShane by 2:00pm. If you have nothing new to share, please inform Hilda that you have no updates at this time.

- If you cannot attend the 12/29 water crisis meeting at Genesee County Health Department's library, but would like to participate, please call: 641.715.3580 and use access code: 307286.
- Michigan Department Environmental Quality (DEQ) continues to take water samples at Flint Community Schools. DEQ will take water samples from the two Flint high schools, Southwestern Classic Academy and Northwestern High School on December: 28, 29 and 30.

From: McShane, Hilda
Sent: Monday, December 21, 2015 3:59 PM
To: 'kboles@valleyaaa.org'; 'Boyer, Jenifier'; 'Jamie Gaskin'; 'Holmes, Virginia (DHHS)'; 'showard@co.genesee.mi.us'; 'Sean Kammer'; 'Andy Leavitt'; 'moses@mi.gov'; 'neeleyrep34@gmail.com'; 'ioliver@cfgf.org'; 'mpurcell@co.genesee.mi.us'; 'schoenowk@michigan.gov'; 'thelenr4@michigan.gov'; Valacak, Mark; 'Jamie-Lee Venable'; Cupal, Suzanne; Henry, James; Hallwood, Dawn; Swartout, April; LaRocco, Toni; Brickey, Tamara; 'Eisner, Jennifer (DHHS)'; 'Wells, Eden (DHHS)'; 'millerm1@michigan.gov'; 'roachb@michigan.gov'; 'Thompson, Sheryl D. (DHHS)'; Johnson, M.D., Gary; 'Sitko, Anthony M'; 'plevine@gcms.org'; 'Kirk Smith'; 'mhanna1@hurleymc.com'; 'gonzalezj6@michigan.gov'; 'morans@michigan.gov'; 'robinsonm18@michigan.gov'; 'doerrkay@gmail.com'; 'irey52@gmail.com'; 'Lcarrav1@yahoo.com'; 'Dayne Walling'; 'krisztiang@michigan.gov'; 'nhenderson@cityofflint.com'; 'edgerton51@michigan.gov'; 'tommasulok@michigan.gov'; Stickler, Lisa; 'BanerjeeA@mottchc.org'
Subject: RE: Genesee County Health Department EOC 12/21/15

This is an informational update and the Genesee County Health Department will provide these updates on a daily basis after 4 pm. We are asking all partners included in this email to provide any pertinent updates **DAILY** to Hilda McShane by 2:00pm. If you have nothing new to share, please inform Hilda that you have no updates at this time.

- If you cannot attend the 12/22 water crisis meeting at Genesee County Health Department's library, but would like to

participate, please call: 641.715.3580 and use access code: 307286.

- Michigan Department of Health and Human Services' Deputy Director of Field Operations, Sheryl Thompson, is working on obtaining several pallets of bottled water for drinking as well as "cans" of water that can be used for bathing, toileting, and cleaning only. The canned water is perfect for families experiencing large water bills and or possible shut offs.
- Genesee County Health Department distributed 100 PUR water filters to Hurley Children's Hospital for its first lead focused cooking class at the Flint Farmers' Market this past Saturday. The cooking classes were hosted by the MSU extension. Waiting is the plan after all testing? Using the recommendations from DEQ, which includes labor and staff overtime. Super will use recommendations. We don't funding so we are creating the plan.
-

From: McShane, Hilda
Sent: Thursday, December 17, 2015 11:28 PM
To: 'kboles@valleyaaa.org'; 'Boyer, Jenifier'; 'Jamie Gaskin'; 'Holmes, Virginia (DHHS)'; 'showard@co.genesee.mi.us'; 'Sean Kammer'; 'Andy Leavitt'; 'moses@mi.gov'; 'neeleyrep34@gmail.com'; 'loliver@cfgf.org'; 'mpurcell@co.genesee.mi.us'; 'schoenowk@michigan.gov'; 'thelenr4@michigan.gov'; Valacak, Mark; 'Jamie-Lee Venable'; Cupal, Suzanne; Henry, James; Hallwood, Dawn; Swartout, April; LaRocco, Toni; Brickey, Tamara; 'Eisner, Jennifer (DHHS)'; 'Wells, Eden (DHHS)'; 'millerm1@michigan.gov'; 'roachb@michigan.gov'; 'Thompson, Sheryl D. (DHHS)'; Johnson, M.D., Gary; 'Sitko, Anthony M'; 'plevine@gcms.org'; 'Kirk Smith'; 'mhanna1@hurleymc.com'; 'gonzalezj6@michigan.gov'; 'morans@michigan.gov'; 'robinsonm18@michigan.gov'; 'doerrkay@gmail.com'; 'irey52@gmail.com'; 'Lcarrav1@yahoo.com'; 'Dayne Walling'; 'krisztiang@michigan.gov'; 'nhenderson@cityofflint.com'; 'edgerton51@michigan.gov'; 'tommasulok@michigan.gov'; Stickler, Lisa; 'BanerjeeA@mottchc.org'
Subject: RE: Genesee County Health Department EOC 12/17/15

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- The Food Bank of Eastern Michigan is supplying pantries, missions, soup kitchens and shelters with all the water they need for public distribution.

- If your agency would like an updated list of water distribution sites, please contact Dan at 396-0222 or dfilipovich@feedingamerica.org.

- Agencies can also direct everyone to fbem.org. Use the drop down tab that says FIND HELP. At this point your clients will be asked their zip code and then they will be directed to the nearest pantry that is an agency of the Food Bank.

From: McShane, Hilda
Sent: Wednesday, December 16, 2015 4:06 PM
To: 'kboles@valleyaaa.org'; 'Boyer, Jenifier'; 'Jamie Gaskin'; 'Holmes, Virginia (DHHS)'; 'showard@co.genesee.mi.us'; 'Sean Kammer'; 'Andy Leavitt'; 'moses@mi.gov'; 'neeleyrep34@gmail.com'; 'ioliver@cfgf.org'; 'mpurcell@co.genesee.mi.us'; 'schoenowk@michigan.gov'; 'thelenr4@michigan.gov'; Valacak, Mark; 'Jamie-Lee Venable'; Cupal, Suzanne; Henry, James; Hallwood, Dawn; Swartout, April; LaRocco, Toni; Brickey, Tamara; 'Eisner, Jennifer (DHHS)'; 'Wells, Eden (DHHS)'; 'millerm1@michigan.gov'; 'roachb@michigan.gov'; 'Thompson, Sheryl D. (DHHS)'; Johnson, M.D., Gary; 'Sitko, Anthony M'; 'plevine@gcms.org'; 'Kirk Smith'; 'mhanna1@hurleymc.com'; 'gonzalezj6@michigan.gov'; 'morans@michigan.gov'; 'robinsonm18@michigan.gov'; 'doerrkay@gmail.com'; 'irey52@gmail.com'; 'Lcarrav1@yahoo.com'; 'Dayne Walling'; 'krisztiang@michigan.gov'; 'nhenderson@cityofflint.com'; 'edgerton51@michigan.gov'; 'tommasulok@michigan.gov'; Stickler, Lisa; 'BanerjeeA@mottchc.org'
Subject: RE: Genesee County Health Department EOC 12/17/15

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- Today, Michigan Department of Health and Human Services (MDHHS) received approval from Department of Environmental Quality (DEQ) to allow the use and public display of the Bath Time Poster that was developed to address individuals' concerns about using the water to bathe their children (see attached). The Genesee County Health Department encourages all agencies to display the bath time poster.

- Hurley Children's Hospital with MSU extension will offer their first lead focused cooking class at the Farmers' Market this Saturday. Lead focused nutrition recipes and resource book will be distributed at the cooking class . Press release promoting the cooking class will go out tomorrow.

- Mott Children's Health Center continues to work with City of Flint to pick up PUR filters.

From Jamie Gaskin
Over the past 48 hours some additional support has started to surface given the National and regional media coverage. These are all

developing streams of possible support and generally reflect organizations and business that got connected several months ago during our initial response. These are developing but I wanted to loop in all of you as this develops and also share some basic information:

1. MSP has again surfaced another source of bulk water that is Federal surplus. This water is free as long as we pay for shipping. I have looped in Bill Kerr at the foodbank as his team is really managing the logistics and understands the local demand and the ability of the local distribution system to handle storage etc.. These shipments come at the cost of shipping. This is about ½ the cost of buying the water and shipping ranges from between $1000-$2,000 per semi.

2. PUR – They have reached out to me again (Previously donated 2,000 faucet mount systems). I have directed them to consider donation of additional replacement filters and a financial donation. The financial donation would support shipping costs of more bottled water as well as possible prevention work.

3. ZeroWater – I am again working through some ideas with their CEO. He is very interested in the schools. I am not sure how this will develop.

*As we have shared in the past the distribution system currently has supplies of filter mount systems (PUR & Britta), replacement filters (PUR & Britta), and 8 cup pitchers (ZeroWater). If we get to levels below 500 available units for any system it is my understanding that this will serve as a trigger for us to resource more.

I also want to share that I have about $15,000 left of the more than $275k donated. As I get closer to expending all the funds the UW will continue to evaluate our own internal investment and make some adjustments. Please direct any possible financial investors to support the water fund either by calling me directly or making even small donations on our website. I will also be working with Isaiah Oliver at the Community Foundation around the MI Health Endowment Funds. Both the United Way and the Community Foundation are committed to working together and trying to maintain maximum flexibility as the situation develops.

I will follow-up though the normal Health Department updates moving forward but I just felt it necessary to try to bring everyone up to speed on developing work. If you have any questions for me please let me know. I will be available all through the Holiday period via cell phone and I will only be out of town from Christmas eve through the following Saturday. Please do not hesitate to call me for any reason.

From: McShane, Hilda
Sent: Tuesday, December 15, 2015 4:24 PM
To: 'kboles@valleyaaa.org'; 'Boyer, Jenifier'; 'Jamie Gaskin'; 'Holmes, Virginia (DHHS)'; 'showard@co.genesee.mi.us'; 'Sean Kammer'; 'Andy Leavitt'; 'moses@mi.gov'; 'neeleyrep34@gmail.com'; 'ioliver@cfgf.org';

'mpurcell@co.genesee.mi.us'; 'schoenowk@michigan.gov'; 'thelenr4@michigan.gov'; Valacak, Mark; 'Jamie-Lee Venable'; Cupal, Suzanne; Henry, James; Hallwood, Dawn; Swartout, April; LaRocco, Toni; Brickey, Tamara; 'Eisner, Jennifer (DHHS)'; 'Wells, Eden (DHHS)'; 'millerm1@michigan.gov'; 'roachb@michigan.gov'; 'Thompson, Sheryl D. (DHHS)'; Johnson, M.D., Gary; 'Sitko, Anthony M'; 'plevine@gcms.org'; 'Kirk Smith'; 'mhanna1@hurleymc.com'; 'gonzalezj6@michigan.gov'; 'morans@michigan.gov'; 'robinsonm18@michigan.gov'; 'doerrkay@gmail.com'; 'irey52@gmail.com'; 'Lcarrav1@yahoo.com'; 'Dayne Walling'; 'krisztiang@michigan.gov'; 'nhenderson@cityofflint.com'; 'edgerton51@michigan.gov'; 'tommasulok@michigan.gov'; Stickler, Lisa; 'BanerjeeA@mottchc.org'
Subject: RE: Genesee County Health Department EOC 12/15/15

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- City of Flint picked up Two Hundred (200) ZeroWater 8-Cup Filter Pitchers from Flint Community Schools 12/14/15 for distribution.

- The Genesee County Health Department has a total of 1,650 Pur water filters for distribution.

- Mott Children's Center will give City of Flint 117 water filters from the first batch of filters distributed at U of M Flint.

- Department of Health and Human Services and GCCARD attended the Health Fair on Saturday, December 12 and distributed the following at Bethel United Methodist Church's health fair.
    - 12 Filters
    - 17 Replacement Cartridges
    - 2 PUR replacements
    - 1 Pitcher

- Between December 11 and December 14, 2015, Genesee County Community Action Resource Department and Department Health Human Services distributed the following:
    - 78 filters
    - 6 pitchers
    - 53 replacement filters

- Sheryl Thompson from Michigan Department Health Human Services will order replacement filters when the inventory level reaches 500. After replacement cartridge order is placed, it takes a few days for delivery.
    - The Zero Water Pitcher replacement filters have been delivered. All sites will begin giving out a pitcher

replacement filter with every Zero Water pitcher given out.

Summary October through December 14, 2015

	Received	Distributed	Remaining
Water Filters	15,000	11,232	**3,768**
Water Pitchers	720	229	**491**
Replacement Cartridges	9,000	1,258	**7,742**

From: McShane, Hilda
Sent: Monday, December 14, 2015 4:46 PM
To: 'kboles@valleyaaa.org'; 'Boyer, Jenifier'; 'Jamie Gaskin'; 'Holmes, Virginia (DHHS)'; 'showard@co.genesee.mi.us'; 'Sean Kammer'; 'Andy Leavitt'; 'moses@mi.gov'; 'neeleyrep34@gmail.com'; 'ioliver@cfgf.org'; 'mpurcell@co.genesee.mi.us'; 'schoenowk@michigan.gov'; 'thelenr4@michigan.gov'; Valacak, Mark; 'Jamie-Lee Venable'; Cupal, Suzanne; Henry, James; Hallwood, Dawn; Swartout, April; LaRocco, Toni; Brickey, Tamara; 'Eisner, Jennifer (DHHS)'; 'Wells, Eden (DHHS)'; 'millerm1@michigan.gov'; 'roachb@michigan.gov'; 'Thompson, Sheryl D. (DHHS)'; Johnson, M.D., Gary; 'Sitko, Anthony M'; 'plevine@gcms.org'; 'Kirk Smith'; 'mhanna1@hurleymc.com'; 'gonzalezj6@michigan.gov'; 'morans@michigan.gov'; 'robinsonm18@michigan.gov'; 'doerrkay@gmail.com'; 'lrey52@gmail.com'; 'Lcarrav1@yahoo.com'; 'Dayne Walling'; 'krisztiang@michigan.gov'; 'nhenderson@cityofflint.com'; 'edgerton51@michigan.gov'; 'tommasulok@michigan.gov'; Stickler, Lisa; 'BanerjeeA@mottchc.org'
Subject: RE: Genesee County Health Department EOC 12/14/15

This is an informational update and the Genesee County Health Department will provide these updates on a daily basis after 4 pm. We are asking all partners included in this email to provide any pertinent updates **DAILY** to Hilda McShane by 2:00pm. If you have nothing new to share, please inform Hilda that you have no updates at this time.

- Genesee County Health Department, Clerical Coordinator, Lisa Stickler distributed 50 PUR water filters, 4 replacement PUR filters and 5 Brita replacement filters at Grace Emmanuel church on Saturday, Dec. 12.
- Genesee County Health Department screened over 50 people for lead at Grace Emmanuel church on Saturday, December 12.
- Genesee County Health Department's WIC program distributed water filters at Grace Emmanuel church on Saturday, December 12.

From: McShane, Hilda
Sent: Friday, December 11, 2015 4:34 PM
To: 'kboles@valleyaaa.org'; 'Boyer, Jenifier'; 'Jamie Gaskin'; 'Holmes,

Virginia (DHHS)'; 'showard@co.genesee.mi.us'; 'Sean Kammer'; 'Andy Leavitt'; 'moses@mi.gov'; 'neeleyrep34@gmail.com'; 'ioliver@cfgf.org'; 'mpurcell@co.genesee.mi.us'; 'schoenowk@michigan.gov'; 'thelenr4@michigan.gov'; Valacak, Mark; 'Jamie-Lee Venable'; Cupal, Suzanne; Henry, James; Hallwood, Dawn; Swartout, April; LaRocco, Toni; Brickey, Tamara; 'Eisner, Jennifer (DHHS)'; 'Wells, Eden (DHHS)'; 'millerm1@michigan.gov'; 'roachb@michigan.gov'; 'Thompson, Sheryl D. (DHHS)'; Johnson, M.D., Gary; 'Sitko, Anthony M'; 'plevine@gcms.org'; 'Kirk Smith'; 'mhanna1@hurleymc.com'; 'gonzalezj6@michigan.gov'; 'morans@michigan.gov'; 'robinsonm18@michigan.gov'; 'doerrkay@gmail.com'; 'irey52@gmail.com'; 'Lcarrav1@yahoo.com'; 'Dayne Walling'; 'krisztiang@michigan.gov'; 'nhenderson@cityofflint.com'; 'edgerton51@michigan.gov'; 'tommasulok@michigan.gov'; Stickler, Lisa; 'BanerjeeA@mottchc.org'
Subject: RE: Genesee County Health Department EOC 12/11/15

This is an informational update and the Genesee County Health Department will provide these updates on a daily basis after 4 pm. We are asking all partners included in this email to provide any pertinent updates **DAILY** to Hilda McShane by 2:00pm. If you have nothing new to share, please inform Hilda that you have no updates at this time.

- For the month of December, and as of December 10, Michigan Department of Health and Human Services (MDHHS) has distributed the following:
  - 214 Brita Filters
  - 38 Zero Water Pitchers
  - 275 Brita Replacement Cartridges

- Below is a filter distribution summary from MDHHS. Filter distribution began October 2015.

Summary

	Distributed
Water Filters	11,171
Water Pitchers	222
Replacement Cartridges	1,206

From: McShane, Hilda
Sent: Tuesday, December 8, 2015 5:15 PM
To: 'kboles@valleyaaa.org'; 'Boyer, Jenifier'; 'Jamie Gaskin'; 'Holmes, Virginia (DHHS)'; 'showard@co.genesee.mi.us'; 'Sean Kammer'; 'Andy Leavitt'; 'moses@mi.gov'; 'neeleyrep34@gmail.com'; 'ioliver@cfgf.org'; 'mpurcell@co.genesee.mi.us'; 'schoenowk@michigan.gov'; 'thelenr4@michigan.gov'; Valacak, Mark; 'Jamie-Lee Venable'; Cupal, Suzanne; Henry, James; Hallwood, Dawn; Swartout, April; LaRocco, Toni; Brickey, Tamara; 'Eisner, Jennifer (DHHS)'; 'Wells, Eden (DHHS)'; 'millerm1@michigan.gov'; 'roachb@michigan.gov'; 'Thompson, Sheryl D. (DHHS)'; Johnson, M.D., Gary; 'Sitko, Anthony M'; 'plevine@gcms.org';

'Kirk Smith'; 'mhanna1@hurleymc.com'; 'gonzalezj6@michigan.gov'; 'morans@michigan.gov'; 'robinsonm18@michigan.gov'; 'doerrkay@gmail.com'; 'irey52@gmail.com'; 'Lcarrav1@yahoo.com'; 'Dayne Walling'; 'krisztiang@michigan.gov'; 'nhenderson@cityofflint.com'; 'edgerton51@michigan.gov'; 'tommasulok@michigan.gov'; Stickler, Lisa; 'BanerjeeA@mottchc.org'
Subject: RE: Genesee County Health Department EOC 12/8/15

- Genesee County Health Department is working with the United Way and American Red Cross to develop and implement a plan to bring an NCCC team to the area to assist with fire prevention and lead education.
- BJ Roach from the State of Michigan Police department facilitated the assistance of Homeland Security to move large volumes of water to the Eastern Foodbank of Michigan.
- As of 12.8.15 14,545 water filters have been distributed to Flint residents.

From: McShane, Hilda
Sent: Monday, December 7, 2015 5:04 PM
To: 'kboles@valleyaaa.org'; 'Boyer, Jenifier'; 'Jamie Gaskin'; 'Holmes, Virginia (DHHS)'; 'showard@co.genesee.mi.us'; 'Sean Kammer'; 'Andy Leavitt'; 'moses@mi.gov'; 'neeleyrep34@gmail.com'; 'ioliver@cfgf.org'; 'mpurcell@co.genesee.mi.us'; 'schoenowk@michigan.gov'; 'thelenr4@michigan.gov'; Valacak, Mark; 'Jamie-Lee Venable'; Cupal, Suzanne; Henry, James; Hallwood, Dawn; Swartout, April; LaRocco, Toni; Brickey, Tamara; 'Eisner, Jennifer (DHHS)'; 'Wells, Eden (DHHS)'; 'millerm1@michigan.gov'; 'roachb@michigan.gov'; 'Thompson, Sheryl D. (DHHS)'; Johnson, M.D., Gary; 'Sitko, Anthony M'; 'plevine@gcms.org'; 'Kirk Smith'; 'mhanna1@hurleymc.com'; 'gonzalezj6@michigan.gov'; 'morans@michigan.gov'; 'robinsonm18@michigan.gov'; 'doerrkay@gmail.com'; 'irey52@gmail.com'; 'Lcarrav1@yahoo.com'; 'Dayne Walling'; 'krisztiang@michigan.gov'; 'nhenderson@cityofflint.com'; 'edgerton51@michigan.gov'; 'tommasulok@michigan.gov'; Stickler, Lisa; 'BanerjeeA@mottchc.org'
Subject: RE: Genesee County Health Department EOC 12/7/15

- Mott Children's Health Center distributed 117 PUR filters (that you attach to the faucet, [part of the batch that the United Way purchased and was distributed at U of M Flint).

- Mott Children's Health Center's leadership has put together a lead information packet. The intent of the packet is to distribute to patients. The packet includes information on appropriate filters and resources and how to obtain them. Genesee County Health Department will update Mott Children's Health Center as necessary with new distribution locations.

- As noted by Mott Children's Health Center, most parents of newborns continue to use bottled water to mix with formula.

- Genesee County Health Department continues to distributed water filters at its lead screening clinic in Burton.

- After a complete inventory is taken at all water filter distribution sites of remaining water filter cartridges, The State of Michigan has agreed to purchase additional PUR replacement filters.

- As of December 4, Michigan Department of Health and Human Services has distributed the following:

Water Filters	11,046
Water Pitchers	184
Replacement Cartridges	1,073

From: McShane, Hilda
Sent: Friday, December 4, 2015 5:15 PM
To: 'kboles@valleyaaa.org'; 'Boyer, Jenifier'; 'Jamie Gaskin'; 'Holmes, Virginia (DHHS)'; 'showard@co.genesee.mi.us'; 'Sean Kammer'; 'Andy Leavitt'; 'moses@mi.gov'; 'neeleyrep34@gmail.com'; 'ioliver@cfgf.org'; 'mpurcell@co.genesee.mi.us'; 'schoenowk@michigan.gov'; 'thelenr4@michigan.gov'; Valacak, Mark; 'Jamie-Lee Venable'; Cupal, Suzanne; Henry, James; Hallwood, Dawn; Swartout, April; LaRocco, Toni; Brickey, Tamara; 'Eisner, Jennifer (DHHS)'; 'Wells, Eden (DHHS)'; 'millerm1@michigan.gov'; 'roachb@michigan.gov'; 'Thompson, Sheryl D. (DHHS)'; Johnson, M.D., Gary; 'Sitko, Anthony M'; 'plevine@gcms.org'; 'Kirk Smith'; 'mhanna1@hurleymc.com'; 'gonzalezj6@michigan.gov'; 'morans@michigan.gov'; 'robinsonm18@michigan.gov'; 'doerrkay@gmail.com'; 'irey52@gmail.com'; 'Lcarrav1@yahoo.com'; 'Dayne Walling'; 'krisztiang@michigan.gov'; 'nhenderson@cityofflint.com'; 'edgerton51@michigan.gov'; 'tommasulok@michigan.gov'; Stickler, Lisa; 'BanerjeeA@mottchc.org'
Subject: RE: Genesee County Health Department EOC 12/4/15

This is an informational update and the Genesee County Health Department will provide these updates on a daily basis after 4 pm. We are asking all partners included in this email to provide any pertinent updates **DAILY** to Hilda McShane by 2:00pm. If you have nothing new to share, please inform Hilda that you have no updates at this time.

- Genesee County Health Department distributed a press release supporting Professor Marc Edwards' announcement to Flint residents to remind them that the water is still unsafe to drink without a faucet filter. Also, attached to the press release was a poster that list water filter distribution locations.

From: McShane, Hilda
Sent: Thursday, December 3, 2015 5:57 PM
To: 'kboles@valleyaaa.org'; 'Boyer, Jenifier'; 'Jamie Gaskin'; 'Holmes, Virginia (DHHS)'; 'showard@co.genesee.mi.us'; 'Sean Kammer'; 'Andy Leavitt'; 'moses@mi.gov'; 'neeleyrep34@gmail.com'; 'ioliver@cfgf.org'; 'mpurcell@co.genesee.mi.us'; 'schoenowk@michigan.gov'; 'thelenr4@michigan.gov'; Valacak, Mark; 'Jamie-Lee Venable'; Cupal, Suzanne; Henry, James; Hallwood, Dawn; Swartout, April; LaRocco, Toni; Brickey, Tamara; 'Eisner, Jennifer (DHHS)'; 'Wells, Eden (DHHS)'; 'millerm1@michigan.gov'; 'roachb@michigan.gov'; 'Thompson, Sheryl D. (DHHS)'; Johnson, M.D., Gary; 'Sitko, Anthony M'; 'plevine@gcms.org'; 'Kirk Smith'; 'mhanna1@hurleymc.com'; 'gonzalezj6@michigan.gov'; 'morans@michigan.gov'; 'robinsonm18@michigan.gov'; 'doerrkay@gmail.com'; 'irey52@gmail.com'; 'Lcarrav1@yahoo.com'; 'Dayne Walling'; 'krisztiang@michigan.gov'; 'nhenderson@cityofflint.com'; 'edgerton51@michigan.gov'; 'tommasulok@michigan.gov'; Stickler, Lisa; 'BanerjeeA@mottchc.org'
Subject: RE: Genesee County Health Department EOC 12/3/15

This is an informational update and the Genesee County Health Department will provide these updates on a daily basis after 4 pm. We are asking all partners included in this email to provide any pertinent updates **DAILY** to Hilda McShane by 2:00pm. If you have nothing new to share, please inform Hilda that you have no updates at this time.

- Michigan Department of Health and Human Services and Genesee County Community Action Resource Department have distributed the following in November: water filters 778, Zero Water Pitchers 63, and replacement filters 924. Total filter distribution as of October 1 is 10,951.

- The MDEQ and the City are coordinating the distribution and analysis of containers (bottles) for water testing. Bottles are available at City Hall and the water plant. Genesee County Health Department does not have bottles for distribution. Customers' name, phone, and address are required to be documented on a form when the water sample is submitted for analysis, not when the bottle is picked up. Analysis is conducted in Lansing at the MDEQ lab.

From: McShane, Hilda
Sent: Wednesday, December 2, 2015 4:24 PM
To: 'kboles@valleyaaa.org'; 'Boyer, Jenifier'; 'Jamie Gaskin'; 'Holmes, Virginia (DHHS)'; 'showard@co.genesee.mi.us'; 'Sean Kammer'; 'Andy Leavitt'; 'moses@mi.gov'; 'neeleyrep34@gmail.com'; 'ioliver@cfgf.org'; 'mpurcell@co.genesee.mi.us'; 'schoenowk@michigan.gov'; 'thelenr4@michigan.gov'; Valacak, Mark; 'Jamie-Lee Venable'; Cupal, Suzanne; Henry, James; Hallwood, Dawn; Swartout, April; LaRocco, Toni; Brickey, Tamara; 'Eisner, Jennifer (DHHS)'; 'Wells, Eden (DHHS)'; 'millerm1@michigan.gov'; 'roachb@michigan.gov'; 'Thompson, Sheryl D. (DHHS)'; Johnson, M.D., Gary; 'Sitko, Anthony M'; 'plevine@gcms.org'; 'Kirk Smith'; 'mhanna1@hurleymc.com'; 'gonzalezj6@michigan.gov'; 'morans@michigan.gov'; 'robinsonm18@michigan.gov'; 'doerrkay@gmail.com'; 'irey52@gmail.com'; 'Lcarrav1@yahoo.com';

'Dayne Walling'; 'krisztiang@michigan.gov'; 'nhenderson@cityofflint.com'; 'edgerton51@michigan.gov'; 'tommasulok@michigan.gov'; Stickler, Lisa; 'BanerjeeA@mottchc.org'
Subject: RE: Genesee County Health Department EOC 12/2/15

This is an informational update and the Genesee County Health Department will provide these updates on a daily basis after 4 pm. We are asking all partners included in this email to provide any pertinent updates **DAILY** to Hilda McShane by 2:00pm. If you have nothing new to share, please inform Hilda that you have no updates at this time.

- Genesee County Health Department (GCHD) will distribute an additional 100 water filters to the City of Flint for distribution at City of Hall.
- Besides all the water filter distribution occurring at the blood lead screening clinics and offsite exhibits by Genesee County Health Department's staff, the Health Department continues to distribute water filters at its Burton WIC clinic and continues to educate parents on lead in water issues. Distribution at the WIC clinic has been swift and additional inventory, another 100 water filters, will be added to the WIC distribution inventory.
- Genesee County Health Department will distribute a press release that supports Professor Marc Edwards, of Virginia Tech University's announcement that Flint residents do indeed need to continue to use water filters.
- After a through inventory of water filters, Michigan Department of Health and Human Services (MDHHS) will purchase more Pur replacement filters. As suggested by MDHHS staff, GCHD will inventory its supply of replacement filters and give inventory outcome to MDHHS.
- Genesee County Health Department will host blood lead screening clinics at Grace Emmanuel and Bethel United Methodist churches.

From: McShane, Hilda
Sent: Tuesday, December 1, 2015 5:06 PM
To: 'kboles@valleyaaa.org'; 'Boyer, Jenifier'; 'Jamie Gaskin'; 'Holmes, Virginia (DHHS)'; 'showard@co.genesee.mi.us'; 'Sean Kammer'; 'Andy Leavitt'; 'moses@mi.gov'; 'neeleyrep34@gmail.com'; 'ioliver@cfgf.org'; 'mpurcell@co.genesee.mi.us'; 'schoenowk@michigan.gov'; 'thelenr4@michigan.gov'; Valacak, Mark; 'Jamie-Lee Venable'; Cupal, Suzanne; Henry, James; Hallwood, Dawn; Swartout, April; LaRocco, Toni; Brickey, Tamara; 'Eisner, Jennifer (DHHS)'; 'Wells, Eden (DHHS)'; 'millerm1@michigan.gov'; 'roachb@michigan.gov'; 'Thompson, Sheryl D. (DHHS)'; Johnson, M.D., Gary; 'Sitko, Anthony M'; 'plevine@gcms.org'; 'Kirk Smith'; 'mhanna1@hurleymc.com'; 'gonzalezj6@michigan.gov'; 'morans@michigan.gov'; 'robinsonm18@michigan.gov';

'doerrkay@gmail.com'; 'irey52@gmail.com'; 'Lcarrav1@yahoo.com'; 'Dayne Walling'; 'krisztiang@michigan.gov'; 'nhenderson@cityofflint.com'; 'edgerton51@michigan.gov'; 'tommasulok@michigan.gov'; Stickler, Lisa; 'BanerjeeA@mottchc.org'
Subject: RE: Genesee County Health Department EOC 12/1/15

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City of Flint water filter and filter distribution has increased at City Hall. The Genesee County Health Department will give City of Flint both water filters and filters to keep up with the increased distribution traffic.

Genesee County Health Department's Nursing Director, Toni LaRocco, continues to develop partnerships with area churches to host blood lead screening clinics.

Genesee County Health Department is working with City of Flint Schools; Eisenhower and Freeman to develop blood lead screening clinics.

From: McShane, Hilda
Sent: Monday, November 30, 2015 4:47 PM
To: 'kboles@valleyaaa.org'; 'Boyer, Jenifier'; 'Jamie Gaskin'; 'Holmes, Virginia (DHHS)'; 'showard@co.genesee.mi.us'; 'Sean Kammer'; 'Andy Leavitt'; 'moses@mi.gov'; 'neeleyrep34@gmail.com'; 'ioliver@cfgf.org'; 'mpurcell@co.genesee.mi.us'; 'schoenowk@michigan.gov'; 'thelenr4@michigan.gov'; Valacak, Mark; 'Jamie-Lee Venable'; Cupal, Suzanne; Henry, James; Hallwood, Dawn; Swartout, April; LaRocco, Toni; Brickey, Tamara; 'Eisner, Jennifer (DHHS)'; 'Wells, Eden (DHHS)'; 'millerm1@michigan.gov'; 'roachb@michigan.gov'; 'Thompson, Sheryl D. (DHHS)'; Johnson, M.D., Gary; 'Sitko, Anthony M'; 'plevine@gcms.org'; 'Kirk Smith'; 'mhanna1@hurleymc.com'; 'gonzalezj6@michigan.gov'; 'morans@michigan.gov'; 'robinsonm18@michigan.gov'; 'doerrkay@gmail.com'; 'irey52@gmail.com'; 'Lcarrav1@yahoo.com'; 'Dayne Walling'; 'krisztiang@michigan.gov'; 'nhenderson@cityofflint.com'; 'edgerton51@michigan.gov'; 'tommasulok@michigan.gov'; Stickler, Lisa; 'BanerjeeA@mottchc.org'
Subject: RE: Genesee County Health Department EOC 11/30/15

This is an informational update and the Genesee County Health Department will provide these updates on a daily basis after 4 pm. We are asking all partners included in this email to provide any pertinent updates **DAILY** to Hilda McShane by 2:00pm. If you have nothing new to share, please inform Hilda that you have no updates at this time.

- Genesee County Health Department's Nursing Director, Toni LaRocco is working with City of Flint Schools to develop additional lead clinics.
- The City of Flint (Sean Kammer) picked up 100 ZeroWater 8-Cup filter pitchers, on Wednesday, November 25, 2015, from Flint Community Schools for distribution.

From: McShane, Hilda
Sent: Friday, November 20, 2015 5:07 PM
To: 'kboles@valleyaaa.org'; 'Boyer, Jenifier'; 'Jamie Gaskin'; 'Holmes, Virginia (DHHS)'; 'showard@co.genesee.mi.us'; 'Sean Kammer'; 'Andy Leavitt'; 'moses@mi.gov'; 'neeleyrep34@gmail.com'; 'ioliver@cfgf.org'; 'mpurcell@co.genesee.mi.us'; 'schoenowk@michigan.gov'; 'thelenr4@michigan.gov'; Valacak, Mark; 'Jamie-Lee Venable'; Cupal, Suzanne; Henry, James; Hallwood, Dawn; Swartout, April; LaRocco, Toni; Brickey, Tamara; 'Eisner, Jennifer (DHHS)'; 'Wells, Eden (DHHS)'; 'millerm1@michigan.gov'; 'roachb@michigan.gov'; 'Thompson, Sheryl D. (DHHS)'; Johnson, M.D., Gary; 'Sitko, Anthony M'; 'plevine@gcms.org'; 'Kirk Smith'; 'mhanna1@hurleymc.com'; 'gonzalezj6@michigan.gov'; 'morans@michigan.gov'; 'robinsonm18@michigan.gov'; 'doerrkay@gmail.com'; 'irey52@gmail.com'; 'Lcarrav1@yahoo.com'; 'Dayne Walling'; 'krisztiang@michigan.gov'; 'nhenderson@cityofflint.com'; 'edgerton51@michigan.gov'; 'tommasulok@michigan.gov'; Stickler, Lisa; 'BanerjeeA@mottchc.org'
Subject: RE: Genesee County Health Department EOC 11/20/15

- Parent packets developed by the State and local organizations are almost exhausted. Genesee County Health Department is working with the State on the next version of this parent packet.
- GCHD met with Michigan Department Health and Human Services today to review and revise current lead education material..
- Mark has developed a laudatory resolution to thank the University of Michigan for their assistance with the water filter distribution on Saturday, October 3, 2015. The resolution will be presented to the Genesee County Board of Commissioners.
- Genesee County Health Department's Health Officer, Mark Valacak will meet with United Way's CEO, Jamie Gaskin to discuss grant support for community lead education.
- Water filters distributed as of 11/20/15: 14,473.
- GCHD will share nutrition and lead education with organizations currently doing nutrition education in the community. GCHD will also share locations where individuals can access water filters.

From: McShane, Hilda
Sent: Wednesday, November 18, 2015 4:44 PM
To: kboles@valleyaaa.org; Boyer, Jenifier; Jamie Gaskin; Holmes, Virginia (DHHS); showard@co.genesee.mi.us; Sean Kammer; Andy Leavitt; moses@mi.gov; neeleyrep34@gmail.com; ioliver@cfgf.org; mpurcell@co.genesee.mi.us; schoenowk@michigan.gov; thelenr4@michigan.gov; Valacak, Mark; Jamie-Lee Venable; Cupal, Suzanne; Henry, James; Hallwood, Dawn; Swartout, April; LaRocco, Toni; Brickey, Tamara; Eisner, Jennifer (DHHS); Wells, Eden (DHHS); millerm1@michigan.gov; roachb@michigan.gov; Thompson, Sheryl D. (DHHS); Johnson, M.D., Gary; Sitko, Anthony M; plevine@gcms.org; Kirk Smith; mhanna1@hurleymc.com; gonzalezj6@michigan.gov; morans@michigan.gov; robinsonm18@michigan.gov; doerrkay@gmail.com; lrey52@gmail.com; Lcarrav1@yahoo.com; Dayne Walling; krisztiang@michigan.gov; nhenderson@cityofflint.com; edgerton51@michigan.gov; tommasulok@michigan.gov; Stickler, Lisa; 'BanerjeeA@mottchc.org'
Subject: RE: Genesee County Health Department EOC 11/18/15

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- Genesee County Health Department, Public Health Nurse, Janet Wenstrom will distribute the current parent packet that contains lead information to Flint area parochial schools.
- Attached is a recent report on water filter distribution and location of distribution.

From: McShane, Hilda
Sent: Tuesday, November 17, 2015 5:12 PM
To: Howard Croft; kboles@valleyaaa.org; Boyer, Jenifier; Jamie Gaskin; Holmes, Virginia (DHHS); showard@co.genesee.mi.us; Sean Kammer; Andy Leavitt; moses@mi.gov; neeleyrep34@gmail.com; ioliver@cfgf.org; mpurcell@co.genesee.mi.us; schoenowk@michigan.gov; thelenr4@michigan.gov; Valacak, Mark; Jamie-Lee Venable; Cupal, Suzanne; Henry, James; Hallwood, Dawn; Swartout, April; LaRocco, Toni; Brickey, Tamara; Eisner, Jennifer (DHHS); Wells, Eden (DHHS); millerm1@michigan.gov; roachb@michigan.gov; Thompson, Sheryl D. (DHHS); Johnson, M.D., Gary; Sitko, Anthony M; plevine@gcms.org; Kirk Smith; mhanna1@hurleymc.com; gonzalezj6@michigan.gov; morans@michigan.gov; robinsonm18@michigan.gov; doerrkay@gmail.com; lrey52@gmail.com; Lcarrav1@yahoo.com; Dayne Walling; krisztiang@michigan.gov; nhenderson@cityofflint.com; edgerton51@michigan.gov; tommasulok@michigan.gov; Stickler, Lisa; Banerjee@mottchc.org
Subject: Re: Genesee County Health Department EOC 11/17/15

Genesee County Health Department is working with the CDC to develop phosphate educational materials.

United Way (UW) CEO, Jamie Gaskin and Genesee County Health Department Health Officer, Mark Valacak have been discussing the strategic use of Americore volunteers during this water crisis. Suggested volunteer work includes: distribution of filters, lead education, and assist at health fairs and at church exhibits. Volunteers may be available in February of 2016.

UW Jamie Gaskin reported that UW will giveaway 110 Thanksgiving baskets. The baskets will contain a water filter system.

For those who need 8oz - Zero cup water filters, please contact Tony Sitko at Flint Community Schools. His email address is:tsitko@flintschools.org.

Genesee County Health Department will give City of Flint 50 PUR water filters for distribution at City Hall.

Water filter distribution is well over 13,596.

BJ Roach from the State Police had nothing to report at this time.

Sent from Surface

From: Hilda McShane
Sent: Monday, November 16, 2015 4:34 PM
To: Howard Croft, kboles@valleyaaa.org, Boyer, Jenifier, Jamie Gaskin, Holmes, Virginia (DHHS), showard@co.genesee.mi.us, Sean Kammer, Andy Leavitt, moses@mi.gov, neeleyrep34@gmail.com, ioliver@cfgf.org, mpurcell@co.genesee.mi.us, schoenowk@michigan.gov, thelenr4@michigan.gov, Valacak, Mark, Jamie-Lee Venable, Cupal, Suzanne, Henry, James, Hallwood, Dawn, Swartout, April, LaRocco, Toni, Tamara Brickey, Eisner, Jennifer (DHHS), Wells, Eden (DHHS), millerm1@michigan.gov, roachb@michigan.gov, Thompson, Sheryl D. (DHHS), Johnson, M.D., Gary, Sitko, Anthony M, plevine@gcms.org, Kirk Smith, mhanna1@hurleymc.com, gonzalezj6@michigan.gov, morans@michigan.gov, robinsonm18@michigan.gov, doerrkay@gmail.com, lrey52@gmail.com, Lcarrav1@yahoo.com, Dayne Walling, krisztiang@michigan.gov, nhenderson@cityofflint.com, edgerton51@michigan.gov, tommasulok@michigan.gov, Wells, Eden (DHHS), lstickler@gchd.us

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- Toni LaRocco, Nurse Supervisor at Genesee County Health Department's Burton clinic had no lead clinic updates.
- There has been a noticeable amount of walkup lead testing at Genesee County Health Department's Burton Clinic.
- As of November 16, 2015 a total of 13,569 water filters have been distributed.
- Parent packets that contain lead education and other lead related education information will be distributed at the BE WISE IMMUNIZE event at the Flint Farmer's Market on Saturday, November 21 event from 9 am to 1 pm.

From: McShane, Hilda
Sent: Friday, November 13, 2015 4:46 PM
To: 'hcroft@cityofflint.com'; 'kboles@valleyaaa.org'; 'jboyer@co.genesee.mi.us'; 'Jamie Gaskin'; 'Holmes, Virginia (DHHS'; 'showard@co.genesee.mi.us'; 'skammer@cityofflint.com'; 'Andy Leavitt'; 'moses@mi.gov'; 'neeleyrep34@gmail.com'; 'ioliver@cfgf.org'; 'mpurcell@co.genesee.mi.us'; 'schoenowk@michigan.gov'; 'thelenr4@michigan.gov'; Valacak, Mark; 'Jamie-Lee Venable'; Cupal, Suzanne; Henry, James; Hallwood, Dawn; Swartout, April; LaRocco, Toni; Brickey, Tamara; 'EisnerJ@michigan.gov'; 'WellsE3@michigan.gov'; 'millerm1@michigan.gov'; 'roachb@michigan.gov'; 'ThompsonS2@michigan.gov'; Johnson, M.D., Gary; 'tsitko@flintschools.org'; 'plevine@gcms.org'; 'ksmith@flint.org'; 'mhanna1@hurleymc.com'; 'gonzalezj6@michigan.gov'; 'morans@michigan.gov'; 'robinsonm18@michigan.gov'; 'doerrkay@gmail.com'; 'irey52@gmail.com'; 'Lcarrav1@yahoo.com'; 'Dayne Walling'; 'krisztiang@michigan.gov'; 'nhenderson@cityofflint.com'; 'edgerton51@michigan.gov'; 'tommasulok@michigan.gov'; 'WellsE3@michigan.gov'; 'lstickler@gchd.us'
Subject: RE: Genesee County Health Department EOC 11/13/15

This is an informational update and the Genesee County Health Department will provide these updates on a daily basis after 4 pm. We are asking all partners included in this email to provide any pertinent updates **DAILY** to Hilda McShane by 2:00pm. If you have nothing new to share, please inform Hilda that you have no updates at this time.

- Genesee County Health Department will send staff to Flint Community Schools' city wide parent meeting at Brownell STEM Academy. Genesee County Health Department representatives will present lead education. The presentation will take place on Wednesday, November 18 at 9:30 am.

- Brownell STEM Academy lead screening was hosted by Flint Community Schools with assistance from McLaren Health Plan and Genesee County Health Department. Twenty seven kids were tested. Test results will be mailed to parents in two weeks.

- During the 3:00 to 6:00 pm clinic, a combination of Pur and Brita water filters and replacement filters were distributed. A total of 60 filters and replacement filters were distributed.

- Genesee County Health Department, Genesee Health Plan, Crim Fitness Foundation, University of Michigan Flint Nursing Program, The MDHHS environmental consultants' ETC, and 211 exhibited at Brownell's lead screening clinic where they educated participants on lead preventative and nutrition.

- Home Depot was at Brownell's clinic answering water filter installation questions.

From: McShane, Hilda
Sent: Monday, November 9, 2015 3:45 PM
To: 'hcroft@cityofflint.com'; 'kboles@valleyaaa.org'; 'jboyer@co.genesee.mi.us'; 'Jamie Gaskin'; 'Holmes, Virginia (DHHS'; 'showard@co.genesee.mi.us'; 'skammer@cityofflint.com'; 'Andy Leavitt'; 'moses@mi.gov'; 'neeleyrep34@gmail.com'; 'ioliver@cfgf.org'; 'mpurcell@co.genesee.mi.us'; 'schoenowk@michigan.gov'; 'thelenr4@michigan.gov'; Valacak, Mark; 'Jamie-Lee Venable'; Cupal, Suzanne; Henry, James; Hallwood, Dawn; Swartout, April; LaRocco, Toni; Brickey, Tamara; 'Eisner1@michigan.gov'; 'WellsE3@michigan.gov'; 'millerm1@michigan.gov'; 'roachb@michigan.gov'; 'ThompsonS2@michigan.gov'; Johnson, M.D., Gary; 'tsitko@flintschools.org'; 'plevine@gcms.org'; 'ksmith@flint.org'; 'mhanna1@hurleymc.com'; 'gonzalezj6@michigan.gov';

'morans@michigan.gov'; 'robinsonm18@michigan.gov'; 'doerrkay@gmail.com'; 'irey52@gmail.com'; 'Lcarrav1@yahoo.com'; 'Dayne Walling'; 'krisztiang@michigan.gov'; 'nhenderson@cityofflint.com'; 'edgerton51@michigan.gov'; 'tommasulok@michigan.gov'; 'WellsE3@michigan.gov'; 'lstickler@gchd.us'
Subject: RE: Genesee County Health Department EOC 11/9/15

This is an informational update and the Genesee County Health Department will provide these updates on a daily basis after 4 pm. We are asking all partners included in this email to provide any pertinent updates **DAILY** to Hilda McShane by 2:00pm. If you have nothing new to share, please inform Hilda that you have no updates at this time.

- GCCARD distributed a combination of water filters and replacement filters totaling 154.
- DHHS distributed a combination of water filters and replacement filters totaling 59.
- To date approximately 14,000 water filters have been distributed.
- Tamara Brickey (Genesee County Health Department) is working with Grand Blanc Schools for the purpose of distributing water filter replacement cartridges.
- Tamara continues to contact various organizations to get them replacement filters so that they in turn can distribute replacement filters to their clients.

From: McShane, Hilda
Sent: Friday, November 6, 2015 4:46 PM
To: Brickey, Tamara; McShane, Hilda; 'hcroft@cityofflint.com'; 'kboles@valleyaaa.org'; 'jboyer@co.genesee.mi.us'; 'Jamie Gaskin'; 'Holmes, Virginia (DHHS'; 'showard@co.genesee.mi.us'; 'skammer@cityofflint.com'; 'Andy Leavitt'; 'moses@mi.gov'; 'neeleyrep34@gmail.com'; 'ioliver@cfgf.org'; 'mpurcell@co.genesee.mi.us'; 'schoenowk@michigan.gov'; 'thelenr4@michigan.gov'; Valacak, Mark; 'Jamie-Lee Venable'; Cupal, Suzanne; Henry, James; Hallwood, Dawn; Swartout, April; LaRocco, Toni; 'EisnerJ@michigan.gov'; 'WellsE3@michigan.gov'; 'millerm1@michigan.gov'; 'roachb@michigan.gov'; 'ThompsonS2@michigan.gov'; Johnson, M.D., Gary; 'tsitko@flintschools.org'; 'plevine@gcms.org'; 'ksmith@flint.org'; 'mhanna1@hurleymc.com'; 'gonzalezj6@michigan.gov'; 'morans@michigan.gov'; 'robinsonm18@michigan.gov'; 'doerrkay@gmail.com'; 'irey52@gmail.com'; 'Lcarrav1@yahoo.com'; 'Dayne Walling'; 'nhenderson@cityofflint.com'; 'edgerton51@michigan.gov'; 'tommasulok@michigan.gov'; 'WellsE3@michigan.gov'
Subject: Genesee County Health Department EOC 11/5/15

This is an informational update and the Genesee County Health Department will provide these updates on a daily basis after 4 pm. We are asking all partners included in this email to provide any pertinent updates **DAILY** to Hilda McShane by 2:00pm. If you have nothing new to share, please inform Hilda that you have no updates at this time.

- Genesee County Health Department's (GCHD) Women, Infant and Children (WIC) program has distributed 300 water filters.
- Sixty water filters and replacement cartridges were distributed at yesterday's lead screening clinic.
- There was an additional three lead clinic participants at Genesee County Health Department's lead screening clinic hosted by Genesee County Health Department and McLaren Health Plan on Thursday, November 5 in Burton, Michigan. The final total for this lead screening clinic is 42 participants.
- There was a correction made to abc12's segment covering the lead screening program that was corrected on GCHD's social media platforms. Abc12 will make the correction at their end as well.

From: Wells, Eden (DHHS)
Sent: Tuesday, January 05, 2016 10:43 AM
To: Mona Hanna-Attisha;LaRocco, Toni
Cc: Valacak, Mark;lrey52@gmail.com
Subject: RE: Genesee County Health Department- EOC 1/4/16

I will look into some potential resources for that---

E

From: Mona Hanna-Attisha [mailto:MHanna1@hurleymc.com]
Sent: Tuesday, January 05, 2016 10:23 AM
To: LaRocco, Toni <tlarocco@gchd.us>; Wells, Eden (DHHS) <WellsE3@michigan.gov>
Cc: Valacak, Mark <MVALACAK@gchd.us>; lrey52@gmail.com
Subject: RE: Genesee County Health Department- EOC 1/4/16

great. we have about 10,000 of our lead nutrition packets that they can take with them for each clinic.

they key is buying lunch for the practices - then you will have an audience.

Mona Hanna-Attisha MD MPH FAAP
Program Director Pediatric Residency
Hurley Children's Hospital at Hurley Medical Center
Michigan State University College of Human Medicine
Department of Pediatrics and Human Development
Mhanna1@hurleymc.com

From: LaRocco, Toni [tlarocco@gchd.us]
Sent: Tuesday, January 05, 2016 10:20 AM
To: Wells, Eden (DHHS); Mona Hanna-Attisha
Cc: Valacak, Mark; lrey52@gmail.com
Subject: RE: Genesee County Health Department- EOC 1/4/16

If it would be of any help, we could have a lead case manager attend as well to put a name and contact information in physicians hands. This morning I asked the case managers to contact the largest pediatric practices and see about meeting with them regarding case management services, sources for filters, nutrition and answer any general questions they might have.

Toni L. LaRocco MS, RN
Director of Nursing Services
Genesee County Health Department
810.237.4544
tlarocco@gchd.us

"Gratitude unlocks the fullness of life. It turns what we have into enough, and more. It turns denial into acceptance, chaos to order, confusion to clarity. It can turn a meal into a feast, a house into a home, a stranger

into a friend. Gratitude makes sense of our past, brings peace for today, and creates a vision for tomorrow."- Melody Beattie

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For a copy of the Health Department's Notice of Information Practices, contact the Health Department or visit the Health Department's website at http://www.gchd.us/

From: Wells, Eden (DHHS) [mailto:WellsE3@michigan.gov]
Sent: Tuesday, January 5, 2016 9:34 AM
To: Mona Hanna-Attisha; LaRocco, Toni
Cc: Valacak, Mark; lrey52@gmail.com
Subject: RE: Genesee County Health Department- EOC 1/4/16

Good morning ,

I will relay, with your permission of course, this email to our Medical Services Administration, with whom I have had the same discussions. Rest assured that I saw a multi-point plan from this health plan about how to address the issues in their patient population, and these community engagement pieces are just one part.

One issue all are trying to capture is the urgency under which the enhanced testing needs to be conducted, so this is one of a number of strategies the health plans are utilizing.

Another part is of utmost concern, that I know is also in multiple health plans' strategic approaches, is that of provider engagement. Despite the news and the blast faxes and the Health Alerts and the Provider Letters and the Toolkits, we continue to hear from citizens, the Governor's Task Force and EBL case investigators and case managers, that providers are not asking about lead exposure to Flint water since April 2014, nor asking about testing/screening, or whether families have filters. I tried to set up a provider forum in Nov-Dec to little or no interest, but am now working to get one rolling regardless, in partnership with health plans, by end of this month.

It would really be helpful if you could be there to speak about this very issue and give the perspective of a local physician responding to the crisis, and a leader of best practices. We will webinar it and archive it as well (I am wondering if I can make it CME-able as well), and Dr. Reynolds, it would be great to have you involved as well---

Eden

Eden V. Wells, MD, MPH, FACPM
Chief Medical Executive
Michigan Department of Health and Human Services
201 Townsend St., 5th Floor CVB
Lansing, MI 48913

From: Mona Hanna-Attisha [mailto:MHanna1@hurleymc.com]
Sent: Monday, January 04, 2016 10:16 PM
To: Wells, Eden (DHHS) <WellsE3@michigan.gov>; LaRocco, Toni <tlarocco@gchd.us>
Cc: Valacak, Mark <MVALACAK@gchd.us>; lrey52@gmail.com
Subject: RE: Genesee County Health Department- EOC 1/4/16

Thanks for your reply, Eden. Yes, I have had discussions with Matt Davis about this as well and it was my understanding that it was recommended to expand screening, but still to push kids to their medical homes as you said. If we all agree to drive kids to their medical homes first, the primacy of the medical home, why is that not being done first?

What are the medicaid HMOs doing to push kids to their medical homes? How are they incentivizing visits, providing case management, partnering with practices, enhanced transportation, etc? This is what needs to happen - not only will all of this improve lead screening rates, but also immun rates and all other HEDIS measure that HMOs (and providers) care about.

Mona Hanna-Attisha MD MPH FAAP
Program Director Pediatric Residency
Hurley Children's Hospital at Hurley Medical Center
Michigan State University College of Human Medicine
Department of Pediatrics and Human Development
Mhanna1@hurleymc.com

From: Wells, Eden (DHHS) [WellsE3@michigan.gov]
Sent: Monday, January 04, 2016 9:03 PM
To: LaRocco, Toni
Cc: Mona Hanna-Attisha; Valacak, Mark
Subject: Re: Genesee County Health Department- EOC 1/4/16

Hi Mona,
The Governor's Task Force has made a number of preliminary recommendations to MDHHS last month, and a major one is to maximize blood lead screening. The primary care home is best, all agree, and health plans are identifying any children that have not been tested. Current thoughts are that there could be thousands. Health plans will be closely monitoring the provider follow up as well post initial screens. And, while it does not pick up potential lead exposure prior to Oct 1, water is still a potential source if public health measures are not being used, or used appropriately. Also there is a need to establish the prevalence of EBL in this impacted community-

I have had long discussions with Matt Davis about this, and Larry is aware as well. I can discuss further if needed. But all, including Medicaid, agree with the primacy of the patient primary care home.
E

Sent from my iPhone

On Jan 4, 2016, at 8:38 PM, LaRocco, Toni <tlarocco@gchd.us> wrote:

> At the request of MDHHS, we are working with the Medicaid health plans to screen kids that have not been screened. There are many kids that, for a multitude of reasons, have not been screened.
>
> Toni LaRocco MS, RN
> Director of Nursing Services
> Genesee County Health Department
>
> Begin forwarded message:
>
> > **From:** Mona Hanna-Attisha <MHanna1@hurleymc.com>
> > **Date:** January 4, 2016 at 5:07:02 PM EST
> > **To:** Toni LaRocco <tlarocco@gchd.us>
> > **Subject: Fwd: Genesee County Health Department- EOC 1/4/16**

Why are we still doing mass lead screenings?

Mona Hanna-Attisha MD MPH FAAP
Hurley Children's Hospital
Michigan State University
mhanna1@hurleymc.com

Begin forwarded message:

From: "McShane, Hilda" <hmcshane@gchd.us>
Date: January 4, 2016 at 4:59:54 PM EST
To: <kboles@valleyaaa.org>, "Boyer, Jenifier" <jboyer@co.genesee.mi.us>, "Jamie Gaskin" <jgaskin@unitedwaygenesee.org>, "Holmes, Virginia (DHHS)" <HolmesV@michigan.gov>, <showard@co.genesee.mi.us>, Sean Kammer <skammer@cityofflint.com>, Andy Leavitt <aleavitt@senatedems.org>, <moses@mi.gov>, <neeleyrep34@gmail.com>, <ioliver@cfgf.org>, <mpurcell@co.genesee.mi.us>, <schoenowk@michigan.gov>, <theienr4@michigan.gov>, "Valacak, Mark" <MVALACAK@gchd.us>, "Jamie-Lee Venable" <jvenable@unitedwaygenesee.org>, "Cupal, Suzanne" <scupal@gchd.us>, "Henry, James" <jhenry@gchd.us>, "Hallwood, Dawn" <dhallwood@gchd.us>, "Swartout, April" <ASWARTOUT@gchd.us>, "LaRocco, Toni" <tlarocco@gchd.us>, "Brickey, Tamara" <tbrickey@gchd.us>, "Eisner, Jennifer (DHHS)" <EisnerJ@michigan.gov>, "Wells, Eden (DHHS)" <WellsE3@michigan.gov>, <millerm1@michigan.gov>, <roachb@michigan.gov>, "Thompson, Sheryl D. (DHHS)" <Thompson52@michigan.gov>, "Johnson, M.D., Gary" <GJOHNSON@gchd.us>, "Sitko, Anthony M" <tsitko@flintschools.org>, <plevine@gcms.org>, Kirk Smith <ksmith@flint.org>, <mhanna1@hurleymc.com>, <gonzalezj6@michigan.gov>, <morans@michigan.gov>, <robinsonm18@michigan.gov>, <doerrkay@gmail.com>, <lrev52@gmail.com>, <Lcarrav1@yahoo.com>, Dayne Walling <dwalling@cityofflint.com>, <krisztiang@michigan.gov>, <nhenderson@cityofflint.com>, <edgerton51@michigan.gov>, <tommasulok@michigan.gov>, "Stickler, Lisa" <STICKLER@gchd.us>, <BanerjeeA@mottchc.org>, <CDevriendt@co.genesee.mi.us>, "July, Jori" <jjuly@gchd.us>, <ebenning@MTAFLINT.ORG>, GCHD-Management Team <GCHD-ManagementTeam@gchd.us>
Subject: Genesee County Health Department- EOC 1/4/16

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- In an upcoming broadcast, abc 12 will reinforce the need for water filters, availability of replacement filters and distribution locations:

MDHHS, 125 E. Union Street, Flint, 48501
MDHHS, 4809 Clio Road, Flint, 48504
GCCARD, 601 N. Saginaw Street, Suite A, Flint 48502
GCCARD, 2727 Lippincott Blvd, Flint, 48507
Flint City Hall, 1101 South Saginaw Street, 48502

- In partnership with Flint Community Schools and Molina Health Care, Genesee County Health Department will work with these organizations to host a lead screening event on January 12, 3:00 pm at Freeman Elementary school. Freeman Elementary school is located at 4001 Omega Avenue, Flint, MI 48507.

- As of January 4, 2016 **23,879** water filters have been distributed to residents in the City of Flint, Burton and Flint Township.

Michigan Department of Health and Human Services Water Filter Distribution As of December 31, 2015

	Distributed	Remaining
Water Filters	458	**3,585**
Water Pitchers	51	**485**
Replacement Cartridges - Brita	544	**7,525**
Replacement Cartridges - PUR	74	**5,632**
Replacement Cartridges - Zero	5	**370**

Michigan Department of Health and Human Services Water Filter Distribution Summary total from October- December 31, 2015

	Distributed	Remaining
Water Filters	11,415	**3,585**
Water Pitchers	235	**485**
Replacement Cartridges - Brita	1,475	**7,525**
Replacement Cartridges – PUR*	74	**5,632**
Replacement Cartridges - Zero	5	**370**

*Please note that MDHHS did not buy the current PUR filters being distributed. Once these are exhausted if needed DHHS will purchase PUR replacements.

FOR IMMEDIATE RELEASE
GENESEE COUNTY COMMISSIONERS DECLARE EMERGENCY

Flint, MI -- January 4, 2016 – During their first board meeting of the year, Monday morning, Genesee County Commissioners declared a state of emergency in Genesee County. The move a sign that county leaders support Flint Mayor Dr. Karen Weaver and her efforts to get resources and relief to the residents suffering from the ongoing water situation in the city.

Mayor Weaver declared a state of emergency in Flint last month to raise awareness about the severity of the problems surrounding the water situation that continues to effect residents. The problems a result of the man-made disaster caused by the city switching to the Flint River as a water source in 2014.

Following the board's vote today, Genesee County Commission Chairperson, Jaime Curtis said, "This is a state, man-made disaster and we're going to ask the state to fix their disaster. Curtis also said, "Genesee County is the fifth largest county in Michigan and we will not be ignored."

Mayor Weaver hopes the county's show of support will convince the Governor to provide the City of Flint with financial support to help leaders address immediate infrastructure needs. Those needs include more than $45 million to replace every identified lead pipe in the city, reimbursement of the $2 million spent to switch back to the Detroit Water Sewerage Department, $6 million to help with the transfer to the Karegnondi pipeline and additional resources to support the city's Heath Initiative to assist affected adults and children in Flint who have consumed water contaminated with lead.

In an interview with media after the board's emergency declaration Mayor Weaver said, "It's a victory and a step in the right direction." The mayor plans to meet with Governor Snyder in Lansing Thursday of this week to discuss the state's response and next steps.

###

From: McShane, Hilda
Sent: Wednesday, December 23, 2015 5:05 PM
To: 'kboles@valleyaaa.org'; 'Boyer, Jenifier'; 'Jamie Gaskin'; 'Holmes, Virginia (DHHS)'; 'showard@co.genesee.mi.us'; 'Sean Kammer'; 'Andy Leavitt'; 'moses@mi.gov'; 'neeleyrep34@gmail.com'; 'joliver@cfgf.org'; 'mpurcell@co.genesee.mi.us'; 'schoenowk@michigan.gov'; 'thelenr4@michigan.gov'; Valacak, Mark; 'Jamie-Lee Venable'; Cupal, Suzanne; Henry, James; Hallwood, Dawn; Swartout, April; LaRocco,

Toni; Brickey, Tamara; 'Eisner, Jennifer (DHHS)'; 'Wells, Eden (DHHS)'; 'millerm1@michigan.gov'; 'roachb@michigan.gov'; 'Thompson, Sheryl D. (DHHS)'; Johnson, M.D., Gary; 'Sitko, Anthony M'; 'plevine@gcms.org'; 'Kirk Smith'; 'mhanna1@hurleymc.com'; 'gonzalezj6@michigan.gov'; 'morans@michigan.gov'; 'robinsonm18@michigan.gov'; 'doerrkay@gmail.com'; 'irey52@gmail.com'; 'Lcarrav1@yahoo.com'; 'Dayne Walling'; 'krisztiang@michigan.gov'; 'nhenderson@cityofflint.com'; 'edgerton51@michigan.gov'; 'tommasulok@michigan.gov'; Stickler, Lisa; 'BanerjeeA@mottchc.org'
Subject: RE: Genesee County Health Department EOC 12/23/15

American Red Cross, Genesee-Lapeer chapter in conjunction with their fire education and prevention program is working with the Genesee County Health Department to develop a community outreach program around lead concerns.
The daily water crisis update will not be distributed on December 24 or 25. The next update will be distributed on Monday, December 28.

Happy Holidays to you and yours!

From: McShane, Hilda
Sent: Tuesday, December 22, 2015 4:27 PM
To: 'kboles@valleyaaa.org'; 'Boyer, Jenifier'; 'Jamie Gaskin'; 'Holmes, Virginia (DHHS)'; 'showard@co.genesee.mi.us'; 'Sean Kammer'; 'Andy Leavitt'; 'moses@mi.gov'; 'neeleyrep34@gmail.com'; 'ioliver@cfgf.org'; 'mpurcell@co.genesee.mi.us'; 'schoenowk@michigan.gov'; 'thelenr4@michigan.gov'; Valacak, Mark; 'Jamie-Lee Venable'; Cupal, Suzanne; Henry, James; Hallwood, Dawn; Swartout, April; LaRocco, Toni; Brickey, Tamara; 'Eisner, Jennifer (DHHS)'; 'Wells, Eden (DHHS)'; 'millerm1@michigan.gov'; 'roachb@michigan.gov'; 'Thompson, Sheryl D. (DHHS)'; Johnson, M.D., Gary; 'Sitko, Anthony M'; 'plevine@gcms.org'; 'Kirk Smith'; 'mhanna1@hurleymc.com'; 'gonzalezj6@michigan.gov'; 'morans@michigan.gov'; 'robinsonm18@michigan.gov'; 'doerrkay@gmail.com'; 'irey52@gmail.com'; 'Lcarrav1@yahoo.com'; 'Dayne Walling'; 'krisztiang@michigan.gov'; 'nhenderson@cityofflint.com'; 'edgerton51@michigan.gov'; 'tommasulok@michigan.gov'; Stickler, Lisa; 'BanerjeeA@mottchc.org'
Subject: RE: Genesee County Health Department EOC 12/22/15

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- If you cannot attend the 12/29 water crisis meeting at Genesee County Health Department's library, but would like to participate, please call: 641.715.3580 and use access code: 307286.
- Michigan Department Environmental Quality (DEQ) continues to take water samples at Flint Community Schools. DEQ will take water samples from the two Flint high schools, Southwestern Classic Academy and Northwestern High School on December: 28, 29 and 30.

From: McShane, Hilda
Sent: Monday, December 21, 2015 3:59 PM
To: 'kboles@valleyaaa.org'; 'Boyer, Jenifier'; 'Jamie Gaskin'; 'Holmes, Virginia (DHHS)'; 'showard@co.genesee.mi.us'; 'Sean Kammer'; 'Andy Leavitt'; 'moses@mi.gov'; 'neeleyrep34@gmail.com'; 'ioliver@cfgf.org'; 'mpurcell@co.genesee.mi.us'; 'schoenowk@michigan.gov'; 'thelenr4@michigan.gov'; Valacak, Mark; 'Jamie-Lee Venable'; Cupal, Suzanne; Henry, James; Hallwood, Dawn; Swartout, April; LaRocco, Toni; Brickey, Tamara; 'Eisner, Jennifer (DHHS)'; 'Wells, Eden (DHHS)'; 'millerm1@michigan.gov'; 'roachb@michigan.gov'; 'Thompson, Sheryl D. (DHHS)'; Johnson, M.D., Gary; 'Sitko, Anthony M'; 'plevine@gcms.org'; 'Kirk Smith'; 'mhanna1@hurleymc.com'; 'gonzalezj6@michigan.gov'; 'morans@michigan.gov'; 'robinsonm18@michigan.gov'; 'doerrkay@gmail.com'; 'lrey52@gmail.com'; 'Lcarrav1@yahoo.com'; 'Dayne Walling'; 'krisztiang@michigan.gov'; 'nhenderson@cityofflint.com'; 'edgerton51@michigan.gov'; 'tommasulok@michigan.gov'; Stickler, Lisa; 'BanerjeeA@mottchc.org'
Subject: RE: Genesee County Health Department EOC 12/21/15

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- If you cannot attend the 12/22 water crisis meeting at Genesee County Health Department's library, but would like to participate, please call: 641.715.3580 and use access code: 307286.
- Michigan Department of Health and Human Services' Deputy Director of Field Operations, Sheryl Thompson, is working on obtaining several pallets of bottled water for drinking as well as "cans" of water that can be used for bathing, toileting, and cleaning only. The canned water is perfect for families experiencing large water bills and or possible shut offs.
- Genesee County Health Department distributed 100 PUR water filters to Hurley Children's Hospital for its first lead focused cooking class at the Flint Farmers' Market this past Saturday. The cooking classes were hosted by the MSU extension. Waiting is the plan after all testing? Using the recommendations from DEQ, which includes labor and staff overtime. Super will use recommendations. We don't funding so we are creating the plan.

From: McShane, Hilda
Sent: Thursday, December 17, 2015 11:28 PM
To: 'kboles@valleyaaa.org'; 'Boyer, Jenifier'; 'Jamie Gaskin'; 'Holmes, Virginia (DHHS)'; 'showard@co.genesee.mi.us'; 'Sean Kammer'; 'Andy

Leavitt'; 'moses@mi.gov'; 'neeleyrep34@gmail.com'; 'loliver@cfgf.org'; 'mpurcell@co.genesee.mi.us'; 'schoenowk@michigan.gov'; 'thelenr4@michigan.gov'; Valacak, Mark; 'Jamie-Lee Venable'; Cupal, Suzanne; Henry, James; Hallwood, Dawn; Swartout, April; LaRocco, Toni; Brickey, Tamara; 'Eisner, Jennifer (DHHS)'; 'Wells, Eden (DHHS)'; 'millerm1@michigan.gov'; 'roachb@michigan.gov'; 'Thompson, Sheryl D. (DHHS)'; Johnson, M.D., Gary; 'Sitko, Anthony M'; 'plevine@gcms.org'; 'Kirk Smith'; 'mhanna1@hurleymc.com'; 'gonzalezj6@michigan.gov'; 'morans@michigan.gov'; 'robinsonm18@michigan.gov'; 'doerrkay@gmail.com'; 'irey52@gmail.com'; 'Lcarrav1@yahoo.com'; 'Dayne Walling'; 'krisztiang@michigan.gov'; 'nhenderson@cityofflint.com'; 'edgerton51@michigan.gov'; 'tommasulok@michigan.gov'; Stickler, Lisa; 'BanerjeeA@mottchc.org'
Subject: RE: Genesee County Health Department EOC 12/17/15

This is an informational update and the Genesee County Health Department will provide these updates on a daily basis after 4 pm. We are asking all partners included in this email to provide any pertinent updates **DAILY** to Hilda McShane by 2:00pm. If you have nothing new to share, please inform Hilda that you have no updates at this time.

- The Food Bank of Eastern Michigan is supplying pantries, missions, soup kitchens and shelters with all the water they need for public distribution.

- If your agency would like an updated list of water distribution sites, please contact Dan at 396-0222 or dfilipovich@feedingamerica.org.

- Agencies can also direct everyone to fbem.org. Use the drop down tab that says FIND HELP. At this point your clients will be asked their zip code and then they will be directed to the nearest pantry that is an agency of the Food Bank.

From: McShane, Hilda
Sent: Wednesday, December 16, 2015 4:06 PM
To: 'kboles@valleyaaa.org'; 'Boyer, Jenifier'; 'Jamie Gaskin'; 'Holmes, Virginia (DHHS)'; 'showard@co.genesee.mi.us'; 'Sean Kammer'; 'Andy Leavitt'; 'moses@mi.gov'; 'neeleyrep34@gmail.com'; 'loliver@cfgf.org'; 'mpurcell@co.genesee.mi.us'; 'schoenowk@michigan.gov'; 'thelenr4@michigan.gov'; Valacak, Mark; 'Jamie-Lee Venable'; Cupal, Suzanne; Henry, James; Hallwood, Dawn; Swartout, April; LaRocco, Toni; Brickey, Tamara; 'Eisner, Jennifer (DHHS)'; 'Wells, Eden (DHHS)'; 'millerm1@michigan.gov'; 'roachb@michigan.gov'; 'Thompson, Sheryl D. (DHHS)'; Johnson, M.D., Gary; 'Sitko, Anthony M'; 'plevine@gcms.org'; 'Kirk Smith'; 'mhanna1@hurleymc.com'; 'gonzalezj6@michigan.gov'; 'morans@michigan.gov'; 'robinsonm18@michigan.gov'; 'doerrkay@gmail.com'; 'irey52@gmail.com'; 'Lcarrav1@yahoo.com'; 'Dayne Walling'; 'krisztiang@michigan.gov'; 'nhenderson@cityofflint.com'; 'edgerton51@michigan.gov'; 'tommasulok@michigan.gov'; Stickler, Lisa; 'BanerjeeA@mottchc.org'
Subject: RE: Genesee County Health Department EOC 12/17/15

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- Today, Michigan Department of Health and Human Services (MDHHS) received approval from Department of Environmental Quality (DEQ) to allow the use and public display of the Bath Time Poster that was developed to address individuals' concerns about using the water to bathe their children (see attached). The Genesee County Health Department encourages all agencies to display the bath time poster.

- Hurley Children's Hospital with MSU extension will offer their first lead focused cooking class at the Farmers' Market this Saturday. Lead focused nutrition recipes and resource book will be distributed at the cooking class . Press release promoting the cooking class will go out tomorrow.

- Mott Children's Health Center continues to work with City of Flint to pick up PUR filters.

From Jamie Gaskin

Over the past 48 hours some additional support has started to surface given the National and regional media coverage. These are all developing streams of possible support and generally reflect organizations and business that got connected several months ago during our initial response. These are developing but I wanted to loop in all of you as this develops and also share some basic information:

1. MSP has again surfaced another source of bulk water that is Federal surplus. This water is free as long as we pay for shipping. I have looped in Bill Kerr at the foodbank as his team is really managing the logistics and understands the local demand and the ability of the local distribution system to handle storage etc.. These shipments come at the cost of shipping. This is about ½ the cost of buying the water and shipping ranges from between $1000-$2,000 per semi.

2. PUR – They have reached out to me again (Previously donated 2,000 faucet mount systems). I have directed them to consider donation of additional replacement filters and a financial donation. The financial donation would support shipping costs of more bottled water as well as possible prevention work.

3. ZeroWater – I am again working through some ideas with their CEO. He is very interested in the schools. I am not sure how this will develop.

*As we have shared in the past the distribution system currently has supplies of filter mount systems (PUR & Britta), replacement filters (PUR & Britta), and 8 cup pitchers (ZeroWater). If we get to levels below 500 available units for any system it is my understanding that this will serve as a trigger for us to resource more.

I also want to share that I have about $15,000 left of the more than $275k donated. As I get closer to expending all the funds the UW will continue to evaluate our own internal investment and make some adjustments. Please direct any possible financial investors to support the water fund either by calling me directly or making even small donations on our website. I will also be working with Isaiah Oliver at the Community Foundation around the MI Health Endowment Funds. Both the United Way and the Community Foundation are committed to working together and trying to maintain maximum flexibility as the situation develops.

I will follow-up though the normal Health Department updates moving forward but I just felt it necessary to try to bring everyone up to speed on developing work. If you have any questions for me please let me know. I will be available all through the Holiday period via cell phone and I will only be out of town from Christmas eve through the following Saturday. Please do not hesitate to call me for any reason.

From: McShane, Hilda
Sent: Tuesday, December 15, 2015 4:24 PM
To: 'kboles@valleyaaa.org'; 'Boyer, Jenifier'; 'Jamie Gaskin'; 'Holmes, Virginia (DHHS)'; 'showard@co.genesee.mi.us'; 'Sean Kammer'; 'Andy Leavitt'; 'moses@mi.gov'; 'neeleyrep34@gmail.com'; 'ioliver@cfgf.org'; 'mpurcell@co.genesee.mi.us'; 'schoenowk@michigan.gov'; 'thelenr4@michigan.gov'; Valacak, Mark; 'Jamie-Lee Venable'; Cupal, Suzanne; Henry, James; Hallwood, Dawn; Swartout, April; LaRocco, Toni; Brickey, Tamara; 'Eisner, Jennifer (DHHS)'; 'Wells, Eden (DHHS)'; 'millerm1@michigan.gov'; 'roachb@michigan.gov'; 'Thompson, Sheryl D. (DHHS)'; Johnson, M.D., Gary; 'Sitko, Anthony M'; 'plevine@gcms.org'; 'Kirk Smith'; 'mhanna1@hurleymc.com'; 'gonzalezj6@michigan.gov'; 'morans@michigan.gov'; 'robinsonm18@michigan.gov'; 'doerrkay@gmail.com'; 'irey52@gmail.com'; 'Lcarrav1@yahoo.com'; 'Dayne Walling'; 'krisztiang@michigan.gov'; 'nhenderson@cityofflint.com'; 'edgerton51@michigan.gov'; 'tommasulok@michigan.gov'; Stickler, Lisa; 'BanerjeeA@mottchc.org'
Subject: RE: Genesee County Health Department EOC 12/15/15

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- City of Flint picked up Two Hundred (200) ZeroWater 8-Cup Filter Pitchers from Flint Community Schools 12/14/15 for distribution.

- The Genesee County Health Department has a total of 1,650 Pur water filters for distribution.

- Mott Children's Center will give City of Flint 117 water filters from the first batch of filters distributed at U of M Flint.

- Department of Health and Human Services and GCCARD attended the Health Fair on Saturday, December 12 and distributed the following at Bethel United Methodist Church's health fair.
  - 12 Filters
  - 17 Replacement Cartridges
  - 2 PUR replacements
  - 1 Pitcher

- Between December 11 and December 14, 2015, Genesee County Community Action Resource Department and Department Health Human Services distributed the following:
  - 78 filters
  - 6 pitchers
  - 53 replacement filters

- Sheryl Thompson from Michigan Department Health Human Services will order replacement filters when the inventory level reaches 500. After replacement cartridge order is placed, it takes a few days for delivery.
  - The Zero Water Pitcher replacement filters have been delivered. All sites will begin giving out a pitcher replacement filter with every Zero Water pitcher given out.

Summary October through December 14, 2015

	Received	Distributed	Remaining
Water Filters	15,000	11,232	**3,768**
Water Pitchers	720	229	**491**
Replacement Cartridges	9,000	1,258	**7,742**

From: McShane, Hilda
Sent: Monday, December 14, 2015 4:46 PM
To: 'kboles@valleyaaa.org'; 'Boyer, Jenifier'; 'Jamie Gaskin'; 'Holmes, Virginia (DHHS)'; 'showard@co.genesee.mi.us'; 'Sean Kammer'; 'Andy Leavitt'; 'moses@mi.gov'; 'neeleyrep34@gmail.com'; 'ioliver@cfgf.org'; 'mpurcell@co.genesee.mi.us'; 'schoenowk@michigan.gov'; 'thelenr4@michigan.gov'; Valacak, Mark; 'Jamie-Lee Venable'; Cupal, Suzanne; Henry, James; Hallwood, Dawn; Swartout, April; LaRocco, Toni; Brickey, Tamara; 'Eisner, Jennifer (DHHS)'; 'Wells, Eden (DHHS)'; 'millerm1@michigan.gov'; 'roachb@michigan.gov'; 'Thompson, Sheryl D. (DHHS)'; Johnson, M.D., Gary; 'Sitko, Anthony M'; 'plevine@gcms.org'; 'Kirk Smith'; 'mhanna1@hurleymc.com'; 'gonzalezj6@michigan.gov';

'morans@michigan.gov'; 'robinsonm18@michigan.gov'; 'doerrkay@gmail.com'; 'irey52@gmail.com'; 'Lcarrav1@yahoo.com'; 'Dayne Walling'; 'krisztiang@michigan.gov'; 'nhenderson@cityofflint.com'; 'edgerton51@michigan.gov'; 'tommasulok@michigan.gov'; Stickler, Lisa; 'BanerjeeA@mottchc.org'
Subject: RE: Genesee County Health Department EOC 12/14/15

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- Genesee County Health Department, Clerical Coordinator, Lisa Stickler distributed 50 PUR water filters, 4 replacement PUR filters and 5 Brita replacement filters at Grace Emmanuel church on Saturday, Dec. 12.
- Genesee County Health Department screened over 50 people for lead at Grace Emmanuel church on Saturday, December 12.
- Genesee County Health Department's WIC program distributed water filters at Grace Emmanuel church on Saturday, December 12.

From: McShane, Hilda
Sent: Friday, December 11, 2015 4:34 PM
To: 'kboles@valleyaaa.org'; 'Boyer, Jenifier'; 'Jamie Gaskin'; 'Holmes, Virginia (DHHS)'; 'showard@co.genesee.mi.us'; 'Sean Kammer'; 'Andy Leavitt'; 'moses@mi.gov'; 'neeleyrep34@gmail.com'; 'loliver@cfgf.org'; 'mpurcell@co.genesee.mi.us'; 'schoenowk@michigan.gov'; 'thelenr4@michigan.gov'; Valacak, Mark; 'Jamie-Lee Venable'; Cupal, Suzanne; Henry, James; Hallwood, Dawn; Swartout, April; LaRocco, Toni; Brickey, Tamara; 'Eisner, Jennifer (DHHS)'; 'Wells, Eden (DHHS)'; 'millerm1@michigan.gov'; 'roachb@michigan.gov'; 'Thompson, Sheryl D. (DHHS)'; Johnson, M.D., Gary; 'Sitko, Anthony M'; 'plevine@gcms.org'; 'Kirk Smith'; 'mhanna1@hurleymc.com'; 'gonzalezj6@michigan.gov'; 'morans@michigan.gov'; 'robinsonm18@michigan.gov'; 'doerrkay@gmail.com'; 'irey52@gmail.com'; 'Lcarrav1@yahoo.com'; 'Dayne Walling'; 'krisztiang@michigan.gov'; 'nhenderson@cityofflint.com'; 'edgerton51@michigan.gov'; 'tommasulok@michigan.gov'; Stickler, Lisa; 'BanerjeeA@mottchc.org'
Subject: RE: Genesee County Health Department EOC 12/11/15

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- For the month of December, and as of December 10, Michigan Department of Health and Human Services (MDHHS) has distributed the following:

214 Brita Filters
38 Zero Water Pitchers
275 Brita Replacement Cartridges

- Below is a filter distribution summary from MDHHS. Filter distribution began October 2015.

Summary

	Distributed
Water Filters	11,171
Water Pitchers	222
Replacement Cartridges	1,206

From: McShane, Hilda
Sent: Tuesday, December 8, 2015 5:15 PM
To: 'kboles@valleyaaa.org'; 'Boyer, Jenifier'; 'Jamie Gaskin'; 'Holmes, Virginia (DHHS)'; 'showard@co.genesee.mi.us'; 'Sean Kammer'; 'Andy Leavitt'; 'moses@mi.gov'; 'neeleyrep34@gmail.com'; 'loliver@cfgf.org'; 'mpurcell@co.genesee.mi.us'; 'schoenowk@michigan.gov'; 'thelenr4@michigan.gov'; Valacak, Mark; 'Jamie-Lee Venable'; Cupal, Suzanne; Henry, James; Hallwood, Dawn; Swartout, April; LaRocco, Toni; Brickey, Tamara; 'Eisner, Jennifer (DHHS)'; 'Wells, Eden (DHHS)'; 'millerm1@michigan.gov'; 'roachb@michigan.gov'; 'Thompson, Sheryl D. (DHHS)'; Johnson, M.D., Gary; 'Sitko, Anthony M'; 'plevine@gcms.org'; 'Kirk Smith'; 'mhanna1@hurleymc.com'; 'gonzalezj6@michigan.gov'; 'morans@michigan.gov'; 'robinsonm18@michigan.gov'; 'doerrkay@gmail.com'; 'irey52@gmail.com'; 'l.carrav1@yahoo.com'; 'Dayne Walling'; 'krisztiang@michigan.gov'; 'nhenderson@cityofflint.com'; 'edgerton51@michigan.gov'; 'tommasulok@michigan.gov'; Stickler, Lisa; 'BanerjeeA@mottchc.org'
Subject: RE: Genesee County Health Department EOC 12/8/15

- Genesee County Health Department is working with the United Way and American Red Cross to develop and implement a plan to bring an NCCC team to the area to assist with fire prevention and lead education.
- BJ Roach from the State of Michigan Police department facilitated the assistance of Homeland Security to move large volumes of water to the Eastern Foodbank of Michigan.
- As of 12.8.15 14,545 water filters have been distributed to Flint residents.

From: McShane, Hilda
Sent: Monday, December 7, 2015 5:04 PM
To: 'kboles@valleyaaa.org'; 'Boyer, Jenifier'; 'Jamie Gaskin'; 'Holmes, Virginia (DHHS)'; 'showard@co.genesee.mi.us'; 'Sean Kammer'; 'Andy

Leavitt'; 'moses@mi.gov'; 'neeleyrep34@gmail.com'; 'ioliver@cfgf.org'; 'mpurcell@co.genesee.mi.us'; 'schoenowk@michigan.gov'; 'thelenr4@michigan.gov'; Valacak, Mark; 'Jamie-Lee Venable'; Cupal, Suzanne; Henry, James; Hallwood, Dawn; Swartout, April; LaRocco, Toni; Brickey, Tamara; 'Eisner, Jennifer (DHHS)'; 'Wells, Eden (DHHS)'; 'millerm1@michigan.gov'; 'roachb@michigan.gov'; 'Thompson, Sheryl D. (DHHS)'; Johnson, M.D., Gary; 'Sitko, Anthony M'; 'plevine@gcms.org'; 'Kirk Smith'; 'mhanna1@hurleymc.com'; 'gonzalezj6@michigan.gov'; 'morans@michigan.gov'; 'robinsonm18@michigan.gov'; 'doerrkay@gmail.com'; 'irey52@gmail.com'; 'Lcarrav1@yahoo.com'; 'Dayne Walling'; 'krisztiang@michigan.gov'; 'nhenderson@cityofflint.com'; 'edgerton51@michigan.gov'; 'tommasulok@michigan.gov'; Stickler, Lisa; 'BanerjeeA@mottchc.org'
Subject: RE: Genesee County Health Department EOC 12/7/15

- Mott Children's Health Center distributed 117 PUR filters (that you attach to the faucet, [part of the batch that the United Way purchased and was distributed at U of M Flint).

- Mott Children's Health Center's leadership has put together a lead information packet. The intent of the packet is to distribute to patients. The packet includes information on appropriate filters and resources and how to obtain them. Genesee County Health Department will update Mott Children's Health Center as necessary with new distribution locations.

- As noted by Mott Children's Health Center, most parents of newborns continue to use bottled water to mix with formula.

- Genesee County Health Department continues to distributed water filters at its lead screening clinic in Burton.

- After a complete inventory is taken at all water filter distribution sites of remaining water filter cartridges, The State of Michigan has agreed to purchase additional PUR replacement filters.

- As of December 4, Michigan Department of Health and Human Services has distributed the following:

Water Filters	11,046
Water Pitchers	184
Replacement Cartridges	1,073

From: McShane, Hilda
Sent: Friday, December 4, 2015 5:15 PM
To: 'kboles@valleyaaa.org'; 'Boyer, Jenifier'; 'Jamie Gaskin'; 'Holmes, Virginia (DHHS)'; 'showard@co.genesee.mi.us'; 'Sean Kammer'; 'Andy Leavitt'; 'moses@mi.gov'; 'neeleyrep34@gmail.com'; 'ioliver@cfgf.org'; 'mpurcell@co.genesee.mi.us'; 'schoenowk@michigan.gov'; 'thelenr4@michigan.gov'; Valacak, Mark; 'Jamie-Lee Venable'; Cupal,

Suzanne; Henry, James; Hallwood, Dawn; Swartout, April; LaRocco, Toni; Brickey, Tamara; 'Eisner, Jennifer (DHHS)'; 'Wells, Eden (DHHS)'; 'millerm1@michigan.gov'; 'roachb@michigan.gov'; 'Thompson, Sheryl D. (DHHS)'; Johnson, M.D., Gary; 'Sitko, Anthony M'; 'plevine@gcms.org'; 'Kirk Smith'; 'mhanna1@hurleymc.com'; 'gonzalezj6@michigan.gov'; 'morans@michigan.gov'; 'robinsonm18@michigan.gov'; 'doerrkay@gmail.com'; 'irey52@gmail.com'; 'Lcarrav1@yahoo.com'; 'Dayne Walling'; 'krisztiang@michigan.gov'; 'nhenderson@cityofflint.com'; 'edgerton51@michigan.gov'; 'tommasulok@michigan.gov'; Stickler, Lisa; 'BanerjeeA@mottchc.org'
Subject: RE: Genesee County Health Department EOC 12/4/15

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- Genesee County Health Department distributed a press release supporting Professor Marc Edwards' announcement to Flint residents to remind them that the water is still unsafe to drink without a faucet filter. Also, attached to the press release was a poster that list water filter distribution locations.

From: McShane, Hilda
Sent: Thursday, December 3, 2015 5:57 PM
To: 'kboles@valleyaaa.org'; 'Boyer, Jenifier'; 'Jamie Gaskin'; 'Holmes, Virginia (DHHS)'; 'showard@co.genesee.mi.us'; 'Sean Kammer'; 'Andy Leavitt'; 'moses@mi.gov'; 'neeleyrep34@gmail.com'; 'joliver@cfgf.org'; 'mpurcell@co.genesee.mi.us'; 'schoenowk@michigan.gov'; 'thelenr4@michigan.gov'; Valacak, Mark; 'Jamie-Lee Venable'; Cupal, Suzanne; Henry, James; Hallwood, Dawn; Swartout, April; LaRocco, Toni; Brickey, Tamara; 'Eisner, Jennifer (DHHS)'; 'Wells, Eden (DHHS)'; 'millerm1@michigan.gov'; 'roachb@michigan.gov'; 'Thompson, Sheryl D. (DHHS)'; Johnson, M.D., Gary; 'Sitko, Anthony M'; 'plevine@gcms.org'; 'Kirk Smith'; 'mhanna1@hurleymc.com'; 'gonzalezj6@michigan.gov'; 'morans@michigan.gov'; 'robinsonm18@michigan.gov'; 'doerrkay@gmail.com'; 'irey52@gmail.com'; 'Lcarrav1@yahoo.com'; 'Dayne Walling'; 'krisztiang@michigan.gov'; 'nhenderson@cityofflint.com'; 'edgerton51@michigan.gov'; 'tommasulok@michigan.gov'; Stickler, Lisa; 'BanerjeeA@mottchc.org'
Subject: RE: Genesee County Health Department EOC 12/3/15

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- Michigan Department of Health and Human Services and Genesee County Community Action Resource Department have distributed the following in November: water filters 778, Zero

Water Pitchers 63, and replacement filters 924. Total filter distribution as of October 1 is 10,951.

- The MDEQ and the City are coordinating the distribution and analysis of containers (bottles) for water testing. Bottles are available at City Hall and the water plant. Genesee County Health Department does not have bottles for distribution. Customers' name, phone, and address are required to be documented on a form when the water sample is submitted for analysis, not when the bottle is picked up. Analysis is conducted in Lansing at the MDEQ lab.

From: McShane, Hilda
Sent: Wednesday, December 2, 2015 4:24 PM
To: 'kboles@valleyaaa.org'; 'Boyer, Jenifier'; 'Jamie Gaskin'; 'Holmes, Virginia (DHHS)'; 'showard@co.genesee.mi.us'; 'Sean Kammer'; 'Andy Leavitt'; 'moses@mi.gov'; 'neeleyrep34@gmail.com'; 'joliver@cfgf.org'; 'mpurcell@co.genesee.mi.us'; 'schoenowk@michigan.gov'; 'thelenr4@michigan.gov'; Valacak, Mark; 'Jamie-Lee Venable'; Cupal, Suzanne; Henry, James; Hallwood, Dawn; Swartout, April; LaRocco, Toni; Brickey, Tamara; 'Eisner, Jennifer (DHHS)'; 'Wells, Eden (DHHS)'; 'millerm1@michigan.gov'; 'roachb@michigan.gov'; 'Thompson, Sheryl D. (DHHS)'; Johnson, M.D., Gary; 'Sitko, Anthony M'; 'plevine@gcms.org'; 'Kirk Smith'; 'mhanna1@hurleymc.com'; 'gonzalezj6@michigan.gov'; 'morans@michigan.gov'; 'robinsonm18@michigan.gov'; 'doerrkay@gmail.com'; 'irey52@gmail.com'; 'Lcarrav1@yahoo.com'; 'Dayne Walling'; 'krisztiang@michigan.gov'; 'nhenderson@cityofflint.com'; 'edgerton51@michigan.gov'; 'tommasulok@michigan.gov'; Stickler, Lisa; 'BanerjeeA@mottchc.org'
Subject: RE: Genesee County Health Department EOC 12/2/15

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- Genesee County Health Department (GCHD) will distribute an additional 100 water filters to the City of Flint for distribution at City of Hall.
- Besides all the water filter distribution occurring at the blood lead screening clinics and offsite exhibits by Genesee County Health Department's staff, the Health Department continues to distribute water filters at its Burton WIC clinic and continues to educate parents on lead in water issues. Distribution at the WIC clinic has been swift and additional inventory, another 100 water filters, will be added to the WIC distribution inventory.
- Genesee County Health Department will distribute a press release that supports Professor Marc Edwards, of Virginia

Tech University's announcement that Flint residents do indeed need to continue to use water filters.

- After a through inventory of water filters, Michigan Department of Health and Human Services (MDHHS) will purchase more Pur replacement filters. As suggested by MDHHS staff, GCHD will inventory its supply of replacement filters and give inventory outcome to MDHHS.
- Genesee County Health Department will host blood lead screening clinics at Grace Emmanuel and Bethel United Methodist churches.

From: McShane, Hilda
Sent: Tuesday, December 1, 2015 5:06 PM
To: 'kboles@valleyaaa.org'; 'Boyer, Jenifier'; 'Jamie Gaskin'; 'Holmes, Virginia (DHHS)'; 'showard@co.genesee.mi.us'; 'Sean Kammer'; 'Andy Leavitt'; 'moses@mi.gov'; 'neeleyrep34@gmail.com'; 'joliver@cfgf.org'; 'mpurcell@co.genesee.mi.us'; 'schoenowk@michigan.gov'; 'thelenr4@michigan.gov'; Valacak, Mark; 'Jamie-Lee Venable'; Cupal, Suzanne; Henry, James; Hallwood, Dawn; Swartout, April; LaRocco, Toni; Brickey, Tamara; 'Eisner, Jennifer (DHHS)'; 'Wells, Eden (DHHS)'; 'millerm1@michigan.gov'; 'roachb@michigan.gov'; 'Thompson, Sheryl D. (DHHS)'; Johnson, M.D., Gary; 'Sitko, Anthony M'; 'plevine@gcms.org'; 'Kirk Smith'; 'mhanna1@hurleymc.com'; 'gonzalezj6@michigan.gov'; 'morans@michigan.gov'; 'robinsonm18@michigan.gov'; 'doerrkay@gmail.com'; 'irey52@gmail.com'; 'Lcarrav1@yahoo.com'; 'Dayne Walling'; 'krisztiang@michigan.gov'; 'nhenderson@cityofflint.com'; 'edgerton51@michigan.gov'; 'tommasulok@michigan.gov'; Stickler, Lisa; 'BanerjeeA@mottchc.org'
Subject: RE: Genesee County Health Department EOC 12/1/15

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City of Flint water filter and filter distribution has increased at City Hall. The Genesee County Health Department will give City of Flint both water filters and filters to keep up with the increased distribution traffic.

Genesee County Health Department's Nursing Director, Toni LaRocco, continues to develop partnerships with area churches to host blood lead screening clinics.

Genesee County Health Department is working with City of Flint Schools; Eisenhower and Freeman to develop blood lead screening clinics.

From: McShane, Hilda
Sent: Monday, November 30, 2015 4:47 PM
To: 'kboles@valleyaaa.org'; 'Boyer, Jenifier'; 'Jamie Gaskin'; 'Holmes, Virginia (DHHS)'; 'showard@co.genesee.mi.us'; 'Sean Kammer'; 'Andy Leavitt'; 'moses@mi.gov'; 'neeleyrep34@gmail.com'; 'ioliver@cfgf.org'; 'mpurcell@co.genesee.mi.us'; 'schoenowk@michigan.gov'; 'thelenr4@michigan.gov'; Valacak, Mark; 'Jamie-Lee Venable'; Cupal, Suzanne; Henry, James; Hallwood, Dawn; Swartout, April; LaRocco, Toni; Brickey, Tamara; 'Eisner, Jennifer (DHHS)'; 'Wells, Eden (DHHS)'; 'millerm1@michigan.gov'; 'roachb@michigan.gov'; 'Thompson, Sheryl D. (DHHS)'; Johnson, M.D., Gary; 'Sitko, Anthony M'; 'plevine@gcms.org'; 'Kirk Smith'; 'mhanna1@hurleymc.com'; 'gonzalezj6@michigan.gov'; 'morans@michigan.gov'; 'robinsonm18@michigan.gov'; 'doerrkay@gmail.com'; 'lrey52@gmail.com'; 'Lcarrav1@yahoo.com'; 'Dayne Walling'; 'krisztiang@michigan.gov'; 'nhenderson@cityofflint.com'; 'edgerton51@michigan.gov'; 'tommasulok@michigan.gov'; Stickler, Lisa; 'BanerjeeA@mottchc.org'
Subject: RE: Genesee County Health Department EOC 11/30/15

This is an informational update and the Genesee County Health Department will provide these updates on a daily basis after 4 pm. We are asking all partners included in this email to provide any pertinent updates **DAILY** to Hilda McShane by 2:00pm. If you have nothing new to share, please inform Hilda that you have no updates at this time.

- Genesee County Health Department's Nursing Director, Toni LaRocco is working with City of Flint Schools to develop additional lead clinics.
- The City of Flint (Sean Kammer) picked up 100 ZeroWater 8-Cup filter pitchers, on Wednesday, November 25, 2015, from Flint Community Schools for distribution.

From: McShane, Hilda
Sent: Friday, November 20, 2015 5:07 PM
To: 'kboles@valleyaaa.org'; 'Boyer, Jenifier'; 'Jamie Gaskin'; 'Holmes, Virginia (DHHS)'; 'showard@co.genesee.mi.us'; 'Sean Kammer'; 'Andy Leavitt'; 'moses@mi.gov'; 'neeleyrep34@gmail.com'; 'ioliver@cfgf.org'; 'mpurcell@co.genesee.mi.us'; 'schoenowk@michigan.gov'; 'thelenr4@michigan.gov'; Valacak, Mark; 'Jamie-Lee Venable'; Cupal, Suzanne; Henry, James; Hallwood, Dawn; Swartout, April; LaRocco, Toni; Brickey, Tamara; 'Eisner, Jennifer (DHHS)'; 'Wells, Eden (DHHS)'; 'millerm1@michigan.gov'; 'roachb@michigan.gov'; 'Thompson, Sheryl D. (DHHS)'; Johnson, M.D., Gary; 'Sitko, Anthony M'; 'plevine@gcms.org'; 'Kirk Smith'; 'mhanna1@hurleymc.com'; 'gonzalezj6@michigan.gov'; 'morans@michigan.gov'; 'robinsonm18@michigan.gov'; 'doerrkay@gmail.com'; 'lrey52@gmail.com'; 'Lcarrav1@yahoo.com'; 'Dayne Walling'; 'krisztiang@michigan.gov'; 'nhenderson@cityofflint.com'; 'edgerton51@michigan.gov'; 'tommasulok@michigan.gov'; Stickler, Lisa; 'BanerjeeA@mottchc.org'
Subject: RE: Genesee County Health Department EOC 11/20/15

- Parent packets developed by the State and local organizations are almost exhausted. Genesee County Health Department is working with the State on the next version of this parent packet.
- GCHD met with Michigan Department Health and Human Services today to review and revise current lead education material..
- Mark has developed a laudatory resolution to thank the University of Michigan for their assistance with the water filter distribution on Saturday, October 3, 2015. The resolution will be presented to the Genesee County Board of Commissioners.
- Genesee County Health Department's Health Officer, Mark Valacak will meet with United Way's CEO, Jamie Gaskin to discuss grant support for community lead education.
- Water filters distributed as of 11/20/15: 14,473.
- GCHD will share nutrition and lead education with organizations currently doing nutrition education in the community. GCHD will also share locations where individuals can access water filters.

From: McShane, Hilda
Sent: Wednesday, November 18, 2015 4:44 PM
To: kboles@valleyaaa.org; Boyer, Jenifier; Jamie Gaskin; Holmes, Virginia (DHHS); showard@co.genesee.mi.us; Sean Kammer; Andy Leavitt; moses@mi.gov; neeleyrep34@gmail.com; ioliver@cfgf.org; mpurcell@co.genesee.mi.us; schoenowk@michigan.gov; thelenr4@michigan.gov; Valacak, Mark; Jamie-Lee Venable; Cupal, Suzanne; Henry, James; Hallwood, Dawn; Swartout, April; LaRocco, Toni; Brickey, Tamara; Eisner, Jennifer (DHHS); Wells, Eden (DHHS); millerm1@michigan.gov; roachb@michigan.gov; Thompson, Sheryl D. (DHHS); Johnson, M.D., Gary; Sitko, Anthony M; plevine@gcms.org; Kirk Smith; mhanna1@hurleymc.com; gonzalezj6@michigan.gov; morans@michigan.gov; robinsonm18@michigan.gov; doerrkay@gmail.com; lrey52@gmail.com; Lcarrav1@yahoo.com; Dayne Walling; krisztiang@michigan.gov; nhenderson@cityofflint.com; edgerton51@michigan.gov; tommasulok@michigan.gov; Stickler, Lisa; 'BanerjeeA@mottchc.org'
Subject: RE: Genesee County Health Department EOC 11/18/15

This is an informational update and the Genesee County Health Department will provide these updates on a daily basis after 4 pm. We are asking all partners included in this email to provide any pertinent updates **DAILY** to Hilda McShane by 2:00pm. If you have nothing new to share, please inform Hilda that you have no updates at this time.

- Genesee County Health Department, Public Health Nurse, Janet Wenstrom will distribute the current parent packet that contains lead information to Flint area parochial schools.
- Attached is a recent report on water filter distribution and location of distribution.

From: McShane, Hilda
Sent: Tuesday, November 17, 2015 5:12 PM
To: Howard Croft; kboles@valleyaaa.org; Boyer, Jenifier; Jamie Gaskin; Holmes, Virginia (DHHS); showard@co.genesee.mi.us; Sean Kammer; Andy Leavitt; moses@mi.gov; neeleyrep34@gmail.com; joliver@cfgf.org; mpurcell@co.genesee.mi.us; schoenowk@michigan.gov; thelenr4@michigan.gov; Valacak, Mark; Jamie-Lee Venable; Cupal, Suzanne; Henry, James; Hallwood, Dawn; Swartout, April; LaRocco, Toni; Brickey, Tamara; Eisner, Jennifer (DHHS); Wells, Eden (DHHS); millerm1@michigan.gov; roachb@michigan.gov; Thompson, Sheryl D. (DHHS); Johnson, M.D., Gary; Sitko, Anthony M; plevine@gcms.org; Kirk Smith; mhanna1@hurleymc.com; gonzalezj6@michigan.gov; morans@michigan.gov; robinsonm18@michigan.gov; doerrkay@gmail.com; lrey52@gmail.com; Lcarrav1@yahoo.com; Dayne Walling; krisztiang@michigan.gov; nhenderson@cityofflint.com; edgerton51@michigan.gov; tommasulok@michigan.gov; Stickler, Lisa; Banerjee@mottchc.org
Subject: Re: Genesee County Health Department EOC 11/17/15

Genesee County Health Department is working with the CDC to develop phosphate educational materials.

United Way (UW) CEO, Jamie Gaskin and Genesee County Health Department Health Officer, Mark Valacak have been discussing the strategic use of Americore volunteers during this water crisis. Suggested volunteer work includes: distribution of filters, lead education, and assist at health fairs and at church exhibits. Volunteers may be available in February of 2016.

UW Jamie Gaskin reported that UW will giveaway 110 Thanksgiving baskets. The baskets will contain a water filter system.

For those who need 8oz - Zero cup water filters, please contact Tony Sitko at Flint Community Schools. His email address is:tsitko@flintschools.org.

Genesee County Health Department will give City of Flint 50 PUR water filters for distribution at City Hall.

Water filter distribution is well over 13,596.

BJ Roach from the State Police had nothing to report at this time.

Sent from Surface

From: Hilda McShane
Sent: Monday, November 16, 2015 4:34 PM
To: Howard Croft, kboles@valleyaaa.org, Boyer, Jenifier, Jamie Gaskin, Holmes, Virginia (DHHS), showard@co.genesee.mi.us, Sean Kammer, Andy Leavitt, moses@mi.gov, neeleyrep34@gmail.com, ioliver@cfgf.org, mpurcell@co.genesee.mi.us, schoenowk@michigan.gov, thelenr4@michigan.gov, Valacak, Mark, Jamie-Lee Venable, Cupal, Suzanne, Henry, James, Hallwood, Dawn, Swartout, April, LaRocco, Toni, Tamara Brickey, Eisner, Jennifer (DHHS), Wells, Eden (DHHS), millerm1@michigan.gov, roachb@michigan.gov, Thompson, Sheryl D. (DHHS), Johnson, M.D., Gary, Sitko, Anthony M, plevine@gcms.org, Kirk Smith, mhanna1@hurleymc.com, gonzalezj6@michigan.gov, morans@michigan.gov, robinsonm18@michigan.gov, doerrkay@gmail.com, lrey52@gmail.com, Lcarrav1@yahoo.com, Dayne Walling, krisztiang@michigan.gov, nhenderson@cityofflint.com, edgerton51@michigan.gov, tommasulok@michigan.gov, Wells, Eden (DHHS), lstickler@gchd.us

This is an informational update and the Genesee County Health Department will provide these updates on a daily basis after 4 pm. We are asking all partners included in this email to provide any pertinent updates **DAILY** to Hilda McShane by 2:00pm. If you have nothing new to share, please inform Hilda that you have no updates at this time.

- Toni LaRocco, Nurse Supervisor at Genesee County Health Department's Burton clinic had no lead clinic updates.
- There has been a noticeable amount of walkup lead testing at Genesee County Health Department's Burton Clinic.
- As of November 16, 2015 a total of 13,569 water filters have been distributed.
- Parent packets that contain lead education and other lead related education information will be distributed at the BE WISE IMMUNIZE event at the Flint Farmer's Market on Saturday, November 21 event from 9 am to 1 pm.

From: McShane, Hilda
Sent: Friday, November 13, 2015 4:46 PM
To: 'hcroft@cityofflint.com'; 'kboles@valleyaaa.org'; 'jboyer@co.genesee.mi.us'; 'Jamie Gaskin'; 'Holmes, Virginia (DHHS';

'showard@co.genesee.mi.us'; 'skammer@cityofflint.com'; 'Andy Leavitt'; 'moses@mi.gov'; 'neeleyrep34@gmail.com'; 'ioliver@cfgf.org'; 'mpurcell@co.genesee.mi.us'; 'schoenowk@michigan.gov'; 'thelenr4@michigan.gov'; Valacak, Mark; 'Jamie-Lee Venable'; Cupal, Suzanne; Henry, James; Hallwood, Dawn; Swartout, April; LaRocco, Toni; Brickey, Tamara; 'Eisner1@michigan.gov'; 'WellsE3@michigan.gov'; 'millerm1@michigan.gov'; 'roachb@michigan.gov'; 'ThompsonS2@michigan.gov'; Johnson, M.D., Gary; 'tsitko@flintschools.org'; 'plevine@gcms.org'; 'ksmith@flint.org'; 'mhanna1@hurleymc.com'; 'gonzalezj6@michigan.gov'; 'morans@michigan.gov'; 'robinsonm18@michigan.gov'; 'doerrkay@gmail.com'; 'irey52@gmail.com'; 'Lcarrav1@yahoo.com'; 'Dayne Walling'; 'krisztiang@michigan.gov'; 'nhenderson@cityofflint.com'; 'edgerton51@michigan.gov'; 'tommasulok@michigan.gov'; 'WellsE3@michigan.gov'; 'istickler@gchd.us'

Subject: RE: Genesee County Health Department EOC 11/13/15

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- Genesee County Health Department will send staff to Flint Community Schools' city wide parent meeting at Brownell STEM Academy. Genesee County Health Department representatives will present lead education. The presentation will take place on Wednesday, November 18 at 9:30 am.

- Brownell STEM Academy lead screening was hosted by Flint Community Schools with assistance from McLaren Health Plan and Genesee County Health Department. Twenty seven kids were tested. Test results will be mailed to parents in two weeks.

- During the 3:00 to 6:00 pm clinic, a combination of Pur and Brita water filters and replacement filters were distributed. A total of 60 filters and replacement filters were distributed.

- Genesee County Health Department, Genesee Health Plan, Crim Fitness Foundation, University of Michigan Flint Nursing Program, The MDHHS environmental consultants' ETC, and 211 exhibited at

Brownell's lead screening clinic where they educated participants on lead preventative and nutrition.

- Home Depot was at Brownell's clinic answering water filter installation questions.

From: McShane, Hilda
Sent: Monday, November 9, 2015 3:45 PM
To: 'hcroft@cityofflint.com'; 'kboles@valleyaaa.org'; 'jboyer@co.genesee.mi.us'; 'Jamie Gaskin'; 'Holmes, Virginia (DHHS'; 'showard@co.genesee.mi.us'; 'skammer@cityofflint.com'; 'Andy Leavitt'; 'moses@mi.gov'; 'neeleyrep34@gmail.com'; 'ioliver@cfgf.org'; 'mpurcell@co.genesee.mi.us'; 'schoenowk@michigan.gov'; 'thelenr4@michigan.gov'; Valacak, Mark; 'Jamie-Lee Venable'; Cupal, Suzanne; Henry, James; Hallwood, Dawn; Swartout, April; LaRocco, Toni; Brickey, Tamara; 'EisnerJ@michigan.gov'; 'WellsE3@michigan.gov'; 'millerm1@michigan.gov'; 'roachb@michigan.gov'; 'ThompsonS2@michigan.gov'; Johnson, M.D., Gary; 'tsitko@flintschools.org'; 'plevine@gcms.org'; 'ksmith@flint.org'; 'mhanna1@hurleymc.com'; 'gonzalezj6@michigan.gov'; 'morans@michigan.gov'; 'robinsonm18@michigan.gov'; 'doerrkay@gmail.com'; 'irey52@gmail.com'; 'l.carrav1@yahoo.com'; 'Dayne Walling'; 'krisztiang@michigan.gov'; 'nhenderson@cityofflint.com'; 'edgerton51@michigan.gov'; 'tommasulok@michigan.gov'; 'WellsE3@michigan.gov'; 'lstickler@gchd.us'
Subject: RE: Genesee County Health Department EOC 11/9/15

This is an informational update and the Genesee County Health Department will provide these updates on a daily basis after 4 pm. We are asking all partners included in this email to provide any pertinent updates **DAILY** to Hilda McShane by 2:00pm. If you have nothing new to share, please inform Hilda that you have no updates at this time.

- GCCARD distributed a combination of water filters and replacement filters totaling 154.
- DHHS distributed a combination of water filters and replacement filters totaling 59.
- To date approximately 14,000 water filters have been distributed.
- Tamara Brickey (Genesee County Health Department) is working with Grand Blanc Schools for the purpose of distributing water filter replacement cartridges.
- Tamara continues to contact various organizations to get them replacement filters so that they in turn can distribute replacement filters to their clients.

From: McShane, Hilda
Sent: Friday, November 6, 2015 4:46 PM
To: Brickey, Tamara; McShane, Hilda; 'hcroft@cityofflint.com'; 'kboles@valleyaaa.org'; 'jboyer@co.genesee.mi.us'; 'Jamie Gaskin'; 'Holmes, Virginia (DHHS'; 'showard@co.genesee.mi.us'; 'skammer@cityofflint.com'; 'Andy Leavitt'; 'moses@mi.gov'; 'neeleyrep34@gmail.com'; 'joliver@cfgf.org'; 'mpurcell@co.genesee.mi.us'; 'schoenowk@michigan.gov'; 'thelenr4@michigan.gov'; Valacak, Mark; 'Jamie-Lee Venable'; Cupal, Suzanne; Henry, James; Hallwood, Dawn; Swartout, April; LaRocco, Toni; 'EisnerJ@michigan.gov'; 'WellsE3@michigan.gov'; 'millerm1@michigan.gov'; 'roachb@michigan.gov'; 'ThompsonS2@michigan.gov'; Johnson, M.D., Gary; 'tsitko@flintschools.org'; 'plevine@gcms.org'; 'ksmith@flint.org'; 'mhanna1@hurleymc.com'; 'gonzalezj6@michigan.gov'; 'morans@michigan.gov'; 'robinsonm18@michigan.gov'; 'doerrkay@gmail.com'; 'irey52@gmail.com'; 'Lcarrav1@yahoo.com'; 'Dayne Walling'; 'nhenderson@cityofflint.com'; 'edgerton51@michigan.gov'; 'tommasulok@michigan.gov'; 'WellsE3@michigan.gov'
Subject: Genesee County Health Department EOC 11/5/15

This is an informational update and the Genesee County Health Department will provide these updates on a daily basis after 4 pm. We are asking all partners included in this email to provide any pertinent updates **DAILY** to Hilda McShane by 2:00pm. If you have nothing new to share, please inform Hilda that you have no updates at this time.

- Genesee County Health Department's (GCHD) Women, Infant and Children (WIC) program has distributed 300 water filters.
- Sixty water filters and replacement cartridges were distributed at yesterday's lead screening clinic.
- There was an additional three lead clinic participants at Genesee County Health Department's lead screening clinic hosted by Genesee County Health Department and McLaren Health Plan on Thursday, November 5 in Burton, Michigan. The final total for this lead screening clinic is 42 participants.
- There was a correction made to abc12's segment covering the lead screening program that was corrected on GCHD's social media platforms. Abc12 will make the correction at their end as well.

From: Wells, Eden (DHHS)
Sent: Tuesday, January 05, 2016 10:58 AM
To: Valacak, Mark
Subject: RE: Enhanced Lead testing

Great- thanks!

From: Valacak, Mark [mailto:MVALACAK@gchd.us]
Sent: Tuesday, January 05, 2016 10:55 AM
To: Wells, Eden (DHHS) <WellsE3@michigan.gov>
Subject: Fwd: Enhanced Lead testing

We are expanding the distribution of the physician info through some additional channels.

Sent from my iPhone

Begin forwarded message:

> **From:** "July, Jori" <jjuly@gchd.us>
> **Date:** January 5, 2016, 10:32:41 AM EST
> **To:** "Valacak, Mark" <MVALACAK@gchd.us>, "Swartout, April" <ASWARTOUT@gchd.us>
> **Cc:** "Johnson, M.D., Gary" <GJOHNSON@gchd.us>, "LaRocco, Toni" <tlarocco@gchd.us>, "Brickey, Tamara" <tbrickey@gchd.us>, "Cupal, Suzanne" <scupal@gchd.us>
> **Subject: RE: Enhanced Lead testing**
>
> I can send whatever you need to my VFC Providers and Non-VFC Provider email lists. I also have an OB/Gyn email list.
> My program secretary should be able to change the news screen on MCIR……
>
> Let me know what I need to do.
>
> Jori
>
> Jori July MSN RN ANP-BC
> PHN Supervisor
> Genesee County Health Department
> jjuly@gchd.us
> (810) 237-4543

From: Valacak, Mark
Sent: Tuesday, January 5, 2016 10:26 AM
To: Swartout, April
Cc: Johnson, M.D., Gary; LaRocco, Toni; Brickey, Tamara; Cupal, Suzanne; July, Jori
Subject: Re: Enhanced Lead testing

Would it make more sense to send it to Jori's email list and could Kathie H do something on the MCIR homepage?

Sent from my iPhone

On Jan 5, 2016, at 10:18 AM, "Swartout, April" <ASWARTOUT@gchd.us> wrote:

There are actually 5 people at the Health Department with permissions to send messages on the MIHAN. I would be happy to do it, provided I was given the exact message/attachments to send.

Also – in Genesee County, the MIHAN is not widely used by the medical community. I did a quick search of Genesee County located users with medical/healthcare, etc. as one of their roles. Of the 45 users that came up, @21 of them are staff at long term care/skilled nursing facilities. Of the remaining, most of them are hospital staff (administration and/or ER staff) or Hamilton staff. There is only one pediatrician that I know of from Genesee County on the MIHAN.

April L. Swartout, M.P.A.
Emergency Preparedness Coordinator
Public Health Program Coordinator
Genesee County Health Department
630 S. Saginaw St., Suite 4
Flint, MI 48502
(810) 424-4441
Fax: (810) 257-3147

From: Johnson, M.D., Gary
Sent: Tuesday, January 05, 2016 9:46 AM
To: LaRocco, Toni; Johnson, M.D., Gary
Cc: Brickey, Tamara; Valacak, Mark; Swartout, April
Subject: RE: Enhanced Lead testing

You each received, along with Eden Wells, what I received from the Genesee County Medical Society. I had sent this earlier there to Pete Levine, so I am thinking he sent this out to all members.

April, you would probably have to put this on the HAN alert.

It is harder to make contact with the Genesee County Osteopathic Society, but I will keep trying.

Toni, what other "providers" were you thinking about?

From: LaRocco, Toni
Sent: Tuesday, January 05, 2016 8:52 AM
To: Johnson, M.D., Gary
Cc: Brickey, Tamara; Valacak, Mark; Swartout, April
Subject: Enhanced Lead testing
Importance: High

Hi Dr. Johnson,

Eden Wells just contacted me wanting to know if the information for providers to do enhanced testing went out blast fax to the Flint providers? Also, can we do that again blast fax, MiHAN and through the Medical Society.

Toni

Toni L LaRocco MS, RN
Director of Nursing Services
Genesee County Health Department
810.237.4544
tlarocco@gchd.us

"Gratitude unlocks the fullness of life. It turns what we have into enough, and more, It turns denial into acceptance, chaos to order, confusion to clarity. It can turn a meal into a feast, a house into a home, a stranger into a friend. Gratitude makes sense of our past, brings peace for today, and creates a vision for tomorrow." - Melody Beattie

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For a copy of the Health Department's Notice of Information Practices, contact the Health Department or visit the Health Department's website at http://www.gchd.us/

From: Wells, Eden (DHHS)
Sent: Tuesday, January 05, 2016 8:26 PM
To: Clifford Wells
Subject: Fwd: OAG report
Attachments: image001.gif; ATT00001.htm; OAG Report re DEQ actions.pdf; ATT00002.htm

Sent from my iPhone

Begin forwarded message:

> **From:** "Dykema, Linda D. (DHHS)" <DykemaL@michigan.gov>
> **Date:** January 5, 2016 at 3:22:00 PM EST
> **To:** "Priem, Wesley F. (DHHS)" <priemw@michigan.gov>, "Groetsch, Kory J. (DHHS)" <GroetschK@michigan.gov>, "Stanbury, Martha (DHHS)" <stanburym@michigan.gov>, "Miller, Corinne (DHHS)" <MillerC39@michigan.gov>, "Moran, Susan (DHHS)" <MoranS@michigan.gov>, "Wells, Eden (DHHS)" <WellsE3@michigan.gov>
> **Cc:** "Gray, Jennifer (DHHS)" <GrayJ@michigan.gov>, "Wisinski, Courtney (DHHS)" <wisinskic@michigan.gov>, "Bruneau, Michelle (DHHS)" <BruneauM@michigan.gov>
> **Subject: OAG report**

FYI – in case you haven't seen this.

Linda D. Dykema, Ph.D.

Environmental Public Health Director

Division of Environmental Health

Michigan Department of Health & Human Services

517.335.8566

dykemal@michigan.gov

OAG
Office of the Auditor General
Doug A. Ringler, CPA, CIA
Auditor General
201 N. Washington Square, Sixth Floor • Lansing, Michigan 48913 • Phone: (517) 334-8050 • www.audgen.michigan.gov

December 23, 2015

The Honorable Jim Ananich
Senate Minority Leader
State Capitol, Room S-105
Lansing, Michigan

Dear Senator Ananich:

Enclosed are answers to the questions you posed in your October 20, 2015 letter to our office regarding the audit we are conducting of the Office of Drinking Water and Municipal Assistance (ODWMA), Department of Environmental Quality (DEQ), specific to lead contamination in the City of Flint's drinking water. Also enclosed are additional questions we developed that are relevant to these issues, along with five exhibits:

- A map showing Flint water samples by zip code.
- A map showing lead counts of 5 parts per billion or higher.
- Two charts showing the number of samples by time period and zip code.
- A time line of the Flint water review.

We appreciate the opportunity to assist you in answering questions regarding this topic. If you have further questions or a request for other services, please do not hesitate to contact our office.

Sincerely,

Doug Ringler

Doug Ringler
Auditor General

Enclosures

Q1: How does ODWMA ensure the data it receives is accurate?

A: With regard to the United States Environmental Protection Agency (EPA) Lead and Copper Rule (LCR) monitoring requirements, DEQ relies on the following key controls to ensure the accuracy of test results:

- State-owned laboratories test water samples.
- State-owned laboratories send test results directly to DEQ.
- The City of Flint Water Treatment Plant (Flint WTP) certifies whether sample sites are classified as tier 1*.

The current Flint WTP LCR sampling process includes:

1. DEQ informs the Flint WTP of the required water lead and copper sample size.
2. The Flint WTP determines the pool of tier 1 sites for sampling.
3. The Flint WTP selects the sample.
4. The Flint WTP sends out sample kits and instructions to residents for collecting water samples.
5. Residents leave samples and signed sampling forms outside their front doors.
6. The Flint WTP employee picks up samples and forms from residents.
7. The Flint WTP employee reviews sample forms for completeness.
8. The Flint WTP employee sends samples to the State-owned laboratories.
9. State-owned laboratories test samples and provide results directly to DEQ.
10. DEQ receives water lead and copper sample results, which include the following information: date collected, date received, address where collected, type of residence (e.g., single family or apartment), and sample point (e.g., kitchen sink or bathroom sink).
11. DEQ tracks, and follows up if necessary, the number of samples collected by the Flint WTP to help ensure that the required minimum number of samples are collected by the monitoring period deadline.

* Single-family or multiple-family residence with lead service line, lead solder copper piping constructed after 1982, or lead plumbing.

12. The Flint WTP submits lead and copper report to DEQ that certifies whether sample sites meet tier 1 criteria.

13. DEQ prepares the LCR 90th percentile calculation report.

During our review, we noted two potential improvements for the Flint WTP sampling process (see Question 5 of the additional questions answered by the OAG regarding tier 1 sample validity):

- DEQ could verify that the sampling pool was limited to only tier 1 sample sites to ensure that the Flint WTP is in compliance with the LCR (Title 40, Part 141, section 86(a)(3) of the *Code of Federal Regulations* [*CFR*]).

- DEQ could independently verify the validity of sample site certifications.

Q2: What accountability measures are in place for ODWMA staff who fail to follow data verification protocols?

A: DEQ does not provide any direct oversight over the Flint WTP and, therefore, does not have any accountability measures over the Flint WTP's LCR data verification protocols. DEQ's data verification protocol for lead and copper water sampling is limited to verification that the WTP certifies samples submitted to the State-owned laboratories for analysis (see steps 7 and 12 in the Flint WTP LCR sampling process noted in Question 1 above). We did not identify any instances in which ODWMA staff failed to verify that submitted samples were certified by the Flint WTP.

Q3: What accountability measures are in place for ODWMA staff who lie or misrepresent information to the EPA?

A: As with all classified employees, ODWMA staff must adhere to the rules and regulations established by the Michigan Civil Service Commission. If any ODWMA staff were determined to misrepresent information to the EPA, they would be subject to Civil Service Rule 2-6, Discipline, which allows an appointing authority to discipline an employee for just cause up to and including dismissal. We are not aware of any DEQ-established measures that are in addition to the Civil Service Rules.

We gained access to the e-mail accounts of key DEQ management (DEQ Director, Deputy Director, ODWMA Chief, and other key ODWMA staff) extending back to January 1, 2013. We did so to identify the key decision points and conversations that occurred leading up to and through the situation in Flint. Our review was also intended to determine whether State, Flint, or other officials attempted to conceal key test results or other information.

We noted one e-mail exchange between DEQ and the EPA that appears to be a significant contributor to the concern that DEQ misrepresented information to the EPA. The EPA requested clarification on February 26, 2015 regarding the type of optimized corrosion control **treatment** the Flint WTP was using. DEQ responded on February 27, 2015 that the city had an optimized corrosion control **program** in place, but DEQ did not provide any program details. DEQ informed us that the Flint WTP corrosion control **program** included performing

lead and copper monitoring for two consecutive six-month periods to determine whether corrosion control **treatment** would be necessary in the future. However, it appears the EPA interpreted corrosion control **program** to mean that corrosion control **treatment** was being performed.

On April 23, 2015, the EPA again inquired as to what the Flint WTP was doing for corrosion control **treatment**. DEQ responded on April 24, 2015 that the Flint WTP was not practicing corrosion control **treatment**.

Based on our review of this and other e-mails, we have no specific reason to believe that DEQ willfully misrepresented the information to the EPA.

Q4: What policies do DEQ and ODWMA have in place to escalate major infractions up the chain of command?

A: We did not note any instances of major infractions (i.e., intentional disregard of policies, laws, regulations or specific directions) committed by DEQ staff during the course of our review. DEQ does not have a formal policy or procedure in place to escalate major infractions performed by ODWMA employees; however, our review of DEQ correspondence confirmed the escalation of key issues up the chain of command related to the Flint situation. DEQ stated that its informal policy is for staff to notify the proper level of management of infractions to determine necessary action.

Application of the LCR

Q1: How did the Flint WTP become the primary water supplier for the City of Flint?

A: Upon notification of the City of Flint's plans to switch to the Karegnondi Water Authority (KWA) in April 2013, the Detroit Water and Sewerage Department (DWSD) submitted a letter to the City of Flint stating that it would terminate its agreement to provide water services on April 17, 2014.

According to DEQ management, the Flint WTP attempted to negotiate with the DWSD to maintain it as the City of Flint water supplier; however, after negotiations were unsuccessful, the City of Flint notified DEQ through a permit request of its intent to operate the Flint WTP full time using the Flint River. Although the Flint City Council voted in March 2013 in support of moving to the KWA pipeline, the vote was silent on the use of the Flint River as a temporary drinking water source.

DEQ informed us that in the 1990s, the City of Flint upgraded the Flint WTP to serve as a backup source of water for emergencies. In 2006, the Flint WTP began quarterly testing of the treated Flint River water at the Flint WTP to ensure water quality standards were met; however, the Flint WTP did not test the water's effect on the distribution system at consumer tap locations.

Q2. Did DEQ consult with the EPA prior to determining how to apply the LCR?

A: DEQ did not consult with the EPA on how to apply the LCR prior to implementing two consecutive six-month monitoring periods of the Flint WTP beginning July 1, 2014. Based on past experiences applying the LCR monitoring requirements, DEQ believed that it had appropriately applied the LCR requirements of a large water system.

Q3: When Flint switched to the Flint River water source, should corrosion control treatment have been maintained?

A: We believe that corrosion control treatment should have been maintained.

According to the LCR, a water system can achieve optimized corrosion control if it submits results of tap water monitoring for two consecutive six-month monitoring periods with acceptable lead levels. However, a water system that has optimized corrosion control, and which has treatment in place, should continue to operate and maintain optimal corrosion control treatment.

DEQ staff explained that they did not treat the switch to Flint River water as a new system, but as a new source. DEQ further stated that because the Flint River was a new water source and there was a change in chemicals needed to treat the new source, a corrosion control study was needed to determine the impact on the water distribution system. Therefore, it was DEQ's interpretation that two rounds of six-month monitoring were still needed to evaluate the water quality and determine optimal corrosion control treatment.

The Flint water system had optimal corrosion control treatment when the DWSD WTP was the water supplier. Based on our review of notes from a July 21, 2015 EPA and DEQ conference call on DEQ's implementation of the LCR regarding whether the Flint WTP should have continued to maintain corrosion control treatment, it appeared that the EPA did not agree with DEQ's interpretation of the LCR. Region 5 EPA staff explained that they would talk to the EPA headquarters about the interpretation of regulations and believes that systems that have been deemed optimized need to "maintain" corrosion control. The Region agreed to provide supporting regulatory citations for the language about maintaining corrosion control.

On November 3, 2015, the EPA issued a memorandum stating that the LCR had differing possible interpretations; however, the EPA concluded that it is important for large water systems to take the steps necessary to ensure that appropriate corrosion control treatment is maintained at all times, thus ensuring that public health is protected. Based on this clarification, it appears that corrosion control treatment should have been maintained.

Q4: Should DEQ have required the Flint WTP to start pursuing optimized corrosion control treatment after the first round of six-month sampling results were above the lead action level of 5 parts per billion (ppb)?

A: Yes. According to DEQ's application of the LCR, within six months after the end of the monitoring period in which the water sample results exceeded the acceptable lead level, DEQ should have required the Flint WTP to start pursuing optimized corrosion control treatment.

The LCR states that the lead action level is exceeded if the lead level, as determined by the 90th percentile calculation, is greater than 15 ppb. If the lead action level is exceeded, water systems are required to take additional actions including educating the public about lead in drinking water as well as commencing lead service line replacement if the water system has already installed corrosion control and/or source water treatment. However, for water systems that have not yet implemented corrosion control treatment, they can be deemed to have optimized corrosion control without installing treatment if they can demonstrate lead levels below 5 ppb for two consecutive six-month periods.

The first round of six-month sampling results was received in late March 2015. Because the results were 1 ppb over the lead action level of 5 ppb, DEQ would not be able to achieve two consecutive six-month periods below 5 ppb. Therefore, DEQ should have notified the Flint WTP to start pursuing optimized corrosion control treatment. However, DEQ waited until the second round of sampling was completed (June 30, 2015) to assess whether water sample results improved.

Water Samples

Q5: Did DEQ verify that only tier 1 sample sites were selected by the Flint WTP in the two rounds of six-month samples?

A: DEQ did not verify that only tier 1 sample sites were selected. DEQ relies on the Flint WTP's certification of sample sites and does not perform any independent verification of those certifications.

In a November 19, 2015 *Flint Journal* article, the Flint WTP indicated that it did not have the ability to ensure that all sites were tier 1. In fact, water samples came from the random distribution of 175 testing bottles without regard for whether the homes were at risk for high lead levels. DEQ issued a formal memorandum on November 9, 2015 requesting that the Flint WTP verify the classification of all prior sample items. The results are due back from the Flint WTP on December 30, 2015.

Q6: DEQ dropped two water sampling sites from its second six-month sample (January 1, 2015 through June 30, 2015). Was this appropriate?

A: Yes, it was appropriate for DEQ to drop these two water sampling sites. Federal regulation 40 *CFR* 141.86(a) states:

> ". . . each water system shall complete a materials evaluation of its distribution system in order to identify a pool of targeted sampling sites that meets the requirements of this section . . . All sites from which first draw samples are collected shall be selected from this pool . . . Sampling sites may not include faucets that have point-of-use or point-of-entry treatment devices designed to remove inorganic contaminants."

This regulation also requires that a water system's targeted sampling pool consist of only tier 1 sampling sites if an adequate number is available to meet monitoring requirements.

According to federal regulation 40 *CFR* 141.86(f), the State may invalidate a water sample if it determines that the sample was taken from a site that did not meet the site selection criteria. A sample invalidated per this regulation does not count toward determining lead or copper 90th percentile levels or toward meeting the minimum monitoring requirements.

DEQ dropped one water sample site from its 90th percentile calculations because the site was from a business that does not meet the tier 1 requirements of being a single-family or multiple-family residence. The second sample site was dropped because the home had a point-of-entry treatment device to filter contaminants. Based on the criteria specified above, it appears that DEQ's rationale for dropping the samples from these two sites appropriately met the requirements for invalidating samples per federal regulation 40 *CFR* 141.86.

Q7: Was flushing of the taps the night before drawing a sample an appropriate sample methodology?

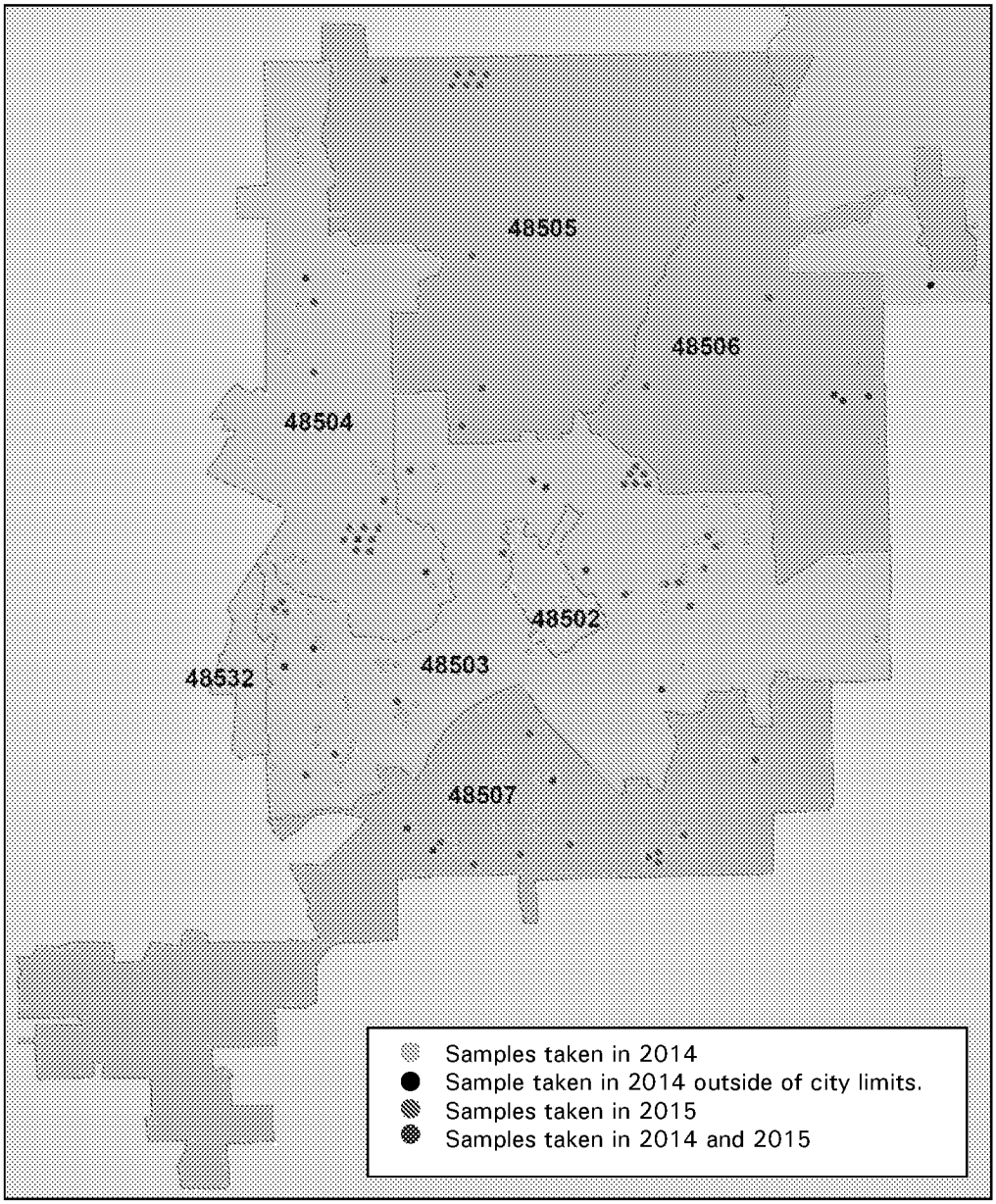
A: Yes. The LCR requires that samples be a first draw of water after six hours of stagnation. The LCR does not indicate whether or not the water line should be flushed prior to collecting the sample. In the sample instructions, DEQ required preflushing to ensure that sampled faucets were not stagnant for an excessive period of time beyond the targeted six hours (e.g., rarely used faucets or when a homeowner has been gone for an extended period of time.)

The LCR requires six hours of stagnation; however, it does not preclude DEQ from instructing residents to flush prior to stagnation.

Flint WTP 2014 and 2015 Sample Locations (Exhibit #1)

In calendar year 1992, the Flint WTP established a tier 1 sample site pool for LCR monitoring. With the change to the Flint River water, the Flint WTP needed to increase the pool of sample locations because of additional sampling requirements. The following exhibit documents the 2014 and 2015 sample locations for LCR monitoring. Based on the data obtained during our review, we could not determine how the locations were selected or whether they were properly classified as tier 1 sample sites.

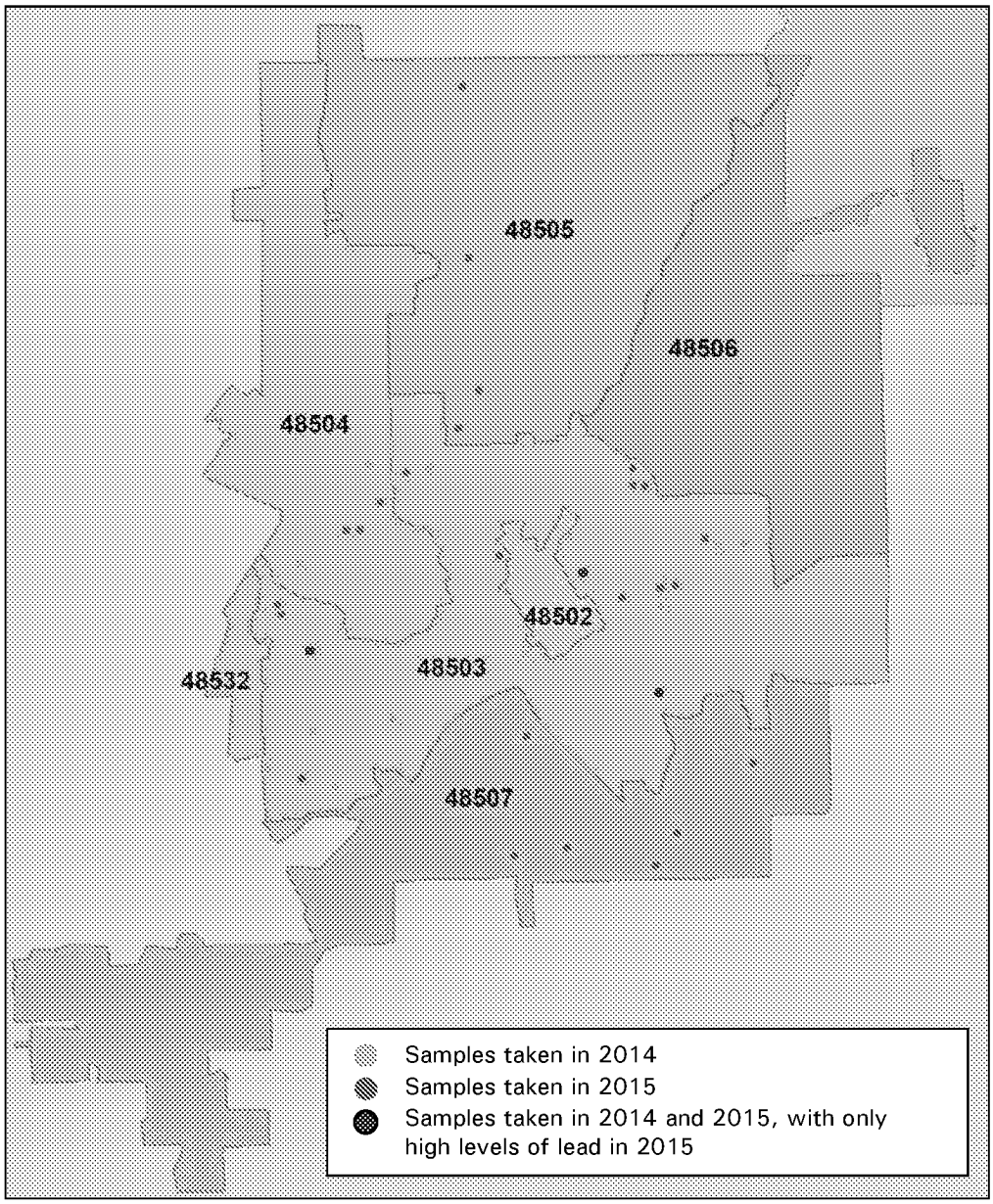
As noted in Question 5 of the additional questions answered by the OAG, DEQ has requested the Flint WTP to verify the tier 1 classification of all prior sample items.



Source: The OAG prepared this map using data obtained from DEQ and ©OpenStreetMap contributors (opendatacommons.org). The sample locations are approximate.

Flint WTP 2014 and 2015 Sample Locations With Lead Counts of 5 Parts Per Billion or Higher (Exhibit #2)

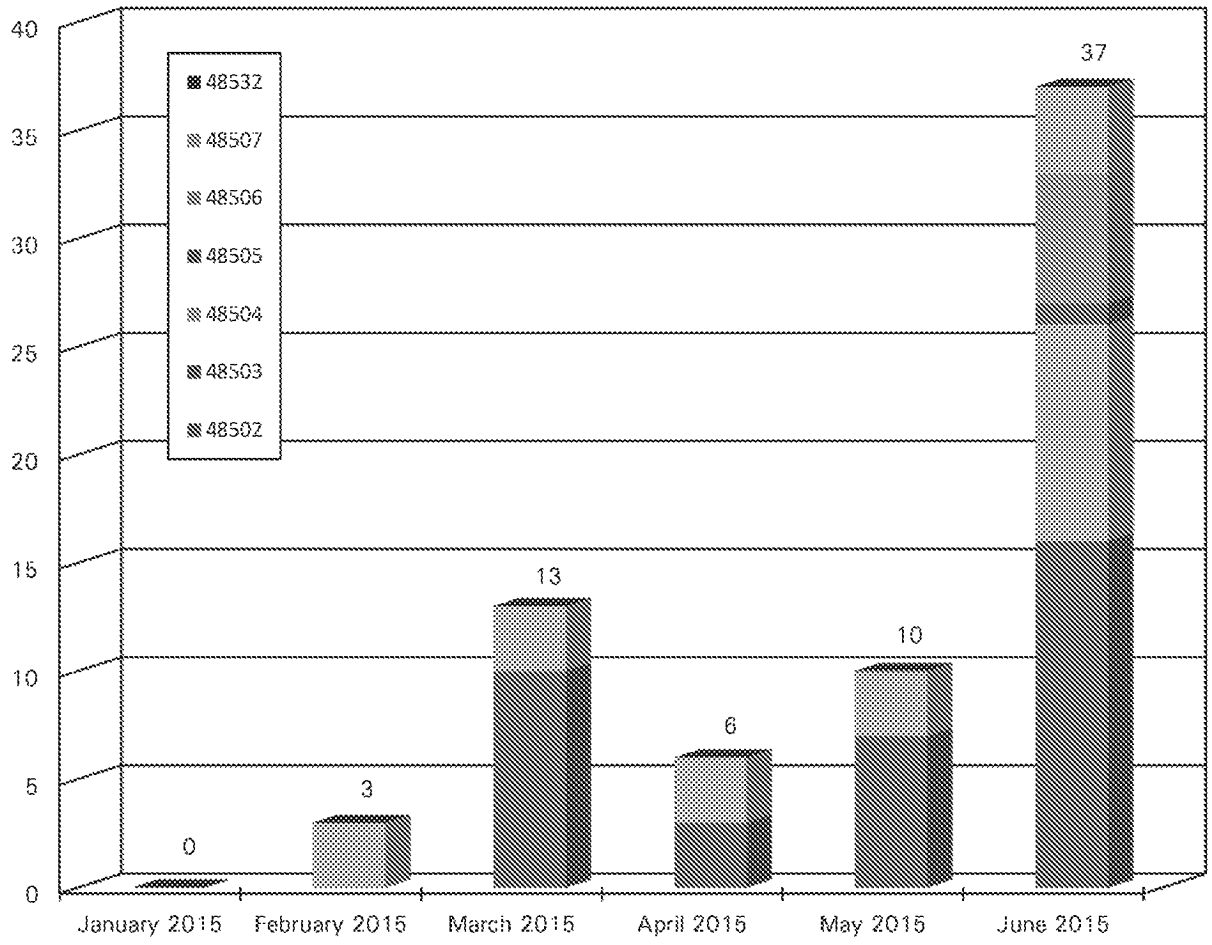
This exhibit documents the 2014 and 2015 sample locations with lead counts of 5 ppb or higher. This information is used in aggregate by DEQ to determine if the city has optimized lead levels.



Source: The OAG prepared this map using data obtained from DEQ and ©OpenStreetMap contributors (opendatacommons.org). The sample locations are approximate.

Flint WTP 2015 Number of Samples by Time Period and Zip Code (Exhibit #3)

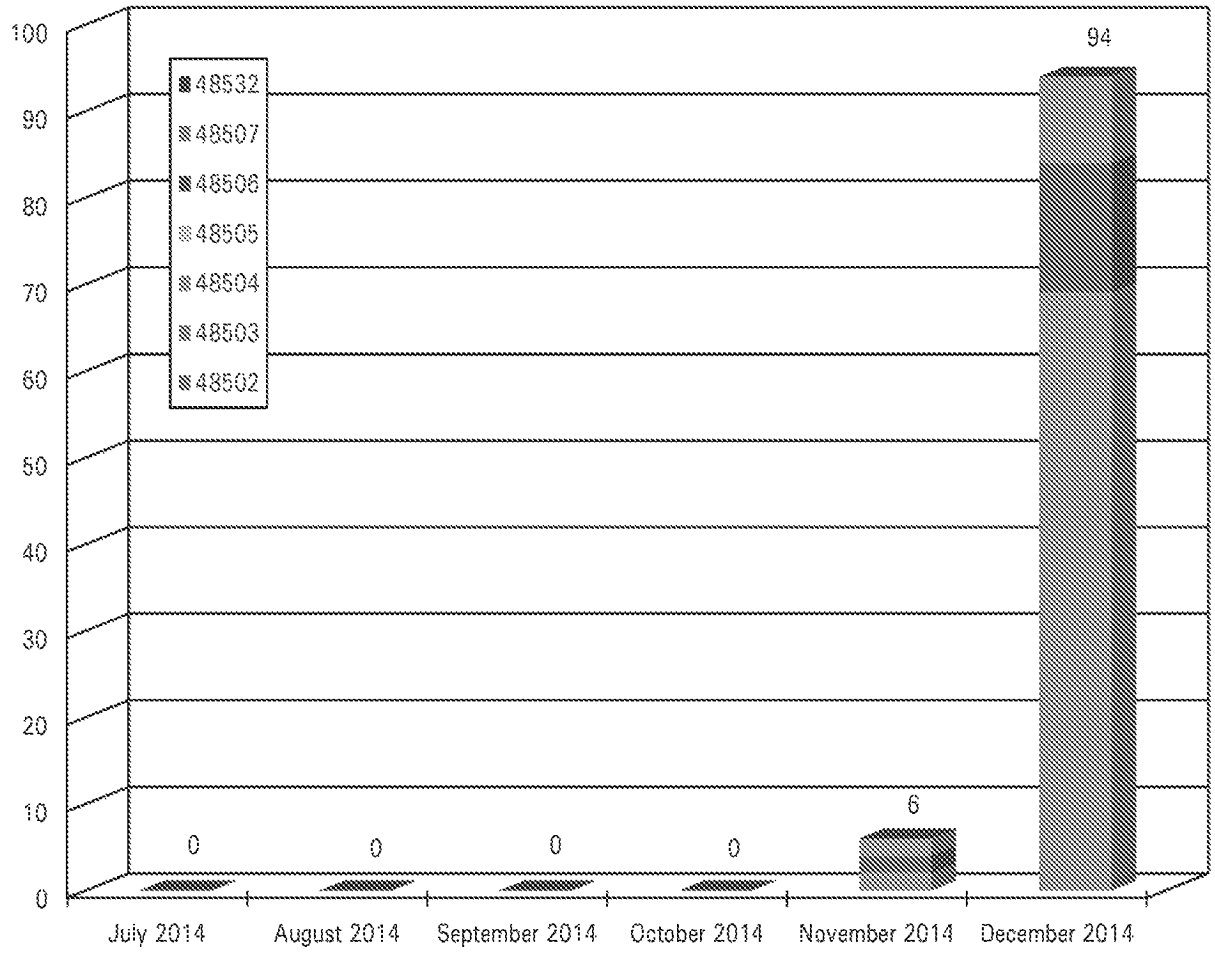
This chart expands on Exhibit #1 to show a summary by zip code and time of selection within the sampling period. Based on the data obtained during our review, we could not determine if the lateness of selection within the monitoring period affected the appropriateness of the sample items.



Source: The OAG prepared this chart using data obtained from DEQ.

Flint WTP 2014 Number of Samples by Time Period and Zip Code (Exhibit #4)

This chart expands on Exhibit #1 to show a summary by zip code and time of selection within the sampling period. Based on the data obtained during our review, we could not determine if the lateness of selection within the monitoring period affected the appropriateness of the sample items.



Source: The OAG prepared this chart using data obtained from DEQ.

Flint Water Review Time Line (Exhibit #5)

March 2013
Flint City Council voted 7-1 to join Karegnondi Water Authority (KWA).

April 16, 2013
City of Flint emergency manager Ed Kurtz signs agreement to switch from Detroit Water and Sewerage Department (DWSD) water source to KWA.

April 17, 2013
DWSD said it will stop selling water to the City of Flint in April 2014.

July 2014
DEQ begins the first six-month Flint lead/copper monitoring period.

Mid-March 2014
City of Flint decides to use the Flint River as a water source.

April 25, 2014
City of Flint switches to Flint River water.

January 1, 2015
DEQ begins the second six-month Flint lead/copper monitoring period.

January 12, 2015
DWSD offers the City of Flint a waiver of the $4 million reconnection fee to switch back to Detroit water.

January 29, 2015
City of Flint emergency manager Jerry Ambrose declines DWSD water source reconnection.

February 3, 2015
Governor Snyder awards the City of Flint $2 million to find leaks and replace wastewater incinerator.

February 26, 2015
The EPA discusses a resident's water sample testing results with DEQ (high levels of lead found in water).

February 27, 2015
DEQ responded to the EPA saying that the Flint WTP has an optimized corrosion control program.

March 30, 2015
DEQ notifies the Flint WTP of the first six-month lead/copper monitoring period.

April 24, 2015
DEQ indicates no corrosion control (orthophosphate) chemical in place (treatment).

May 28, 2015
Sample results from the residence noted with high levels on February 26, 2015 show lead levels look good after a new copper service line installation.

July 21, 2015
The EPA and DEQ hold conference call on DEQ's implementation of the Lead and Copper Rule (LCR) and Flint issues.

August 17, 2015
DEQ notifies the Flint WTP of the second six-month lead/copper monitoring results.

August 23, 2015
Virginia Tech researcher notifies DEQ that he will begin a study of the City of Flint water quality.

September 2, 2015
Virginia Tech researcher claims that the corrosiveness of the Flint water is causing lead to leach into residents' water.

September 24, 2015
Hurley Medical Center study issued showing high blood lead levels in City of Flint children.

October 1, 2015
- Michigan Department of Health and Human Services confirms results of Hurley Medical Center study.
- City of Flint urges residents to not drink water.

October 8, 2015
City of Flint develops plan to reconnect to DWSD.

October 16, 2015
City of Flint reconnects to DWSD.

October 19, 2015
DEQ Director Dan Wyant states: ". . . staff made a mistake while working with the city of Flint. Simply stated, staff employed a federal [corrosion control] protocol they believed was appropriate, and it was not."

November 3, 2015
The EPA indicates differing possible interpretations of the LCR with respect to how the LCR's optimal corrosion control treatment procedures apply to this situation (new water source/new water treatment).

2013 | 2014 | 2015

Source: The OAG prepared this time line using data (e-mails, meeting notes, and letters) obtained from DEQ, newspaper and press release articles, the Flintwaterstudy.org, and the Hurley Medical Center survey results.

This Document is a Non-Responsive Attachment.

From: Peeler, Nancy (DCH)
Sent: Tuesday, September 29, 2015 4:39 PM
To: Lasher, Geralyn (DCH);Wells, Eden (DCH);Miller, Corinne (DCH);Moran, Susan (DCH);Robinson, Mikelle (DCH);Dykema, Linda D. (DCH);LyonCallo, Sarah (DCH);Hertel, Elizabeth (DCH);Travis, Rashmi (DCH);Miller, Mark (DCH)
Cc: Minicuci, Angela (DCH);Eisner, Jennifer (DCH);Grijalva, Nancy (DCH)
Subject: RE: Public Health Advisory

Curious whether they issued the same thing to Hurley, as their analysis sample (based on zip codes 48501-48507) also appears to extend beyond the city geographic boundaries, into Townships that are on Detroit water?

From: Lasher, Geralyn (DCH)
Sent: Tuesday, September 29, 2015 12:06 PM
To: Wells, Eden (DCH); Miller, Corinne (DCH); Moran, Susan (DCH); Robinson, Mikelle (DCH); Dykema, Linda D. (DCH); LyonCallo, Sarah (DCH); Hertel, Elizabeth (DCH); Peeler, Nancy (DCH); Travis, Rashmi (DCH); Miller, Mark (DCH)
Cc: Minicuci, Angela (DCH); Eisner, Jennifer (DCH); Grijalva, Nancy (DCH)
Subject: FW: Public Health Advisory
Importance: High

And Genesee County and the Genesee County Health Department, have just issued the attached public health advisory and on the final paragraph it says:

> Recent data provided by Hurley Hospital researchers has indicated that a significant increase in blood lead levels has occurred in children since the switch to Flint River water. The county Health Officer has requested that the Michigan Department of Health and Human Services (MDHHS) provide to the County specific data to support its claim that state data is more comprehensive and does not show a significant increase. To date, the MDHHS has failed to confirm the geographic area included in their findings. We want to assure the state data is specific to the boundaries of the City of Flint, and not Flint addresses which would include addresses in areas outside of the City of Flint. These areas, such as Flint Township, that obtain their water from the Detroit Water Authority and would, therefore, not be representative of Flint River water as the water source. The County is prepared to take further action if the State fails to provide the requested data by September 30, 2015. Further action could include a request for outside independent evaluation of the data and to declare a Public Health Emergency in Flint.

I understand that we are still reviewing the data---but the county has basically issued a ransom date that they want this information by tomorrow.

Eden---please coordinate an answer so Nick can walk into the 1:00 p.m. meeting prepared on this.

From: Minicuci, Angela (DCH)
Sent: Tuesday, September 29, 2015 11:59 AM
To: Lasher, Geralyn (DCH) <lasherg@michigan.gov>
Subject: FW: Public Health Advisory
Importance: High

Last paragraph, last page.

Angela

From: Sandlin, Mary [mailto:MSANDLIN@gchd.us]
Sent: Tuesday, September 29, 2015 11:55 AM
Subject: Public Health Advisory
Importance: High

Mary E. Sandlin
Clerical Coordinator
Genesee County Health Department
630 S. Saginaw Street, Suite 4
Flint, MI 48502-1540
(810) 257-3812 FAX: (810) 257-3147
msandlin@gchd.us

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For a copy of the Health Department's Notice of Information Practices, contact the Health Department or visit the Health Department's website at http://www.gchd.us

From: Moran, Susan (DHHS)
Sent: Sunday, October 04, 2015 11:17 AM
To: Hertel, Elizabeth (DHHS)
Subject: Fwd: Draft Reply - Inquiry from U.S. Senate on Situation in Flint

This looks fine to me- but I know there is some sensitivity on who giving what- this look OK to you?

Sent from my iPhone

Begin forwarded message:

> **From:** "Wells, Eden (DHHS)" <WellsE3@michigan.gov>
> **Date:** October 4, 2015 at 11:14:53 AM EDT
> **To:** "Travis, Rashmi (DHHS)" <TravisR@michigan.gov>, "Lasher, Geralyn (DHHS)" <lasherg@michigan.gov>, "Hertel, Elizabeth (DHHS)" <HertelE@michigan.gov>, "Moran, Susan (DHHS)" <MoranS@michigan.gov>
> **Subject: Re: Draft Reply - Inquiry from U.S. Senate on Situation in Flint**
>
> Not sure where this is in the chain of events, but this is fine by me if OK with Sue and Geralyn,
>
> Eden

From: Travis, Rashmi (DHHS)
Sent: Friday, October 2, 2015 3:57 PM
To: Wells, Eden (DHHS); Lasher, Geralyn (DHHS); Hertel, Elizabeth (DHHS); Moran, Susan (DHHS)
Subject: FW: Draft Reply - Inquiry from U.S. Senate on Situation in Flint

Eden, Elizabeth, Geralyn, and Sue,
Below is the draft response we would like to the send to the US Senate inquiry on how are we assisting WIC clients.

Please review and send me any comments.
Thanks,
Rashmi

From: Bien, Stan (DHHS)
Sent: Friday, October 02, 2015 3:51 PM
To: Travis, Rashmi (DHHS)
Cc: Hanulcik, Kristen (DHHS)
Subject: Draft Reply - Inquiry from U.S. Senate on Situation in Flint
Importance: High

Hi Rashmi – Per your phone call, here's a draft reply to review :

Jacqlyn
Thank you for your 10/2/15 email to Michigan WIC regarding the water situation in Flint. Our Michigan Dept. of Health & Human Services has been in regular contact with the local health department and working on the issues. Here are some key updates:

Genesee County reports their WIC nutritionists are currently assessing whether or not clients have access to safe water. They first screen to determine which clients live in city (apparently this about 50-60% total caseload), and then ask if they have access to bottled water. They indicated that the majority of clients who are reconstituting infant formula with water are already using bottled water.

Filter Distribution: United Way is giving the County Health Dept. 4,000 filters. The Health Dept. is targeting this distribution to WIC clients They are planning to have a distribution even on Fri and Sat—possibly at U of M Flint.

Lead Testing: Blood Lead testing for kids is currently done adjunct with WIC clinics. Also, Hurley does a good job of already testing their kids. Additionally, they are working on a plan to have McLaren Health Plan do additional testing.

We will continue to monitor the overall situation and work with the local health department on this situation. Thank you.

From: Travis, Rashmi (DHHS)
Sent: Friday, October 02, 2015 1:36 PM
To: Bien, Stan (DHHS)
Cc: Hanulcik, Kristen (DHHS)
Subject: RE: Inquiry from U.S. Senate on Situation in Flint

I am checking with Eden. It seems like we can only say what we think the GCHD is doing for WIC clients or we refer her to the GCHD.
Rashmi

From: Bien, Stan (DHHS)
Sent: Friday, October 02, 2015 1:27 PM
To: Travis, Rashmi (DHHS)
Cc: Hanulcik, Kristen (DHHS)
Subject: Inquiry from U.S. Senate on Situation in Flint
Importance: High

Hi Rashmi - Please review and advise who will/can reply. Thanks

Stan Bien, Director
Michigan WIC Program - BFMCH
Michigan Department of Health & Human Services
320 South Walnut Street - 6th Floor
Lansing, MI 48913
517.335.8448

From: Schneider, Jacqlyn (Agriculture) [mailto:Jacqlyn_Schneider@ag.senate.gov]
Sent: Friday, October 02, 2015 12:26 PM
To: Bien, Stan (DHHS)
Subject: Situation in Flint

Hi Stan,

Hope you are doing well. I just wanted to check in with you on the situation in Flint. Our office has been getting calls about the water situation and I'm curious what advice, if any, you all are giving to WIC parents. Have you all explored allowing ready-to-feed formulas or do you feel confident that the water filters being provided by the state are sufficient to address the concerns about lead?

Hope all is well!

Jacqlyn

Jacqlyn Schneider
Deputy Staff Director & Policy Director
U.S. Senate Committee on Agriculture, Nutrition & Forestry
328A Russell Office Building
Washington, D.C. 20510
202-224-2035

From: Eden Wells [ewells@umich.edu]
Sent: Tuesday, October 13, 2015 6:15 PM
To: Lasher, Geralyn (DHHS);Hertel, Elizabeth (DHHS)
Cc: Wells, Eden (DHHS)
Subject: Fwd: Lead educational materials

See below--- Mona visiting with Stabenow Friday---if nothing to provide her OK, but her past email had asked what resources CLPP needed to do its work....again ,not her job to represent us, but looping you in for thoughts so I can follow-up with her ,

E

Eden V. Wells, MD, MPH, FACPM
Clinical Associate Professor, Epidemiology
Director, Preventive Medicine Residency
University of Michigan School of Public Health
1415 Washington Heights,
Ann Arbor, MI 48109
Tel: 734-647-5306
Fax: 734-936-2084
ewells@umich.edu

---------- Forwarded message ----------
From: **Wells, Eden (DHHS)** <WellsE3@michigan.gov>
Date: Mon, Oct 12, 2015 at 7:44 PM
Subject: Fwd: Lead educational materials
To: Eden Wells <ewells@umich.edu>

Sent from my iPhone

Begin forwarded message:

From: "Wells, Eden (DHHS)" <WellsE3@michigan.gov>
Date: October 12, 2015 at 7:43:41 PM EDT
To: Mona Hanna-Attisha <MHanna1@hurleymc.com>
Subject: Re: Lead educational materials

Great! Ok- good- and CLPP funding would be great- but do not feel you have to represent MDHHS (our liaisons have their own connections) but the more they hear things from folks outside of DHHS is great! I will find out if our folks want to have a thing else brought up!

Sent from my iPhone

On Oct 12, 2015, at 7:26 PM, Mona Hanna-Attisha <MHanna1@hurleymc.com> wrote:

Friday is the meeting as of now.
Would love to build momentum to tighten loopholes in lead and copper rule and increase funding for CLPPPs.
Would love to hear what ideas your legislative staff may have, especially in regards to the MI CLPPP.
Thanks!

Mona Hanna-Attisha MD MPH FAAP
Director, Pediatric Residency Program
Hurley Children's Hospital
Michigan State University

On Oct 12, 2015, at 6:51 PM, Wells, Eden (DHHS) <WellsE3@michigan.gov> wrote:

I hear you! Yes Siam I am having weird dreams. One question I forgot but did follow up with our communications people: what day do you see Debbie Stabenau?

Sent from my iPhone

On Oct 12, 2015, at 6:18 PM, Mona Hanna-Attisha <MHanna1@hurleymc.com> wrote:

Got it. Hang in there.
It's gets really messed up when you start dreaming about lead - I mentioned it to my research team, and evidently they've been having lead dreams/nightmares too. I think I worked them too hard.
;)

Mona Hanna-Attisha MD MPH FAAP
Director, Pediatric Residency Program
Hurley Children's Hospital
Michigan State University

On Oct 12, 2015, at 6:14 PM, Wells, Eden (DHHS) <WellsE3@michigan.gov> wrote:

I think my brain exploded- do you mind forwarding to Dr. Reynolds and Jamie?

Sent from my iPhone

Begin forwarded message:

From: "Eisner, Jennifer (DHHS)" <EisnerJ@michigan.gov>
Date: October 12, 2015 at 5:14:21 PM EDT
To: "hmcshane@gchd.us" <hmcshane@gchd.us>
Cc: "Wells, Eden (DHHS)" <WellsE3@michigan.gov>, "mvalacak@gchd.us" <mvalacak@gchd.us>
Subject: Lead educational materials

Hi Hilda:

We want to make sure you have the link to our MDHHS educational materials on lead, available at www.michigan.gov/flintwater. Under resources you'll find posted: a parent handout; lead screening & testing information; and blood lead level guide for providers.

I'll be sure to be in touch as more and updated materials become available, but please reach out if you have any questions.

Thanks and best,

Jennifer (Smith) Eisner

Public Information Officer

Michigan Department of Health and Human Services

517-241-2112

From: Eden Wells <ewells@umich.edu>
Sent: Tuesday, October 27, 2015 10:01 AM
To: Becker, Timothy (DHHS);Lasher, Geralyn (DHHS);Hertel, Elizabeth (DHHS);Lyon, Nick (DHHS);Moran, Susan (DHHS)
Subject: Fwd: cheat sheet
Attachments: 26Oct15 Executive Summary for Blood Lead Modeling Results (revised).pdf

Eden V. Wells, MD, MPH, FACPM
Clinical Associate Professor, Epidemiology
Director, Preventive Medicine Residency
University of Michigan School of Public Health
1415 Washington Heights,
Ann Arbor, MI 48109
Tel: 734-647-5306
Fax: 734-936-2084
ewells@umich.edu

---------- Forwarded message ----------
From: **Dykema, Linda D. (DHHS)** <DykemaL@michigan.gov>
Date: Mon, Oct 26, 2015 at 4:27 PM
Subject: cheat sheet
To: "Lasher, Geralyn (DHHS)" <lasherg@michigan.gov>, "Minicuci, Angela (DHHS)" <MinicuciA@michigan.gov>, "Eisner, Jennifer (DHHS)" <EisnerJ@michigan.gov>, Eden Wells <ewells@umich.edu>

5 ppb added

Linda D. Dykema, Ph.D.

Environmental Public Health Director

Division of Environmental Health

Michigan Department of Health & Human Services

517.335.8566

dykemal@michigan.gov

Executive Summary for a Health-Based Drinking Water Lead Level

October 26, 2015

Objective: Identify health-based drinking water lead level(s) to allow re-opening of school and/or daycare water fountains/faucets for student use.

Public Health Assumptions Included in the Model

The model estimates are only accurate if the following assumptions are met:

1. Children are not exposed to lead paint chips or lead paint dust (at home or elsewhere).
2. Children's drinking water at home is filtered and contains no more than 1 ppb of lead.
3. Children are exposed to lead soil concentrations typical of the urban environment in Flint (i.e. soil has not been impacted by lead-based paint).

Children's risk of having an elevated blood lead level will be greater than the model estimates if these assumptions are not met.

Resulting risk from drinking water with the following lead concentrations:

The goal is that a child should have ***no more than a 5 percent risk*** of having a blood lead level greater than 5 micrograms per deciliter.

Risk of a child having an elevated blood lead level		
Daycare or School Drinking Water Lead Levels	less than 1 year old	less than 7 years old
2 ppb	**5 percent**	**3 percent**
5 ppb	**6 percent**	**4 percent**
11 ppb	**8 percent**	**5 percent**
15 ppb	**10 percent**	**6 percent**
30 ppb	**18 percent**	**11 percent**
100 ppb	**55 percent**	**42 percent**

From: Lasher, Geralyn (DHHS)
Sent: Tuesday, November 10, 2015 10:57 AM
To: Lyon, Nick (DHHS);Grijalva, Nancy (DHHS);Becker, Timothy (DHHS);Granger, Patricia (DHHS);Hertel, Elizabeth (DHHS)
Subject: FW: Final Draft BLL Report
Attachments: 2015-11-10 - Flint Lead Report DRAFT 05.indd; 2015-11-10 - Flint Lead Report DRAFT 05 - without percentages.pdf

This is the one pager that Population Health had been working on. They were still making edits yesterday but I am told that this is now final version.

From: Dykema, Linda D. (DHHS)
Sent: Tuesday, November 10, 2015 9:48 AM
To: Lasher, Geralyn (DHHS) <lasherg@michigan.gov>; Moran, Susan (DHHS) <MoranS@michigan.gov>; Wells, Eden (DHHS) <WellsE3@michigan.gov>
Cc: McKane, Patricia (DHHS) <McKaneP@michigan.gov>; LyonCallo, Sarah (DHHS) <lyoncallos@michigan.gov>; Miller, Corinne (DHHS) <MillerC39@michigan.gov>; Minicuci, Angela (DHHS) <MinicuciA@michigan.gov>
Subject: Final Draft BLL Report

All,

Attached is the final draft of the BLL data report in InDesign and pdf format.

Linda

This Document is a Non-Responsive Attachment.

Michigan Department of Health and Human Services (MDHHS)
Summary of Blood Lead Level Test Results for Flint ZIP Codes 48501-48507
As of October 30, 2015

Executive Summary

This report is generated by MDHHS to track Blood Lead Level test results in Flint, Michigan.

- Counts on this report include both capillary and venous blood tests. People who have had multiple tests are counted only once.
- Since 10/1/2015, an additional 963 people have been tested in Flint.
- Continued testing efforts by Genessee County Health Department, MDHHS and local medical personnel have identified 18 children with blood lead levels greater than or equal to 5ug/dL since 10/1/2015.
- 3% of the children younger than 6 years old tested since 10/1/2015 have had blood lead levels greater than or equal to 5ug/dL.
- Additional testing is ongoing. Counts may vary slightly as new results are added.

Number of People Tested for Lead in Flint

Total number of people tested for lead from 4/15/2014 to 9/30/2015	5017
Total number of people tested for lead since 10/1/2015:	**963**

Children Younger than 6 Years Old with Blood Lead Levels (BLL) ≥5ug/dL

Total number of children tested for lead from 4/15/2014 to 9/30/2015:	4156
Number of child BLL test results ≥5ug/dL from 4/15/2014 to 9/30/2015:	181
Total number of children tested for lead since 10/1/2015:	**385**
Number of child BLL test results ≥5ug/dL since 10/1/2015:	**12**

Adults with Blood Lead Levels (BLL) ≥5ug/dL

Total number of adults tested for lead from 4/15/2014 to 9/30/2015:	207
Number of adult BLL test results ≥5ug/dL from 4/15/2014 to 9/30/2015:	13
Total number of adults tested for lead since 10/1/2015:	**289**
Number of adult BLL test results ≥5ug/dL since 10/1/2015:	**6**

Children 6 to 18 Years Old with Blood Lead Levels (BLL) ≥5ug/dL

Total number of children tested for lead from 4/15/2014 to 9/30/2015:	654
Number of child BLL test results ≥5ug/dL from 4/15/2014 to 9/30/2015:	7
Total number of children tested for lead since 10/1/2015:	**289**
Number of child BLL test results ≥5ug/dL since 10/1/2015:	**6**

From:	Lyon, Nick (DHHS)
Sent:	Tuesday, November 17, 2015 11:34 AM
To:	Becker, Timothy (DHHS);Grijalva, Nancy (DHHS);Lasher, Geralyn (DHHS);Hertel, Elizabeth (DHHS)
Subject:	Fwd: Privileged Attorney-Client Communication - Outline of Flint Drinking Water Issues
Attachments:	image001.png; ATT00001.htm; image002.png; ATT00002.htm; DEQ's Outline of Flint Drinking Water Issues for Flint Water Task Force - Attorney Client Privilege Work Product -11-16-2015.pdf; ATT00003.htm

Nancy - will you make sure they see this.

Begin forwarded message:

> **From:** "Anderson, Madhu (DEQ)" <AndersonM30@michigan.gov>
> **Date:** November 17, 2015 at 11:19:30 AM EST
> **To:** "Ken Sikkema (ksikkema@pscinc.com)" <ksikkema@pscinc.com>
> **Cc:** "Agen, Jarrod (GOV)" <AgenJ@michigan.gov>, "Baird, Richard (GOV)" <bairdr@michigan.gov>, "Muchmore, Dennis (GOV)" <muchmored@michigan.gov>, "webert7@michigan.gov" <webert7@michigan.gov>, "Hollins, Harvey (GOV)" <hollinsh@michigan.gov>, "Murray, David (GOV)" <MurrayD1@michigan.gov>, "Wurfel, Sara (GOV)" <Wurfels@michigan.gov>, "Lyon, Nick (DHHS)" <LyonN2@michigan.gov>
> **Subject: Privileged Attorney-Client Communication - Outline of Flint Drinking Water Issues**
>
> Ken – Attached is the outline of the Flint Drinking Water issue (in a question and answer format) we have prepared for you to share with your colleagues on the Governor's Flint Water Task Force. Please let me know if we can provide any other material in preparation for the meeting tomorrow.

Madhu R. Anderson

Deputy Director, Economic and Strategic Initiatives

☎ 517 284 6702 | 517 290 9653

✉ andersonm30@michigan.gov

This Document is a Non-Responsive Attachment.

From: Moran, Susan (DHHS)
Sent: Saturday, November 21, 2015 10:42 AM
To: Lyon, Nick (DHHS);Lasher, Geralyn (DHHS);Hertel, Elizabeth (DHHS);Becker, Timothy (DHHS);Dykema, Linda D. (DHHS);Wells, Eden (DHHS)
Cc: Grijalva, Nancy (DHHS)
Subject: MDHHS Flint Water Action Plan- week ending 11/30/15
Attachments: Flint Action Plan 11-20-15 v2.docx

Updated/new items in **BOLD.**

Highlights:

- Draft press release and BLL report (for period 10/1/15-10/30/15) completed
- Water sampling protocol no longer includes pre flushing of lines
- Developing enhanced strategies to accelerate BLL testing of children 0-6

Flint Water Public Health Response: MDHHS Action Plan

Weekly Update 11-20-15

TASK	STATUS	ACTION	DATE COMPLETED
Filter Distribution	Residents may continue to obtain filters from GCCARD (both sites 9-4PM) and MDHHS clients can continue to obtain filters at the two MDHHS office locations or the GCCARD sites.	No action indicated.	NA
Filter Replacement Distribution	The procedure is in place for replacement cartridge distribution including an abbreviated application for residents to apply for and obtain cartridge replacement. Cartridge replacement will occur at same locations as filter sites. DHHS is also placing an order for 750 replacement filters for the 8-cup Zerowater filters. 9000 Brita replacement filters on hand with an additional 10,000 readily available when needed. Total available= 19,000	DHHS and GCCARD will begin issuing the replacement filters the week of November 2nd.	**Ongoing**
	MDHHS is currently coordinating with GCARD on publicity for distribution of the replacement filters. United Way will provide Pur Filter Replacements. United Way will also be purchasing filter units for school water fountains. Press release planned Monday 11/2 re: pick up of replacement filters, videos to be posted on websites and you tube.	Jen Eisner will work with Hilda McShane	Completed 11/2
	United Way requested that DHHS purchase Pur filter replacements. GCARD requests that no more bottled water be donated. They have plenty in stock. Cash is preferred. **City of Flint set up distribution point in City Administration office building. GCHD will be providing City of Flint with Pur Filters. The Brita filter requires a form for MDHHS be filled out; there are some concerns that undocumented members of population will avoid Brita filters for this reason.**	**No action indicated.**	
Public Education Proper Filter Use	When used improperly, the filters will exceed their capacity limit in a much shorter time frame thereby increasing need for filter replacement much sooner than expected. Develop NEW public education material about proper use of cartridge AND how to obtain filter replacement cartridges, targeted for release week of October 26 during lead awareness week.		Completed
	Request made for written instructions on filter cartridge replacements for nurse case		**Completed**

TASK	STATUS	ACTION	DATE COMPLETED
	managers to take on home visits. Wes is working to complete a packet for nurse case managers which will include information on filters.		
	Video created with Home Depot demonstrating replacement of the Brita replacement filter. DEQ receiving questions about meters on the water filter pitchers delivered to the schools which are likely Zerowater Filters.	The video added to the gov/flintwater website.	Completed 11/2
	Video will be added to nurse training- CLPPP.		Completed 11-10
Lead Testing Protocol:	Draft protocol has been completed, undergoing final review. Protocol calls for testing: Priority groups- • Confirmatory venous testing for children who had venous testing (115 children) • Children in day care, Head Start • children attending 3 schools (Freeman, Eisenhower, Brownell) • Children residing in high risk zip codes (03, 04) • All other students Protocol will be announced in a joint MDHHS/GCHD Press release.	Press release has been cleared with Governor's Office.	Completed 10-28
Blood Lead Testing: 9/28/15-10/23/15	CLPPP processed 580 tests from Flint zip codes since 9-28-15; 5 children were reported with elevated lead blood levels. There approximately 200 children that have been identified for follow-up.	MDHHS has arranged a contract with the GCHD to provide nurses for the follow-up.	Contract completed in E-grams as of 10-23
	Cross reference list of children with elevated lead levels with filter distribution data to ensure household has a filter. (Peeler/Scott) So far only about 20% of approximately 200 children with EBL are known to have received a filter. GCHD will deliver filters to these homes as they are doing the case follow-up. GCHD will provide weekly updates.	Send list to Kris S (done)	In process
	A group will develop reporting metrics and system to track same: Linda Dykema, Wes Priem, Michele Bruneau, Bob Scott and group met to discuss metrics. Plan to produce first detailed report for internal review the week of Nov. 9th. A simplified version for external dissemination will be released after internal review. Linda is working on an analysis of blood lead tests done since 9-28-25. Epi will assist with this analysis. Still fine-tuning the report. Report has been completed along with talking points.	**Completed**	**Completed**

TASK	STATUS	ACTION	DATE COMPLETED
	Draft press release and BLL report (for period 10/1/15-10/30/15) completed. DEQ and Governor's office will briefed prior to release.		**Pending**
	Reach out to MSA to discuss maximum effort to promote blood lead testing of children 0-6	**Pending**	
Parent education	Parent education material completed. Discuss dissemination of parent material through Flint schools.	Call with Flint school superintendent, GCHD, and MDHHS scheduled 10-26-15 to discuss dissemination process.	Completed
	Schools require 6000+ information packets for distribution to all students. Print order sent to DTMB. Hardcopy will be distributed to GCHD for issuing to the schools, and to Headstart, daycare, and other agencies in Flint with children ages 0-5. Mark will drop off hard copies at GCHD. Toni LaRocco will take the lead in distribution of the materials to the schools and other agencies.	Geralyn Lasher arranged for printing.	10/30 printing completed and Mark dropped off 6,000 copies at the Flint School Admin. Building, and 2,500 to health dept. Remainder dropped off on 11/2.
	Ensure legislators receive material in advance	Elizabeth Hertel coordinate legislator notification	Completed
Provider Education	Provider Education material completed. Communication to providers will occur through GCHD and MDHHS networks (GCMS, GCARD, hospitals, etc).MDHHS will distribute through the Medicaid Health Plans. Hurley providers received the packet and the remainder of providers will receive the information next week.	Mark Valacek Wells/Peeler Electronic distribution through various	completed 10/30 Completed 11/2

TASK	STATUS	ACTION	DATE COMPLETED
		listservs next week.	
	A webinar for health care providers will be held in early December to discuss the Lead issue, blood lead testing, Ready to Feed Formula, and answer any questions. It will be co-sponsored by the GCHD medical director.		
Community public education and testing event	McLaren Health Plan in conjunction with GCHD hosted a public testing and awareness event on November 5 at the Burton GCHD site. 40 children were tested. McLaren will have providers on site to perform testing for their members; GCHD onsite to perform testing for all others. Event will also include Medicaid application assistance. Tony Larocco (GCHD) has contacted Molina and Meridian Health Plan regarding sponsorship of community testing and awareness event. Molina and Meridian Health Plan testing dates to be determined. GCHD will be at a community event on Nov. 12, from 2 PM to 7 PM, to focus on testing for children 0-5. (Brownell and Holmes Schools)> Another testing event was held at Brownell School on 11/12. Many organizations were present to provide information and services. 27 children were tested, 60 filters distributed. **There was only one EBL result from the Brownell clinic (5.5 ppb that will be reported out as a 6.0; McLaren results are not available yet.) Flint schools superintendent is interested in having another event.**	Dr. Forschee has been contacted. Tony contacted Molina and there is interest in a future testing event.	**pending**
	There will be a combination school testing/townhall/education event, sponsored by Rep. Neeley, on Nov. 2nd. A telephonic townhall is slated for Oct. 28 by Rep. Neely. Gongwer reported that 4,000 people participated in this call.	FYI	Completed
Public Education Materials	Mark Johnson, is the regional representative for ASTDR and CDC. He has been designated as contact. A call was held with ATSRDR on 11/13 to discuss how to improve outreach efforts to the Flint community about lead hazards. It was suggested that state/county consider lowering the readability level of the lead materials for the public to 3rd or 4th grade reading level. **A workgroup is currently reviewing the documents for needed changes. Jim Henry contacted Dr. Suzanne Selig (UMichigan-Flint School of Public Health) who will seek community feedback on the materials that have been developed**. **After readability**	CLPPP and GCHD staff will review documents and work with the communication office on any changes.	**Pending**

TASK	STATUS	ACTION	DATE COMPLETED
	changes, some of the materials will be translated into Spanish and Arabic.		
Environmental Investigation	$275 k contract with ETC requested on Oct. 21st, 2015. About 275 EBL investigations are budgeted for Flint. Wes will work with GCHD to coordinate with Flint Housing/other authorities to deal with recalcitrant landlords. DEH meeting on 11/5 with MDEQ staff to harmonize EBL investigation protocol with water testing protocol. 11/12 The EBL contractor met with GCHD staff to coordinate activities with case management. **The EBL investigation activities require a substantial amount of time (4 hours), less than that for the case management activities; however, the team is arranging joint visits where possible.**		Contract completed 10/29
Nurse Follow Up	Project sent to Contracts for inclusion in E-grams 10-23-15. 10-21-15 Funding for case management nurses will be disseminated to GCHD through new project: *Flint Water*, for $425,000 through the Comprehensive Contract E-grams system, to fund the: Follow-up of Children Reported with Elevated Lead Levels: Case Management Services. GCHD advised to secure approvals for use of these funds and begin procedures to place staff in appropriate positions to conduct the work. GCHD has shifted one nurse over for follow-up. That nurse if fully trained on elevated lead patient management. 1.5 nurse FTE's will be assigned and trained on 11-10-15. Lead Safe Home Program worked with GCHD on protocol to harmonize the flow of outreach to families with children with elevated blood levels. 11/10 Training has been completed for 2.5 FTE nurses. Some follow-up training will be scheduled as well. **Follow-up training with nurses was completed on 11-17. Weekly calls have been set up with CLPPP staff and nurses.** **Weekly status report from GCHD attached in separate file.**	Eden will contact Bob to send the list to Toni at GCHD so they can facilitate case management of children with elevated lead levels (done). Contract approved 10/26	Completed 10/27 Completed 11-10
Water Testing	DEQ will be testing at Freeman Elementary the week of 10-26-15, with plans to expand to 14 schools. Residential testing will have a different protocol. GCHD has been in contact with DEQ to possibly assist in sampling. Linda Dykema has a draft Executive Summary for Health-Based Drinking Water Lead Levels	No action indicated, informational only – DEQ.	

TASK	STATUS	ACTION	DATE COMPLETED
	developed. Once testing is completed, this document will serve as a decision guide on reopening of school and/or daycare water fountains/faucets for student use. Linda will revise the model to include paint chip values/risk levels. GCHD sanitarians are assisting DEQ with water sampling. We should anticipate some differences in opinion on actionable pb levels. Suggested that the following language that DC used be adapted for our use: "The removal of lead in drinking water is most effective if the full lead service line is removed from both the public and private property. If you choose not to replace your private side pipe, lead can continue to dissolve in your drinking water. You should also replace galvanized plumbing, older lead soldered pipes, and brass fixtures and use a different plumbing material in your home. Until all potential sources of lead in drinking water are removed from your private property, be sure to follow the flushing and filter instructions provided." "Water is lead-free when it leaves the treatment plant, but lead can be released when the water comes in contact with pipes and plumbing fixtures that contain lead. Lead sources and lead levels vary between buildings, so it is important to identify and remove any lead sources in each household." "Pregnant or nursing women and children under age six should use filtered tap water for drinking water and cooking until all lead sources are removed. Filters certified for lead removal are required to meet National Sanitary Foundation (NSF) Standard 53." **<u>This language will be incorporated into EBL investigation reports and in the educational packets the nurses will distribute.</u>**		**Pending**
Misc.	City of Flint is asking when the county will lift the emergency order. Jim Henry from GCHD mentioned he was hearing some concerns raised again about Legionella. Eden said that Jim Collins can help address this. Mark V. said that an extensive data analysis was done on this previously and it isn't an issue. DEQ gave permission to increase phosphate levels in the water temporarily. Some health concerns might be raised about this particularly for infants. Dr.Eden Wells said that it is unlikely to cause health problems but we can add information on the FAQ to help reassure citizens. DEQ released its Freeman School water testing results this week. EPA released its report from its expedited review of the response as well.		

TASK	STATUS	ACTION	DATE COMPLETED
	The water testing protocol has been changed to no longer do pre-flushing of the pipes. Other schools that are interested in having their water tested should make a request to DEQ. LARA will do a plumbing assessment before the water samples are taken. The City of Flint is considering taking over the cost of providing the replacement pipes for at least some of the high risk homes.	FYI only	
	A call was held on the 10th with MDHHS staff and the regional USDA staff and congressional staff, on the ready to feed formula issue. Both USDA and Sen. Stabenow's office satisfied with client communication and monitoring process in place. Talking points have been developed by WIC staff and sent to the communication office for review. **The talking points have been approved by the Communications Office. There has only been one client request for Ready to Feed formula in the Flint WIC clinic.** **There will be a farmers market, in conjunction with a flu clinic, that the GCHD is holding on 21 November and lead-related information will be provided by GCHD.**	FYI	Completed **Pending**
	Internal calls will be held once a week on Thursdays at 12:30.	FYI	

From: Becker, Timothy (DHHS)
Sent: Wednesday, December 30, 2015 11:48 AM
To: Priest, Chris (DHHS);Lyon, Nick (DHHS);Lasher, Geralyn (DHHS);Hertel, Elizabeth (DHHS)
Cc: Grijalva, Nancy (DHHS)
Subject: RE: Flint L Letter

I like it. Please send today. Thanks.

-----Original Message-----
From: Priest, Chris (DHHS)
Sent: Tuesday, December 29, 2015 7:45 PM
To: Lyon, Nick (DHHS) <LyonN2@michigan.gov>; Becker, Timothy (DHHS) <beckert1@michigan.gov>; Lasher, Geralyn (DHHS) <lasherg@michigan.gov>; Hertel, Elizabeth (DHHS) <HertelE@michigan.gov>
Cc: Grijalva, Nancy (DHHS) <GrijalvaN@michigan.gov>
Subject: Flint L Letter

Hi Everyone - Working with Dr. Wells and Sue, Medicaid is planning to send an "L" letter to all Medicaid providers in Flint to help ensure as many providers as possible have, and follow, the enhanced guidelines for lead testing in children. Attached is our draft of the "L" letter -- both Dr. Wells and Sue have signed off too. We are planning on sending this ASAP, but want flag it before it went. Please let me know if you have any thoughts, concerns or comments. Thanks!

Chris

From: Lyon, Nick (DHHS)
Sent: Thursday, December 31, 2015 1:11 PM
To: Becker, Timothy (DHHS);Lasher, Geralyn (DHHS);Grijalva, Nancy (DHHS);Hertel, Elizabeth (DHHS)
Subject: Fwd: Attorney Client Work Product (Draft), Privileged and Confidential

Not Responsive

Begin forwarded message:

From: "Holland, Meegan (GOV)" <HollandM2@michigan.gov>
Date: December 30, 2015 at 8:00:47 PM CST
To: "Baird, Richard (GOV)" <bairdr@michigan.gov>, "Agen, Jarrod (GOV)" <AgenJ@michigan.gov>, "Clement, Elizabeth (GOV)" <clemente@michigan.gov>, "Hollins, Harvey (GOV)" <hollinsh@michigan.gov>, "Kelenske, Chris (MSP)" <KelenskeC@michigan.gov>, "Murray, David (GOV)" <MurrayD1@michigan.gov>, "Redford, James (GOV)" <RedfordJ@michigan.gov>, "Becker, Timothy (DHHS)" <beckert1@michigan.gov>, "Creagh, Keith (DNR)" <creaghk@michigan.gov>, "Roberts, John (DTMB)" <RobertsJ9@michigan.gov>
Cc: "Etue, Kriste (MSP)" <EtueK@michigan.gov>, "Lyon, Nick (DHHS)" <LyonN2@michigan.gov>
Subject: RE: Attorney Client Work Product (Draft), Privileged and Confidential

Not Responsive

The goal: Assess the extent of the elevated blood lead levels – the number of those affected and the degree to which they're affected

- Get as many people in the affected zip codes tested as possible – can the Red Cross or some other agency with a bus or mobile unit set up for folks to give blood convert over to blood level testing and go into neighborhoods that have low testing rates?

- A public health friend of mine said that Genesee County Health workers are stressed to the max. Can we deploy appropriate personnel from other county health agencies to help with inspecting homes for possible other causes? In other words, it won't do any good to invest more in water infrastructure if we're finding window sills with teeth marks. I say this NOT to downplay the role that water lead levels may have played. But can we get Habitat for Humanity, for example, to do a massive volunteer effort to eradicate lead paint in homes … or is that beyond their expertise?
- Gather experts to assess exactly how extensive the problem is and potential causes. And then convey this in a much more accessible ways. If you want blood level data, you have to scroll down on the DHHS web site, find the headline and then read a long press release. Maybe we're conveying this information better on the ground, but if not, we need to communicate conclusive findings in multiple ways– graphics, video, informational photo galleries and maybe even a "test" that residents can take to see if their home is at risk in other ways. I know that sounds awfully MLive-ish, but it can be effective.

From: Baird, Richard (GOV)
Sent: Wednesday, December 30, 2015 6:57 PM
To: Agen, Jarrod (GOV) <AgenJ@michigan.gov>; Clement, Elizabeth (GOV) <clemente@michigan.gov>; Hollins, Harvey (GOV) <hollinsh@michigan.gov>; Kelenske, Chris (MSP) <KelenskeC@michigan.gov>; Holland, Meegan (GOV) <HollandM2@michigan.gov>; Murray, David (GOV) <MurrayD1@michigan.gov>; Redford, James (GOV) <RedfordJ@michigan.gov>; Becker, Timothy (DHHS) <beckert1@michigan.gov>; Creagh, Keith (DNR) <creaghk@michigan.gov>; Roberts, John (DTMB) <RobertsJ9@michigan.gov>
Cc: Etue, Kriste (MSP) <EtueK@michigan.gov>; Lyon, Nick (DHHS) <LyonN2@michigan.gov>
Subject: Attorney Client Work Product (Draft), Privileged and Confidential

Team:

Today Harvey and I met with the Flint Water Task Force. It was a good meeting. People were pleased with the G's statement from the prior day. Captain Kelenske joined us and we had a very good discussion about moving forward with the creation of the Flint Water Crisis Agency Coordinating Committee (FIACC). Tim Becker and Captain Kelenske provided me with a fair amount of input. I also read the City of Flint Incident Action Plan for a State of Emergency which Chris received today (enclosed for those who wish to read it as well). I have distilled all of this into a two page plan that I want your edits and comments on and a one page organizational chart (now presented in the "governor's colors" according to our fine people in Communications). Spoiler alert—I made Captain Kelenske Vice Chair of the whole shebang (with the Colonel's blessing) so Harvey wouldn't get lonely.

Here is my ask of you:

1) Within 24 (sooner if you can) hours give me your comments and input
2) Tomorrow I will turn around a final document for Jarrod to review with the Governor either New Year's Day or Saturday
3) Ideally, Governor will approve Harvey sending it to Mayor Weaver Saturday (Sunday latest)
4) Mayor needs to know that this is what the Governor wishes to discuss at the meeting January 7 along with financial resources that we still need some estimates on cost from DHHS for
5) Meegan and Dave need to noodle how best to get out front with this and change the narrative focus on Monday's Genesee County declaration of emergency

I know we are all working way too hard for what should be a rest and recharge period but I do appreciate everyone's efforts and I know the Boss really does as well.

Regards,

Rich

From:	Lyon, Nick (DHHS)
Sent:	Thursday, December 31, 2015 1:18 PM
To:	Becker, Timothy (DHHS);Grijalva, Nancy (DHHS);Lasher, Geralyn (DHHS);Hertel, Elizabeth (DHHS)
Subject:	Fwd: Attorney Client Work Product (Draft), Privileged and Confidential
Attachments:	A Proposal to Create the Flint Water Inter.docx; ATT00001.htm; IA Coord Com Org Chart.jpg; ATT00002.htm; IAP Flint Water 2015-12-29.pdf; ATT00003.htm

Not Responsive

Begin forwarded message:

From: "Baird, Richard (GOV)" <bairdr@michigan.gov>
To: "Agen, Jarrod (GOV)" <AgenJ@michigan.gov>, "Clement, Elizabeth (GOV)" <clemente@michigan.gov>, "Hollins, Harvey (GOV)" <hollinsh@michigan.gov>, "Kelenske, Chris (MSP)" <KelenskeC@michigan.gov>, "Holland, Meegan (GOV)" <HollandM2@michigan.gov>, "Murray, David (GOV)" <MurrayD1@michigan.gov>, "Redford, James (GOV)" <RedfordJ@michigan.gov>, "Becker, Timothy (DHHS)" <beckert1@michigan.gov>, "Creagh, Keith (DNR)" <creaghk@michigan.gov>, "Roberts, John (DTMB)" <RobertsJ9@michigan.gov>
Cc: "Etue, Kriste (MSP)" <EtueK@michigan.gov>, "Lyon, Nick (DHHS)" <LyonN2@michigan.gov>
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Regards,

Rich

A Proposal to Create the Flint Water Inter-Agency Coordinating Committee (FIACC)

In collaboration with the Flint After-Action Task Force, MSP Captain Chris Kelenske, DHHS Chief Deputy Tim Becker and DHHS Director Nick Lyon, Harvey Hollins and Rich Baird are recommending the immediate creation of the above referenced entity, with its sustained role and responsibility enabled under the Governor's Executive Order.

Statement of Need

Due to a combination of resource constraints, inexperienced personnel, "silo" bureaucratic processes and reactionary approaches to immediate problems, there is a nearly complete lack of coordination, communication, and connected management amongst all the departments and stakeholders who must work together to ensure Flint's return to clean, safe water and to coordinate mid and long term efforts to mitigate and address future health and behavioral consequences from lead ingestion. This group MUST be stood up regardless of whether (or when) the conditions required for a declaration of emergency are met by the City, County, State or Federal authorizers. This coordinating body must include:

- The creation of a routine information process between all parties.
- Pursuit of other avenues of funding including federal grants and legislative appropriations.
- While the Emergency Management Act or the Stafford Disaster Relief and Emergency Assistance Act may be mechanisms to fix the issues in Flint, portions of the Emergency Management Act outlining management of events are applicable and should be implemented without delay (e.g. Local emergency operations plans/emergency operations guides as well as emergency operations support plans).

Action Plan and Establishing the FIACCC

It appears that a request for a Governor's declaration may be from the county as soon as January 4, 2016. The state's Emergency Coordinator (Capt. Kelenske) will evaluate the request and provide a recommendation whether to issue a declaration, following established protocol and due diligence. But immediately, we will:

1. Establish an interagency workgroup Chaired and Vice-Chaired by Harvey Hollins and Chris Kelenske, respectively, and be comprised of DHHS, MDEQ, MSP, Treasury, Genesee County, City of Flint, MDE, LARA and external Subject Matter Experts (SMEs). Civil Rights may be added at a later time. If additional agencies/stakeholders who can assist with accomplishing the action plan are needed, they will be added. Personnel must be goal oriented, transparent with findings and measures of progress, and able to work toward accomplishing the Incident Action Plan created by the state in a timely manner. A draft Organization Chart is attached under separate cover.
2. This body should be created by Executive Order and it must complement and not replace the current system under the Emergency Management Act. In fact, it should demonstrate how to best leverage support where existing laws fall short under a man-made emergency.
3. Utilize the National Incident Management System and Unified/Incident Command as appropriate.
4. Establish routine communications protocols at the operational, executive, and legislative levels as determined appropriate.
5. Establish interagency workgroup objectives using the following as a starting point.

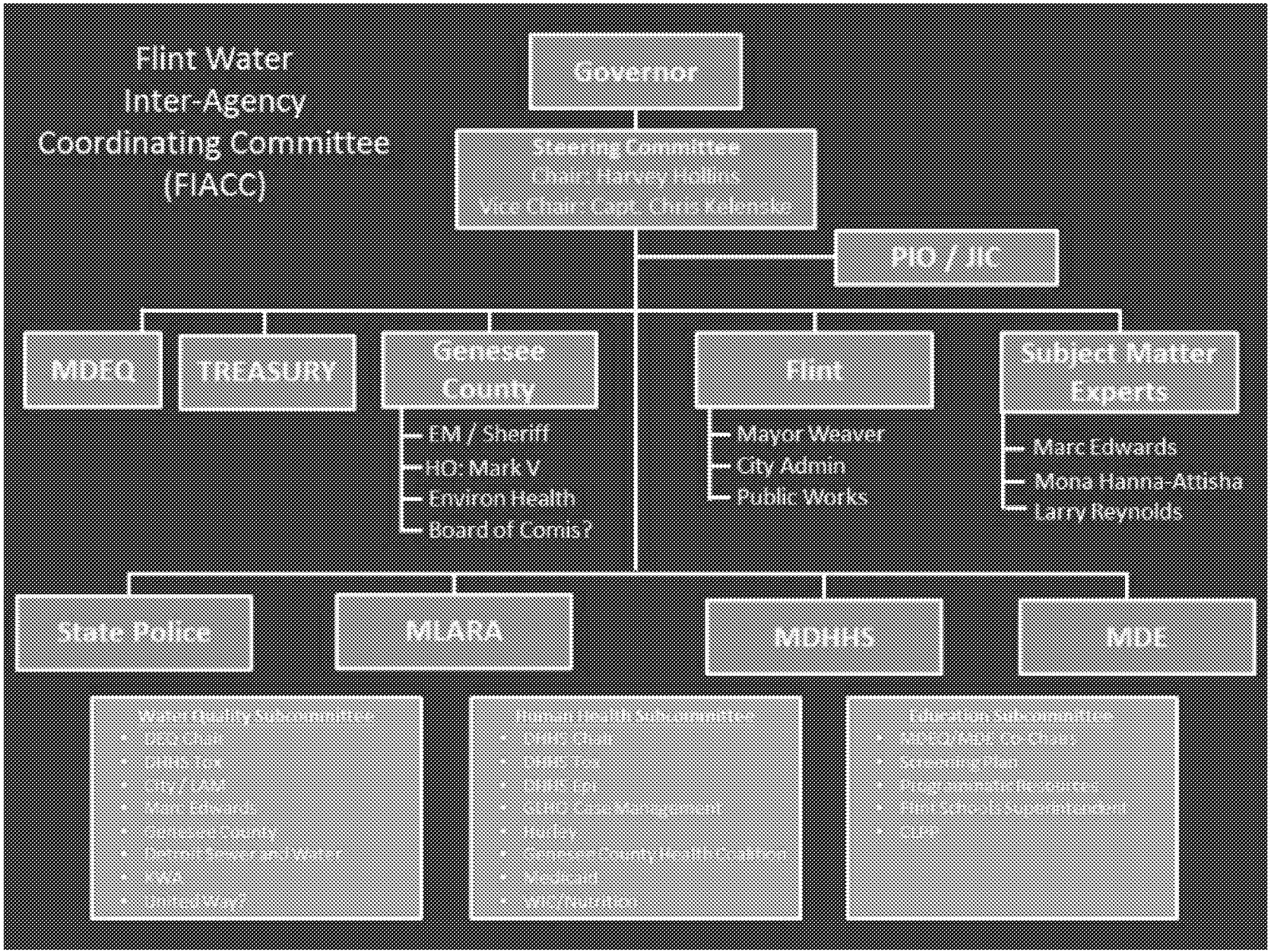
Interagency Workgroup Objectives

1. Determine and convey acceptable standards for potable water.
    - Identify needed remediation.
    - Convey the remediation plan objectives to all stakeholders and interested parties.
    - Logistics plan for distribution and serving homebound citizens with water and filtration
    - Implement the plan.
2. Determine health impacts for the impacted population.
    - Identify treatment methods.
    - Nutrition education and support
    - Coping with lead exposure (care, monitoring, neurodevelopmental screening, access to DBP specialists, psychologists/psychiatrists, expanded county services, etc.)
    - Convey the treatment plan objectives to interested parties.
    - Implement the plan.
3. Establish a public information protocol to effectively inform the community of the situation and actions taken.
    - Identify existing Public Information outlets within the city, county, and state.
    - Establish a Joint Information Center
    - Provide for Emergency Alerts and Updates
    - Leverage public and private education schools
    - Determine official information flow and approval of information.
    - Convey to interested parties.
4. Assess the status of the infrastructure and determine feasible actions to upgrade the water system.
    - Determine current state of the infrastructure.
    - Develop priorities, costs, and potential funding sources for infrastructure upgrades as part of a long term recovery plan.
    - Seek partners to assist (NGOs, Foundations, Business, etc.)
    - Implement the plan.

Final Thoughts

After the team provides input to this document, I would ask that Governor Snyder review and approve the approach, authorize Harvey Hollins to get the plan to Mayor Weaver no later than this weekend, and then proactively communicate the plan regardless of whether we get an Emergency declaration or not.

Also, we do believe setting up an Emergency Command Center which requires 24/7 staffing is sensible until AFTER Genesee County has demonstrated they did all they could and couldn't solve the problem. That is what is required under the law.


Flint Water Inter-Agency Coordinating Committee (FIACC)
Governor
Steering Committee
Chair: Harvey Hollins
Vice Chair: Capt. Chris Kelenske
PIO / JIC
MDEQ
TREASURY
Genesee County
FM / Sheriff
HO: Mark V
Environ Health
Board of Comis?
Flint
Mayor Weaver
City Admin
Public Works
Subject Matter Experts
Marc Edwards
Mona Hanna-Attisha
Larry Reynolds
State Police
MLARA
MDHHS
MDE

CITY OF FLINT

INCIDENT ACTION PLAN

STATE OF EMERGENCY

Objectives:

To provide short term relief and long term solutions in addressing the man-made emergency of increased lead levels in the City of Flint (the "City") water system resulting from the switch to Flint River as the City's water source as well as the threat to public health related to elevated blood lead levels in Flint residents, without interruption of the provision of public safety and other essential public services. Due to the fluidic nature of emergencies and the complexity of the City of Flint's declared emergency, this plan serves as a framework and may be altered as the emergency develops.

The Response Framework

The purpose of this plan is to organize efforts on behalf of the city to assess the extent of the City's infrastructure needs and risks to public health, provide immediate relief to those who are at risk, and establish long term solutions. In addition, the city must ascertain what immediate relief and long term solutions the City is capable of implementing based on what resources are available. For any activities that are beyond the resource capacity of the City, external sources of funding, supplies, and manpower must be sought.

There are a number of steps that must be taken in accordance with the Flint Emergency Support Operations Plan (SEOP), in order for the City to be compliant with the Genesee County Emergency Action Guidelines. These include the activation of the Incident Management Team, the Emergency Operation Center, and the sharing of essential documents with the County, including this plan. Information must also be shared by the City's Public Information Officer on a regular basis, as required by the SEOP.

This plan calls for the provision of immediate relief to those at risk in our community. Special consideration must be given to residents who belong to underserved groups, such as those who are homebound, undocumented, in poverty, etc. Additional consideration must also be given to the equitable provision of services throughout our community in order to equally protect the health and safety of every member of our community.

Implementation of this plan is to be conducted by the Incident Management Team, which will monitor the effective delivery of goods and services in order to address the conditions of the emergency.

Understanding the Issue:

October 1, 2015, the Genesee County Health Department issued a Public Health Emergency after elevated blood-lead levels were found among children in the City of Flint. This incident correlates with elevated levels of lead found in the City's drinking water after the City switched water sources in April of

2014 to the Flint River. The scope of this problem appears to be limited to Flint City Water Customers and their dependents. Public agencies from several levels of government, as well as charitable, nonprofit organizations have partnered with the City to provide immediate relief to Flint residents, including the expansion of health services, the provision of bottled water and NSF rated water filters. The city is also seeking long term infrastructure improvements to eliminate lead and other contaminants from the water system.

Gov. Rick Snyder appointed a task force to review "actions regarding water use and testing in Flint" and to make recommendations for future guidelines: Members of the state task force are Ken Sikkema of Public Sector Consultants, Chris Kolb of the Michigan Environmental Council, Dr. Matthew Davis of the University of Michigan Health System, Eric Rothstein of the Galardi Rothstein Group and Dr. Lawrence Reynolds of Mott Children's Health Center.

In an effort to halt the further escalation of this crisis, the City returned to receiving its water from the Detroit Water and Sewerage Department (DWSD) on October 16, 2015. Since that time, additional corrosion control program has started, estimating a reduction of lead levels over the next six months. In light of these efforts, concerns surrounding the quality of water and health of the residents persist to the point that Mayor Karen Weaver declared a State of Emergency on December 14, 2015 so as to resolve this crisis once and for all.

The current challenge facing the City is providing immediate relief and long term solutions of the quality of the water and health of residents while the City remains in a financially critical condition. It is hoped and expected that higher levels of government recognize this emergency as it pertains to the condition of the City's infrastructure and health of its residents, and do all things necessary to assist the City in the provision of relief and the execution of capital improvement projects that will eliminate the causes of this emergency.

Enhancing Understanding:

Information Collection

Essential Elements of Information (EEIs) can be qualified as the City's water tests containing lead results, the verification of lead water lines (both public and private), and health information. Water testing is performed by the City's water plant in cooperation with the MDEQ. The verification of lead water lines is being handled by University of Michigan Flint, who is currently digitizing the City's water line information and PSI Engineering, who is initiating the effort to verify lead lines by excavating an initial 150 residential lines. This information allows the Incident Management Team to assess the current condition of the emergency by way of determining the water quality and the condition of the water distribution infrastructure.

Information Analysis

The City has sought partners to assist in the analysis and attenuation of complex data. Wayne State University's center for Urban Studies has agreed to assist the City in its efforts to document and track lead water lines, water test results, and filter distribution with geographic information system (GIS) technology. This allows for easily updateable, digestible information to be presented to officials.

Assessment of Impacts

The City will need assistance in determining the total cost of damage done to the public health and infrastructure. As of now, only portions of this damage are visible.

PSI is providing some assistance by excavating 150 residential water lines to verify that they are comprised of lead. This is an initial step, but not enough. More resources will be needed to continue this process.

Continuous Situational Awareness

It is important that the Emergency Management Team receive continuous information regarding water testing results, lead water line numbers, and filter distribution information in order to gain a realistic and current perspective. Much of his information is currently available on the City's website (cityofflint.com) and more is added each week by the PIO team.

Actions taken in Response to the Emergency

Activation of the Incident Management Team

Upon the declaration of Emergency by Mayor Weaver, the Support Emergency Operations Plan (SEOP) was activated. The SEOP calls upon the Incident Management Team to generate the Incident Action Plan (IAP. Each member of this team serves a specific function as it relates to addressing the causes and effects of the emergency. The Emergency Management Team roster can be found in the SEOP on page 3, with a list of alternates on page 4 in case the need for succession arises.

Emergency Operations Center

The Emergency Operations Center (EOC) must be activated upon the declaration of a State of Emergency by the Mayor. This center is required by the SEOP and serves as a nerve center for the Incident Management Team. Here, emergency relief efforts are coordinated by key members of the Incident Management Team. In this case, these relief efforts consist of the distribution of water filters at

City Hall and community events, the distribution of bottled water throughout the city in conjunction with the efforts of community partners, and assisting with the circulation of water testing kits throughout the community. The EOC will also be monitoring and managing the inventory of relief supplies, such as water filters and bottled water.

According to the SEOP, the EOC must establish an incident tracking system. This system will serve as a work plan for the management of the emergency. In addition, it is essential that the IMT record water testing results, lead water line location information, and information about the distribution of water filters and bottled water all in one place so that information is readily available for the Incident Management Team. This information will also be sent out to the public and media in the form of daily regular updates by the City's PIO.

Communication

The EOC maintains a telephone system that exists to intake questions about relief efforts and to organize relief logistics. It is open from 8am to 5pm, Monday through Friday. A voicemail system and eventual email system will exist to handle requests and inquiries that occur outside of the normal operating hours. This system will be constructed by the City's IS department.

Public Awareness and Education

1. **Emergency Alerts and Updates:**
   The City's Public Information Officer will make available information as it relates to the emergency in the form of press releases, emails, and physical documents. Daily updates containing information on the distribution of water filters, bottled water, water testing, blood lead testing, and other relief efforts will be available on the City's website for the public to view. Information will be available at City Hall for residents.

2. **Joint Information Center:**
   The City's PIO will establish a joint Information Center that is organized to coordinate the efforts of multiple agencies to communicate with the public. This includes the circulation of joint press releases, public health information, educational materials, and updates relating to the State of Emergency. This committee is comprised of public information officers and public relations personnel to coordinate efforts to keep the public updated and informed. Regular updates to the media regarding events and progress will be made as news develops.

   The US EPA has offered assistance in the form of Public Information support. Additional support in this area has been provided by the Michigan State Police.

3. **Education:**
   Many government agencies and philanthropic organizations are already distributing information regarding the effects of lead on public health. It is important that the City assist in these efforts so vital information and knowledge is presented to all members of the community. The goal is to continue to eliminate misunderstandings and incorrect information as it relates to reducing lead in drinking water, pursuing medical help, and maintaining a healthy diet to reduce lead absorption in the body. Lead education is currently being performed by the Genesee County Health Department, the Michigan Department of Health and Human Services and Medical community at-large.

Assessment of Social Needs

In order to effectively and equitably provide immediate relief to Flint water customers, the City must take into account many of the socio-economic needs and limitations of the community. Some residents cannot get to City Hall for a water filter. Some residents do not have internet access. Literacy or a language barrier may also pose significant obstacles to the effective distribution of educational information and relief to those in need. These will be continuing challenges facing the community. At present these are the resources the City has available to mitigate some of those challenges.

Logistics

Logistics are being coordinated by the City Emergency Management Team's City's *Chief Logistics Officer*, who is the City Administrator. The CLO is responsible for the coordination, procurement, and transportation of goods and services, which is essential for effective implementation of the response plan.

Fixed Distribution Points

There are several locations throughout the city where residents may acquire a water filter. These locations are:

Flint City Hall
1101 South Saginaw, Flint MI 48502

Genesee County Community Action Resource Department (GCCARD)
601 North Saginaw, Flint MI 48502
and
2727 Lippencott Blvd, Flint MI 48507

Michigan Department of Health and Human Services
4809 Clio Road, Flint MI 48504
and
125 E. Union Street, Flint, MI 48502

Activation of Ward Distribution Centers

Each of the nine wards will have activated distribution centers that are primarily managed by City Council Members or their designees.

Flint City Council – Water Distribution Sites

WARD	COUNCILPERSON	LOCATION	ADDRESS
1	Eric Mays	Hasselbring Senior Center	1002 W. Home Avenue
2	Jackie Poplar	Joy Tabernacle Church	2505 N. Chevrolet Avenue
3	Kerry Nelson	Antioch Baptist Church	1083 E. Stewart Avenue
4	Joshua Freeman	Flint Fire Station No. 5	3402 Western Road
5	Wantwaz Davis	Doyle/Ryder Elementary School	1040 N. Saginaw Street
6	Herbert Winfrey	New Community Baptist Church	1375 Lavender Avenue
7	Monica Galloway	Brennan Community Center	1301 Pingree Avenue
8	Vicki VanBuren	Flint Southwestern Academy	1420 W. 12th Street
9	Scott Kincaid	Dort Mall Police Service Station	3600 S. Dort Highway

Mobile Distribution Centers

With the help of transportation agencies, like the Metro Transit Authority (MTA), meals on wheels, and GCCARD, the city can help establish mobile distribution centers and delivery systems that can provide water filters, bottled water, and nutritious foods, among other types of relief accompanied by educational materials to neighborhoods and to homes of people who experience limited mobility.

- Mass Transportation Authority-MTA bus passes: Assisting residents with bus passes to improve their mobility will increase their chances of receiving help. Transportation services will also improve residents' access to medical care.
- MTA-Your Ride mobile distribution:
    - Estimated Costs: $25 per hour to deliver water and filters to homes throughout the City.

Problem 1. Public Health Emergency

The first objective in addressing this emergency is reducing, and eventually eliminating, the danger to public health. As City water coming out of faucets continue to contain lead, and copper and other

harmful contaminants exceeding government guidelines and regulations, it poses a risk to the people of our community. Preventative measures must be taken to avoid the effects of toxicosis that are difficult if not impossible to completely reverse.

As far as preventative measures are concerned, education, water filters, and bottled water must be provided to every household in the City in order to reduce the chances of lead exposure, especially to our most vulnerable members of the community. If lead exposure has occurred, resulting in elevated blood lead levels, immediate and sustained medical attention must be available to those affected. Health services must be expanded in the area to accommodate increased numbers of case loads and specialized care regarding lead poisoning and its effects.

Immediate Relief for Public Health:

1. Prevention: Education, water filters and replacement cartridges, free water testing, and bottled water must be available to everyone.
2. Access to nutritious food that reduces the risks of lead absorption by the body. The City can coordinate activities with the County Health Department

Long Term Solutions: Maintaining Public Health and Coping with Lead Exposure

1. Work closely with the Genesee County Health Department and Michigan Department of Health and Human Services in order to provide sustainable care and monitoring of children exposed to lead. This care must be available for them for several years-preferably several decades.
2. Support and education for primary care providers regarding aggressive long-term neurodevelopmental screening and testing.
3. Improved access to developmental and behavioral (DBP) specialists, pediatric psychologists, pediatric psychiatrists.
    a. Pre-emptive referral to mental health/ toxic stress screenings.
    b. Support capacity building and or incentivize recruitment to allow Genesee health system (CMH) to build this capacity which is currently needed and lacking.
4. Increase recognition and education regarding trauma informed care, social determinants of health (SDOH).
5. Expand State funded Genesee Health System (CMH) services.
    a. Infant mental health (30 day capacity)
    b. Child case management
    c. Home based services
    d. Trauma informed care- trauma focused CBT

Problem 2. Lead Contamination in the Water

Immediate Relief:

1. Education, water filters and replacement cartridges, free water testing for water customers, and bottled water must be available to everyone. Water filters can be obtained at any of the fixed distribution points throughout the City.
2. Identification and verification of lead water service lines throughout the city- both public and private.
3. Assistance to identify lead pipes within buildings and homes.

Distribution of Bottled Water:
At this point, we are directing all offers for donations to the Food Bank of Eastern Michigan. It is imperative that water be accessible to all members of the community through a variety of distribution channels. These channels are explained in the Logistics Section of this plan.

Distribution of Test Bottles:
Water testing kits can be picked up at City Hall with instructions. Test results are posted on the City's website to raise public awareness and encourage more participation.

Long term Solutions: Capital Improvements Needs
The distribution of filters, water, and food to counter the effects of lead are essential response efforts to keep people safe. However, long term solutions are required to keep people healthy, to eliminate lead from the public and private water distribution system distribution, and to provide affordable clean water. Our public infrastructure and utilities must be reliable, sustainable, and equitable in order for this community to rebound after this emergency. The following long term solutions must be implemented in order to set the City of Flint on a course for recovery. These solutions come at a heavy cost for a City that is currently in receivership. The City has experienced financial distress due to this Emergency, in addition to a two million dollar loss from switching back to DWSD. The City has diligently applied for Fiscally Distressed Cities, Villages, and Townships, Grant in order to supplement funding for capital improvement projects. It is essential that these grants be awarded in order to achieve long term solutions.

1. COMPLETE **Transition to a Temporary Safe Water Source until the Completion of KWA:**
   This has already occurred. On October 16, 2015, Flint returned to receiving its water from DWSD on a 9 month agreement. This agreement will expire in June 2016, when the KWA is projected to be complete. The City had to pay $2 million out of its general fund to make this switch.

2. IN PROGRESS **Additional Corrosion Control added to the Water System:**

This is already occurring. In early December, 2015, Flint began to add additional corrosion control to the water coming in from DWSD in attempts to rebuild the protective scale inside its pipes. This is estimated to reduce lead levels in two to six months.

3. **Faucet Replacement:**
   Replacement of Water faucets, and drinking fountains in the school system. It has been determined after state inspections that many sources of lead contamination in the School System's water were the faucets themselves. These faucets need to be replaced.

4. **Water Line Replacement:**
   Water Line Replacement to reduce antiquated infrastructure and lead service lines. These lines must be identified, verified, and replaced. Residents who are facing financial hardships must have access to assistance to cover the costs of these replacements through access to grants and (forgivable) loans made available through State and Federal agencies. The corrosion damage to public and private lines that Flint River water caused is still being determined.
   - Replacement of an estimated fifteen thousand (15,000) lead service lines at an estimated cost of three thousand dollars ($3,000) per line. Total costs forty –five million dollars ($45,000,000). This project is estimated to be one of the most cost-intensive endeavors related to ameliorating water contaminants.

5. **Reimbursement of Critical Expenditures:**
   Seeking reimbursement of two million dollar cost of returning to DWSD and forgiveness of Water Revolving Loan Debt from the State of Michigan.

6. **KWA Capital Improvements**: The City has reconnected to Detroit temporarily until a water line from Port Huron is developed. The new water line known as the KWA pipeline or Karegnondi Water Authority is expected to bring water to the City from Lake Huron by July. The current cost agreement between Flint and DWSD is for nine months, therefore it is imperative that KWA be completed as soon as possible. Assistance relating to capital improvements to expedite this process will help to achieve long term goals.

KWA Capital Improvements:	**Estimated Costs:**
a. Transfer Station to Dort Reservoir	*$4,500,000*
b. Raw water line to pump station #4	*$636,000*
c. Phosphoric acid feed system	*$186,000*
d. Alum Feed system	*$40,000*
e. Post filtration system	*$387,289*

f.	*SCADA Upgrades*	*$424,000*
g.	*Sewer Relining*	*$100,000*
	Total	***$6,273,289***

Ancillary Considerations: Public Safety during an Emergency

During a time of emergency public safety agencies need to be prepared to respond to threats to public safety and critical infrastructure. The City is facing a man-made emergency that is threatening the public health. Resentment and hostility toward local institutions and municipal government is at a significant level.

Critical infrastructure should be safeguarded if the need arises. This includes increasing security at City Hall to reduce potential for public safety risks. In the case of credible threats to public infrastructure, it may be required to hire private security company for first line of defense. Private Security is lower cost, thereby making it the first option. The minimum response is acted upon first, elevating only if the need arises. Credible or imminent threats of damage or destruction to critical infrastructure requires an elevated response. Such needs may require over-time police officers to address critical situations. Mutual aid from surrounding communities can be requested if Flint public safety is overextended.

Implementation:

Community Partners

Financial limitations of the city persist while it confronts this emergency. Many community partners have offered their assistance to perform various needed functions. The city is heavily reliant on the assistance that government agencies and nonprofit organizations have provided.

The Mott Foundation

The Mott Foundation has provided financial assistance, especially in their generous contribution of $4 million. In addition, the Mott Foundation has recently pledged an additional

United Way

The Genesee County United Way has provided significant financial assistance in the way of purchasing and helping to distribute water filters since the public health emergency began on October 1st, 2015.

Genesee County Community Action Resources Department (GCCARD)

GCCARD is organized to fight poverty and has been a primary partner in the distribution of water filters. It has also regularly supported the city with the logistics and availability of water filters at City Hall.

Genesee County Health Department

Has provided educational information to Flint Water customers

Genesee County Board of Commissioners

The Board of Commissioners have pledged their support to help Flint seek solutions to this crisis. The Board has already assisted in making health and nutrition information available to the public.

Assistance from Wayne State University

Wayne State University's Center for Urban Studies will be providing technical GIS support to assist in the documentation of emergency relief efforts.

The US Environmental Protection Agency

Region 5 EPA has offered assistance with Public Information distribution during the emergency.

Outside Help is still needed…

The City of Flint is forever thankful to our community partners who have given so much to help so many people. However the magnitude of this emergency calls for more resources that are beyond the capacity of the combined local organizations and government agencies. Long term solutions will require a heavy investment in health care and capital improvement projects to upgrade the city's antiquated water distribution system.

- Help with Immediate Relief in terms of assuring allocative efficiency. Distribution should be equitable- assistance from other governments required to assure this.
- Reaching communities for the distribution of water filters, water, and educational materials.
- Help with Water Testing to increase participation and lead education.
- Increasing the rate of water testing
- Assistance is required to fund essential capital improvement projects to guarantee clean and safe water.

From: Eden- Umich <ewells@umich.edu>
Sent: Friday, October 09, 2015 10:27 AM
To: Moran, Susan (DHHS)
Cc: Lyon, Nick (DHHS);Lasher, Geralyn (DHHS);Hertel, Elizabeth (DHHS);Becker, Timothy (DHHS);Grijalva, Nancy (DHHS)
Subject: Re: Flint Drinking Water Action Plan Update - FOIA EXEMPT AND ATTORNEY-CLIENT PRIVILEGED

Sorry for the delay – I've literally been on the phone for the last two hours. Could we please add that we need to have a public health campaign or effort so if we could assist local efforts at educating citizens about perceived an actual risks to lead exposure and what to do to reduce those risks. Thanks.

Sent from my iPhone

On Oct 9, 2015, at 9:00 AM, Moran, Susan (DHHS) <MoranS@michigan.gov> wrote:

> Support local and county efforts to educate providers about Lead monitoring and follow up protocols.
>
> We want to coordinate with health dept and medical society on these efforts- Eden feel free to add.
>
> FyI- there are many kids who have a capillary (finger prick) test, but not a venous blood test, which is the next step in protocol.
>
> Sent from my iPhone
>
> On Oct 9, 2015, at 8:41 AM, Lyon, Nick (DHHS) <LyonN2@michigan.gov> wrote:
>
> > Some of these may belong to us. Are there things we should add? I would think so
> >
> > Begin forwarded message:
> >
> > **From:** "Wyant, Dan (DEQ)" <WyantD@michigan.gov>
> > **Date:** October 9, 2015 at 8:14:12 AM EDT
> > **To:** "Lyon, Nick (DHHS)" <LyonN2@michigan.gov>, "Zimmer, Mike (LARA)" <zimmerm@michigan.gov>
> > **Cc:** "Thelen, Mary Beth (DEQ)" <THELENM2@michigan.gov>
> > **Subject: FW: Flint Drinking Water Action Plan Update - FOIA EXEMPT AND ATTORNEY-CLIENT PRIVILEGED**
> >
> > I will schedule a meeting or call to discuss. Governor would like a point person assigned to each of these items.
> >
> > Dan Wyant, Director
> > Department of Environmental Quality
> > 517-284-6700 (New Number)

From: Wyant, Dan (DEQ)
Sent: Thursday, October 08, 2015 5:40 PM
To: Scott, Allison (GOV); Muchmore, Dennis (GOV); Agen, Jarrod (GOV); Dickinson, Sarah (GOV); Emmitt, Beth (GOV); Snyder, Rick (GOV)
Cc: Wyant, Dan (DEQ)
Subject: Flint Drinking Water Action Plan Update - FOIA EXEMPT AND ATTORNEY-CLIENT PRIVILEGED
Importance: High

Dear Governor,

Below are our 26 action steps we are working on:

26 Action Steps for Next Week, October 12-16, 2015

1. Identify schools and prioritize for assessment
2. Get DLARA plumbers organized
3. Complete sampling instructions
4. MDARD info for restaurants
5. Update 2004 letter to EPA
6. Approve Flint plan for water line
7. Lead education plan for schools for Drinking Water
8. Begin regular meetings with Flint
9. Schedule WTP tour
10. Meet with schools and DLARA-invitation only
11. Update Web page
12. Contact DHHS to see where they are with United Way
13. Circulate protocol draft with EPA
14. Contact City about homeowner sample delivery
15. Communicate to MDARD and City that business samples should be coordinated though lab
16. Figure out number of samples from schools and child care facilities
17. Confirm Lynda Dykema is POC for DHHS
18. Contact KWA to find out if there are any bottlenecks we need to remove
19. Expedite 399 Plan and Phosphate Plan
20. Get update on service line index card conversion and identify where partial replacements exist
21. Make sure DHHS gets info so they can cross reference
22. Legislative contacts
23. Legislative time line and summary
24. Dan reconnect with state superintendent
25. Conduct After Action Plan
26. Change Part 54-Drinking Water Revolving Loan Fund

If you have any questions, please let me know.

Dan Wyant
Director

From: Lyon, Nick (DHHS)
Sent: Thursday, October 15, 2015 10:12 AM
To: Lasher, Geralyn (DHHS);Hertel, Elizabeth (DHHS)
Subject: FW: Teamwork and cooperation; Wells revised draft of response letter (Oct 14)
Attachments: Sheldon A. Neely Ltr 10.12.15_Rev.docx

Are we good with the response, and more importantly the plan contained within?

From: Wells, Eden (DHHS)
Sent: Wednesday, October 14, 2015 4:08 PM
To: Lasher, Geralyn (DHHS) <lasherg@michigan.gov>; Lyon, Nick (DHHS) <LyonN2@michigan.gov>; Hertel, Elizabeth (DHHS) <HertelE@michigan.gov>
Cc: Grijalva, Nancy (DHHS) <GrijalvaN@michigan.gov>; Rockefeller, Cheryl (DHHS) <RockefellerC@michigan.gov>
Subject: RE: Teamwork and cooperation; Wells revised draft of response letter (Oct 14)

Nick et al.

My revised response to Mr. Neeley, attached.

Eden

From: Wells, Eden (DHHS)
Sent: Wednesday, October 14, 2015 3:47 PM
To: Lasher, Geralyn (DHHS); Lyon, Nick (DHHS)
Cc: Grijalva, Nancy (DHHS)
Subject: Fwd: Teamwork and cooperation

I drafted a letter and sent up yesterday but had not heard back if I could send to him???

Sent from my iPhone

Begin forwarded message:

> **From:** "Rep. Sheldon Neeley (District 34)" <SheldonNeeley@house.mi.gov>
> **Date:** October 14, 2015 at 3:33:10 PM EDT
> **To:** "[PPI]" <[PPI]>
> **Cc:** "Muchmore, Dennis (GOV" <muchmored@michigan.gov>, "lyonn2@michigan.gov" <lyonn2@michigan.gov>, "Wellse3@michigan.gov" <Wellse3@michigan.gov>, "hollinsh@michigan.gov" <hollinsh@michigan.gov>, "wyantd@michigan.gov" <wyantd@michigan.gov>
> **Subject: Teamwork and cooperation**
>
> Honorable Rick Snyder, Governor
> State of Michigan
>
> Dear Gov. Snyder,
>
> I'm writing to voice my displeasure with the lack of communication between your office and mine concerning the water crisis in the city of Flint.

Since I have been in a position to represent my community at the Capitol, I have been in constant contact with your office to offer advice, help, partnership and solutions. My community elected me to represent them in Lansing, and I have been striving to do just that. Several letters have reached your office, and I have been highly vocal about the need to come together to fix the water crisis. This has been done with the understanding that we both care about the people of Flint, who I represent in the Legislature, and who you represent as governor of this state.

I have also reached out to Dr. Eden Wells and the Department of Health and Human Services and the Michigan Department of Environmental Quality to be proactive in addressing the issue of lead-laced water damaging the minds and bodies of Flint's citizens, especially the children. While this crisis could be solved by switching water sources, the problems will remain in the health of our future generation.

I had hoped that this entire problem would have been addressed through partnership, teamwork and cooperation. It is unfortunate that hasn't been the case. It is also unfortunate that common courtesy to my office on being kept up to speed with any operational changes and financial solutions has not been timely communicated.

I will continue to keep the lines of communication open as we address the continued problem of health in Flint, and I hope you will take the opportunity to join me in conversation to find future solutions.

For the Love of the Community,

Sheldon A. Neeley, State Representative
34th District

CC: Dennis Muchmore
Nick Lyons
Dan Wyant
Dr. Eden Wells
Harvey Hollins

STATE OF MICHIGAN
DEPARTMENT OF HEALTH AND HUMAN SERVICES
LANSING

RICK SNYDER
GOVERNOR

NICK LYON
DIRECTOR

October 12, 2015

The Honorable Sheldon A. Neeley
Michigan House of Representatives
P.O. Box 30014
Lansing, MI 48909

Dear Representative Neeley:

Thank you for your concerns, and your request for information last week.

Currently, all children in Flint on Medicaid will be covered for lead testing. Further, any physician can order a lead test and this test should be covered by all health insurance programs. Any Flint child not on Medicaid, WIC, or health insurance can get a blood lead level drawn at the Genesee County Health Department.

We are coordinating with and supporting the lead role of the Genesee County Health Department (GCHD) and its Health Officer, Mark Valacak, and his staff to prioritize lead testing of Flint children. The first action is to follow-up and test any child who has had an elevated blood lead level over 5 mcg/dl since April 2014; then, any child within the three schools identified as having lead levels elevated in their water system, then all other Flint children, with younger ages prioritized before older ages.

GCHD is coordinating these actions via their partnerships with health plans, provider clinics, Genesee County Medical Society, and the Greater Flint Health Coalition. We are in daily communications with GCHD and are assisting with planning and response at all levels.

Sincerely,

Eden Wells, MPH, FACPM
Chief Medical Executive
Michigan Department of Health and Human Services

EW:cr

cc: Nick Lyon

Nancy Grijalva

From: Peeler, Nancy (DHHS)
Sent: Monday, November 23, 2015 3:47 PM
To: Lounds, Elizabeth (DHHS)
Subject: form to change over into Excel
Attachments: FLINT BLOOD LEAD CM - weekly status tracking form v2 11 20 15.docx

FLINT BLOOD LEAD LEVEL CASE MANAGEMENT, ORGANIZED BY TESTING PROTOCOL PRIORITY GROUPS

		A	B	C	D	E	F	G	H	I	J
	Target Population	**# for whom contact has been attempted**	**% for whom contact has been attempted** (Col. A / total for row)	**# successfully contacted and offered CM**	**% of total % of attempted** (Col. C / total for row AND Col. C / Col. A)	**# of children receiving CM**	**% of total % of contacted** (Col. E / total for row AND Col. E / Col. C)	**# of children receiving CM who live in Flint**	**% of CM in Flint** (Col. G / Col. E)	**# of CM Medicaid claims filed**	**% for whom Medicaid claims filed** (Col. I / Col. E)
PRIORITY LEVEL 1	All children with elevated Capillary ≥ 5 from April 2014 – September 2015 (row total =75)										
	All children with newly elevated Venous ≥ 5 from April 2014 – September 2015 (row total = 76)										
	All children with new elevated Capillary ≥ 5 since October 2015 (row total = X*)										
	All children with new elevated Venous ≥ 5 since October 2015 (row total = X*)										
	TOTALS										

* *X will reflect the new, weekly numbers*

Metrics included in contract (as amended 11.18.15):

1. Number and percentage of target children with elevated blood lead levels of **≥ 5 ug/dL** for whom contact has been attempted.
2. Number and percentage of target children with elevated blood lead levels of **≥ 5 ug/dL** that are successfully contacted and offered case management services.
3. Number and percentage of target children receiving case management services.
4. Number and percentage of target children receiving case management services residing in the City of Flint.
5. Number of Medicaid claims filed for children enrolled in Medicaid who receive testing or nursing assessment visits.

From: Scott, Robert L. (DCH)
Sent: Thursday, October 16, 2014 11:09 AM
To: Houk, Emily (DCH);Howard, Javier (DCH)
Cc: Lounds, Elizabeth (DCH)
Subject: RE: PPTs on LPP
Attachments: CLPPP Presentation for PH Director v2.pptx

Hm, here's another one, maybe more to your purpose.

From: Houk, Emily (DCH)
Sent: Thursday, October 16, 2014 10:35 AM
To: Scott, Robert L. (DCH); Howard, Javier (DCH)
Subject: PPTs on LPP

Hey there,
I have to put together a ppt presentation for Rashmi on early childhood prevention programs including LPP.

Do you have any slides that talk about your work? Specifically, I am looking for ones that answer the question:
1. What is the LPP program?
2. What does it do?
3. How does it do this?
4. What outcomes is it achieving?

I think Nancy may have created something like this for Sue Moran...if so, just send that along.

Thanks,
Em

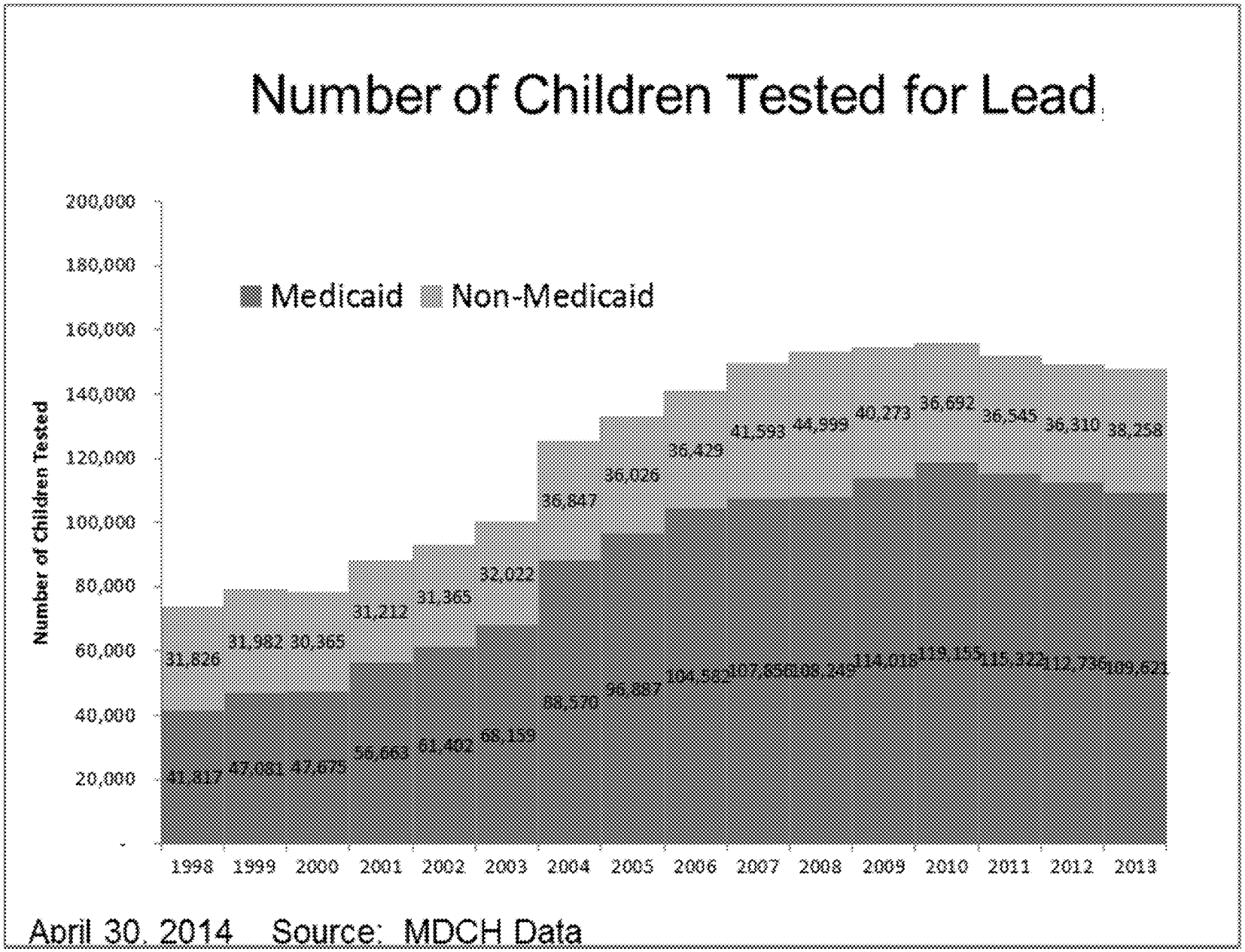
Emily Houk, Communications Consultant
Michigan Home Visiting Initiative
Michigan Department of Community Health
517-896-2712
www.michigan.gov/homevisiting/

Status, Challenges & Next Steps

Michigan Department of Community Health

Background/History

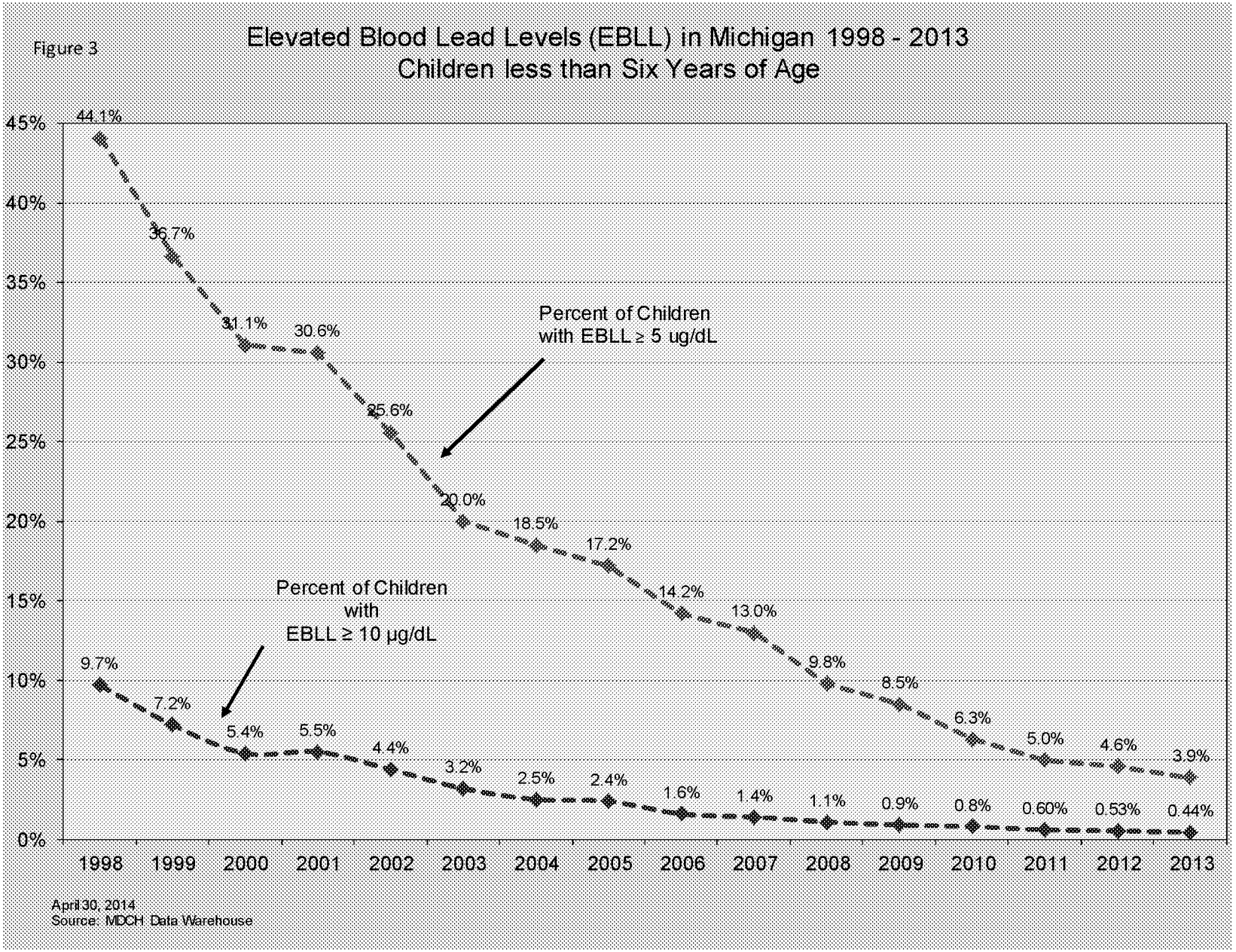
Childhood LEAD POISONING prevention program



April 30, 2014 Source: MDCH Data

Background/History

Childhood LEAD POISONING prevention program



Legislation

Childhood LEAD POISONING prevention program

Public Health Code

- Section 333.5474 – Establishment of lead poisoning prevention program; components; reports.
  - Coordinated and comprehensive plan to minimize exposure to lead-based paint hazards.
  - Educational and outreach program.
  - Technical assistance system for health care providers.
  - Surveillance system, with all tests reported to state.
  - Legislative report.

Legislation, cont.

Childhood LEAD POISONING prevention program

Public Health Code

- Section 333.20531 – Lead analysis; clinical laboratory reporting requirements.
  - Electronic reporting of blood lead analysis to Department.

History of CLPPP Funding

Childhood LEAD POISONING prevention program

Source	FY2008	FY2009	FY2010	FY2011	FY2012	FY2013	FY2014	FY2015
CDC	$929,857	$841,059	$760,552	$731,894	$544,500	$109,200	$0	??
MCH Block	$490,000	$490,000	$490,000	$490,000	$490,000	$490,000	$1,076,900	$1,072,500
General Fund	$106,900	$106,900	$107,600	$110,900	$111,400	$113,900	$116,300	$113,700
Title XIX match (on GF/Healthy Michigan)	$144,150	$193,763	$22,720	$44,448	$0	$0	$0	??
Healthy Michigan	$1,000,000	$1,000,000	$0	$0	$0	$0	$0	$0
MIECHV	--	--	--	--	--	$20,000	$0	$0
TOTALS	$2,670,907	$2,631,722	$1,380,872	$1,377,242	$1,145,900	$733,100	$1,193,200	$1,186,200

History of CLPPP Staffing

Staff	FY2008	FY2009	FY2010	FY2011	FY2012	FY2013	FY2014	FY2015
Nurse/Program Coordinator	1	1	1	1	.4	0	0	0
Surveillance Manager	1	1	1	1	.6	1	1	1
Nurse Consultants	2	2	2	1	1	1	1	1
Community TA	0	0	0	0	1	0	0	0
Surveillance Data Assistants	2	2	2	2	1	1	1	1
Secretary	1	1	.5	.5	0	.5	.5	.5
TOTALS	7	7	7	5.5	4	3.5	3.5	3.5

Current Context

CDC Response to Advisory Committee on Childhood Lead Poisoning Prevention: Recommendations in "Low Level Lead Exposure Harms Children: A Renewed Call of Primary Prevention." May 2012

- Eliminates term "level of concern" of 10 µg/dL , moves to a **reference value** that is based on 97.5 percentile of the BLL distribution of children aged 1-5 in USA, currently at **5 µg/dL**.

- Emphasizes **preventing lead exposure** rather than responding after exposure has taken place.

http://www.cdc.gov/nceh/lead/ACCLPP/CDC_Response_Lead_Exposure_Recs.pdf

Current Context, cont.

AAP Pediatric Environmental Health Specialty Unit (PEHSU): Recommendations on Medical Management of Childhood Lead Exposure and Poisoning. June 2013

- Updates AAP recommendations to match 2012 CDC guidance.
- Incorporates for the first time recommendations for medical management of lead levels below 10 µg/dL , including anticipatory guidance by primary care provider.

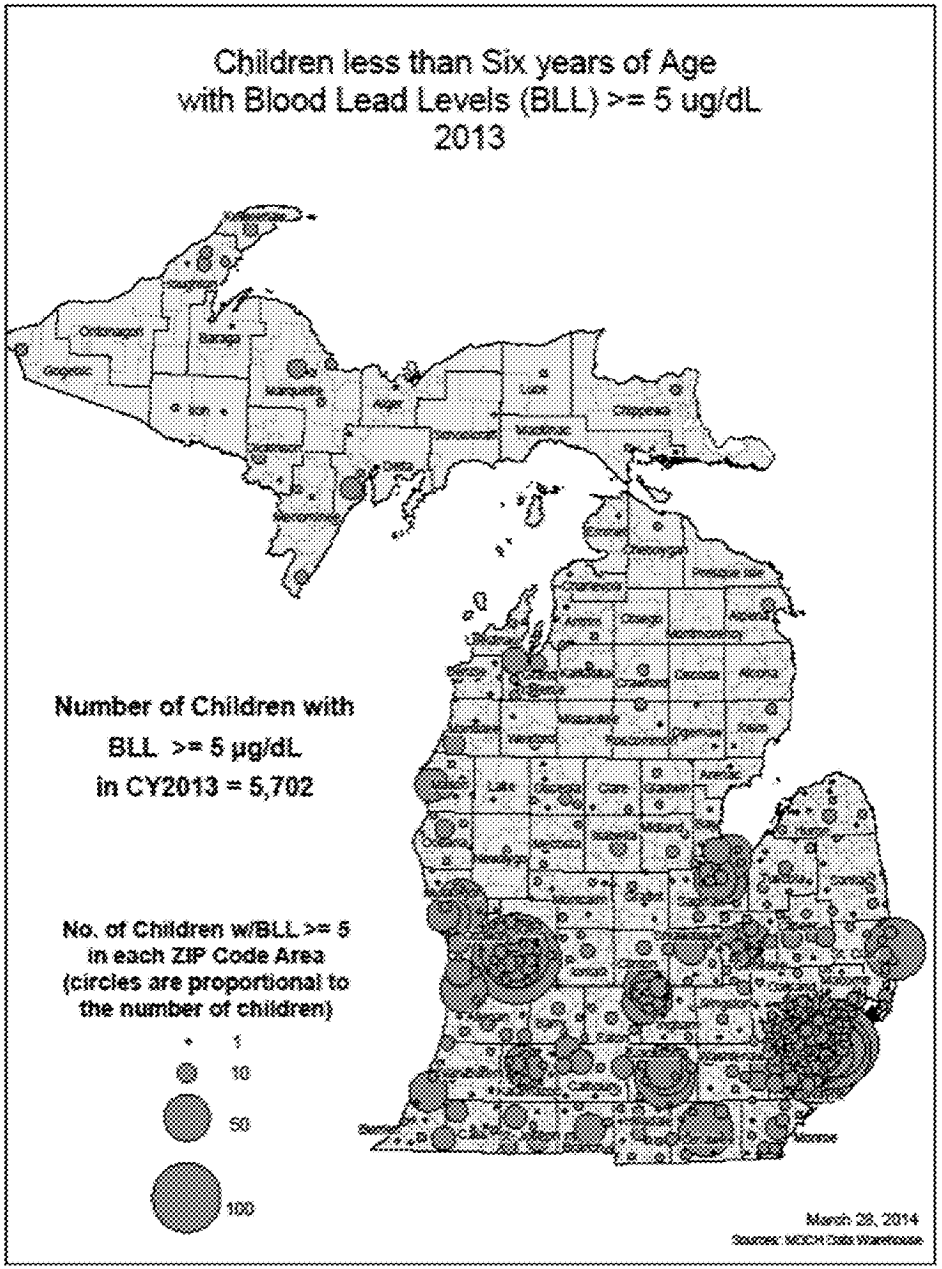
Current Context, cont.

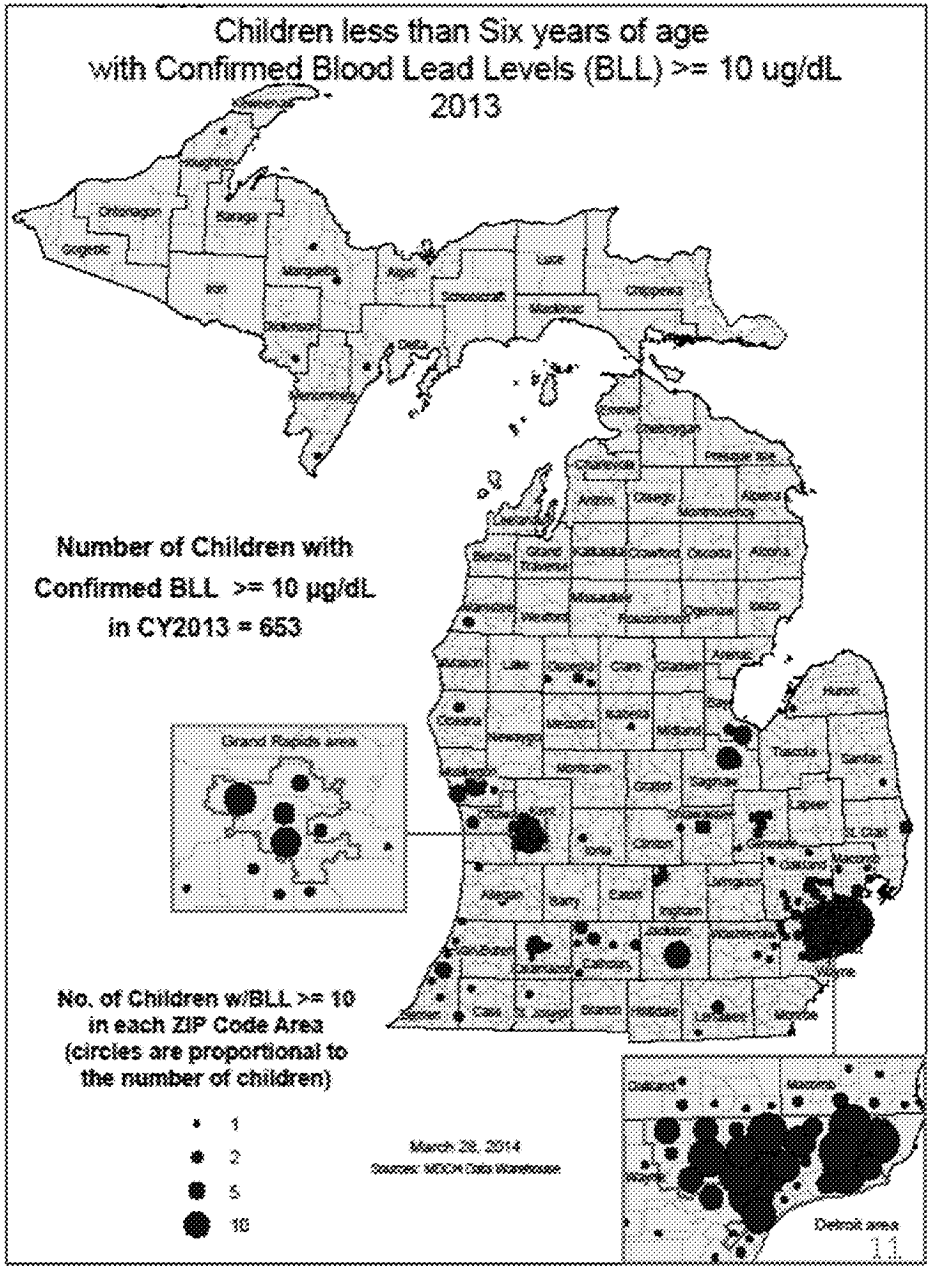
- Medical Services Administration is incorporating updated AAP Recommendations into new EPSDT chapter of the Medicaid Provider Manual, Summer/Fall 2014.

- CLPPP is in the process of updating Program Provider Guidelines and other program documents.

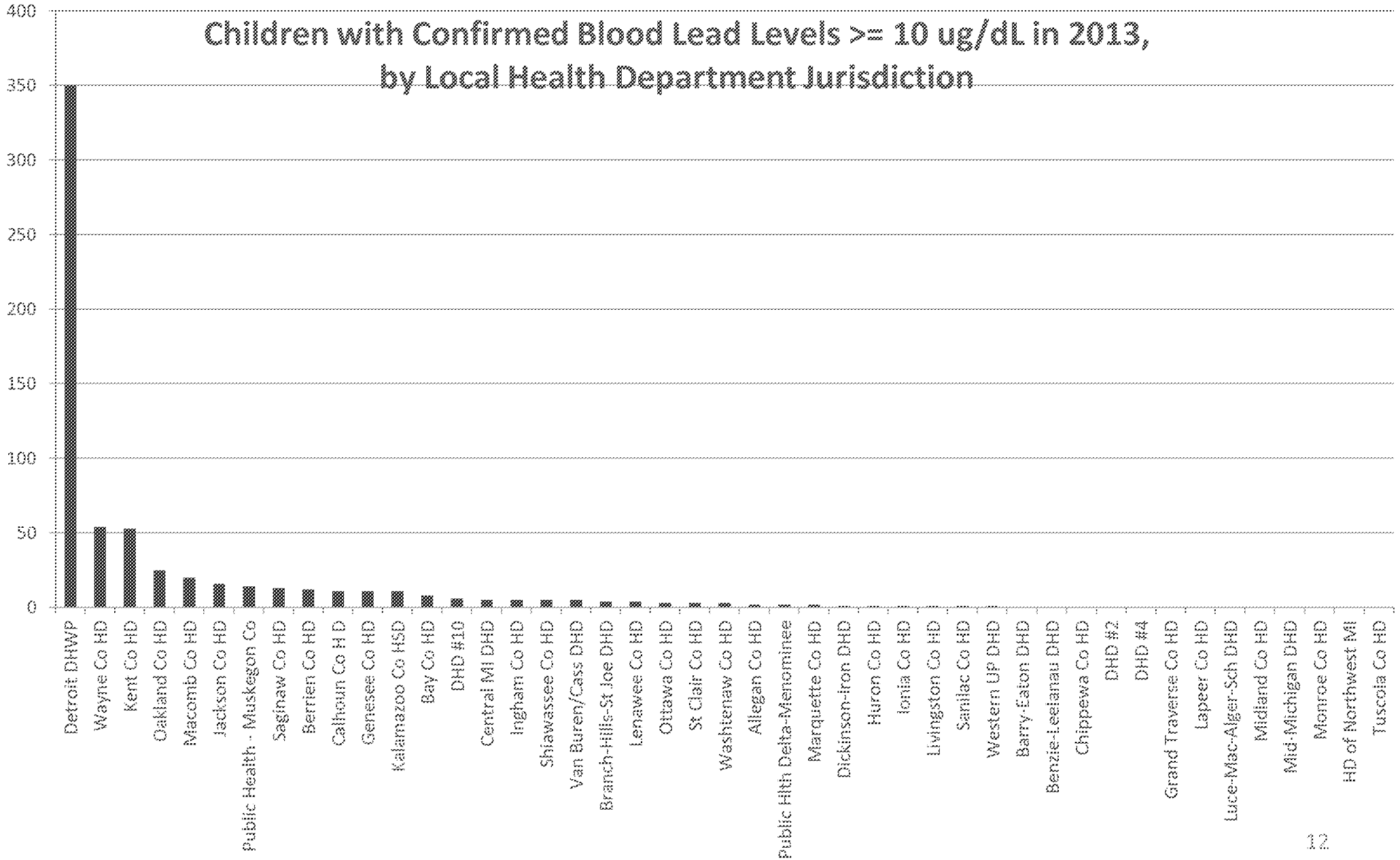
Current Status

Childhood LEAD POISONING prevention program





Current Status

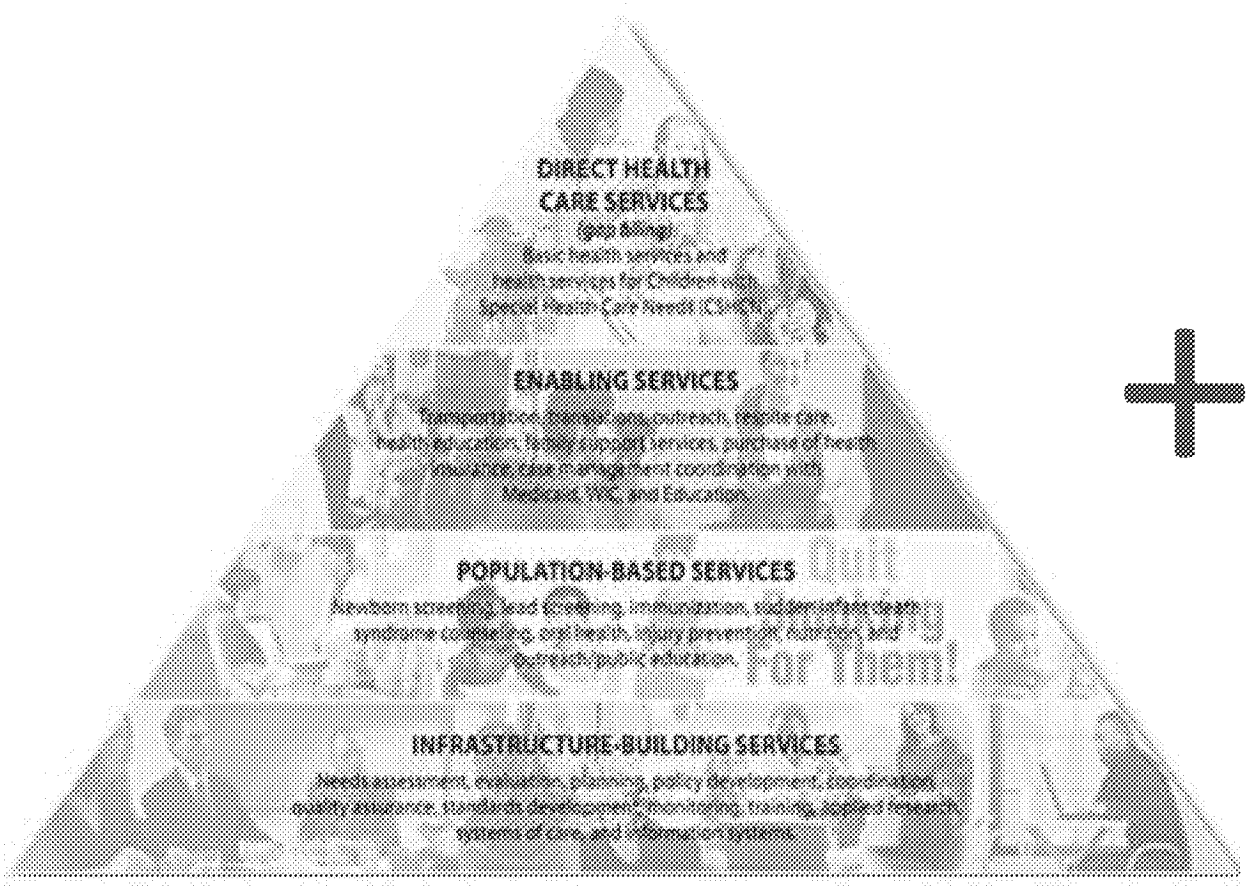


CLPPP Activities - 2013

- Worked with stakeholders to begin a CQI process; 2 primary issues identified:
  - Education for Providers
  - Issues with Medicaid billing
- Worked with Public Sector Consultants and stakeholders to develop an Education & Outreach Plan in 2013.

How we organize our work

Childhood LEAD POISONING prevention program



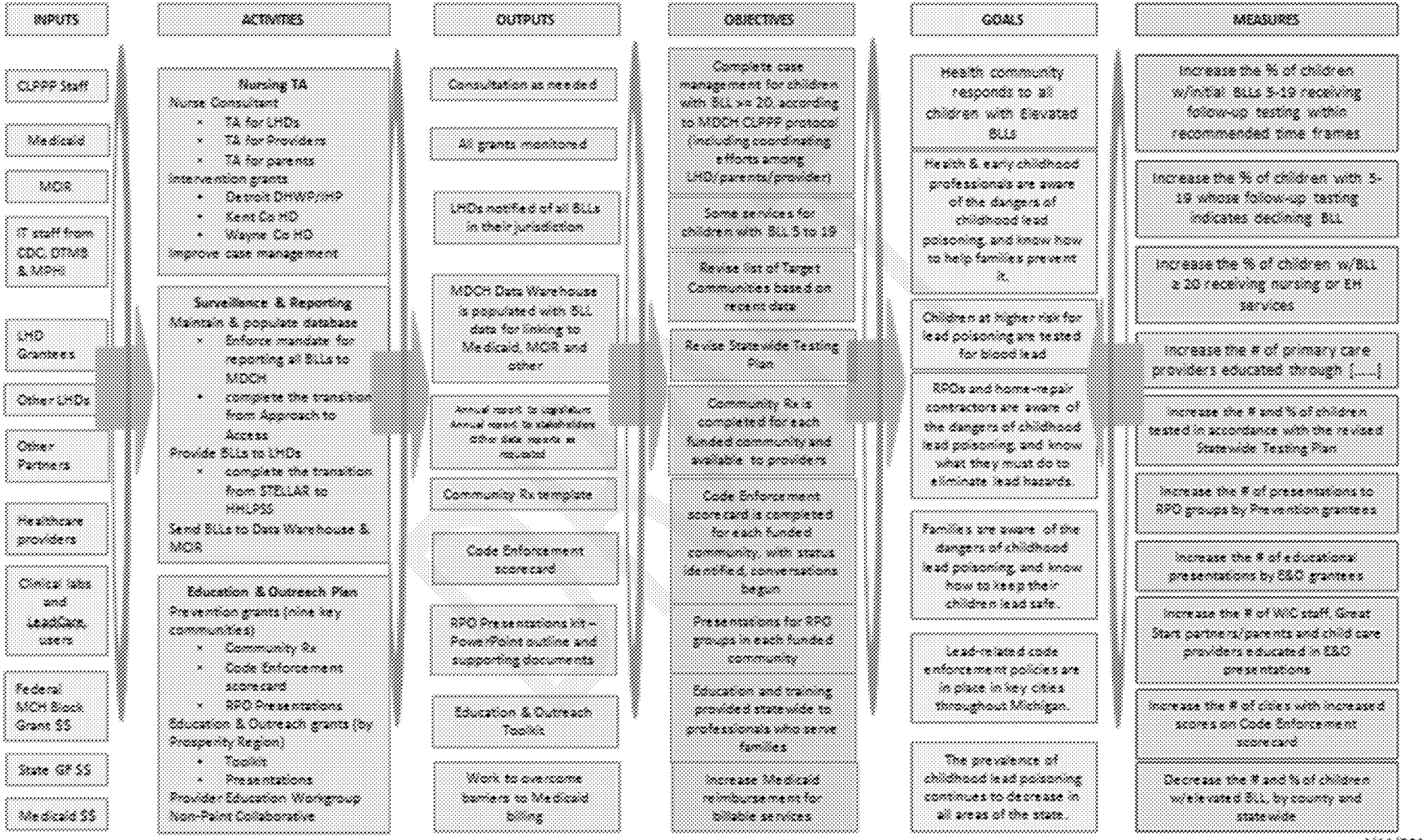
+

Michigan Public Health Code

PA 368 of 1978
Section 333.5474

CLPPP Logic Model

Childhood LEAD POISONING prevention program



4/11/2014

CLPPP Activities - 2014

Childhood LEAD POISONING prevention program

- Convening a Provider Work Group with Matt Davis; includes Physicians and Medicaid Health Plans.
- Working with MDCH Communications Office to develop a new CLPPP Tool Kit, targeting "health care providers, child care providers, public schools, owners and tenants of residential dwellings, and parents of young children" (from PH Code).
- Working with Deb Brinson regarding funding issues.
- Actively working on 9 of 12 highest priority recommendations from the Education & Outreach Plan.

CLPPP Activities - 2014

Childhood LEAD POISONING prevention program

Based on Education & Outreach Plan – using additional MCH Block grant funds:

- Released RFP and contracts for Education & Outreach grants in 9 of 10 Prosperity Regions *(no applications from Region 6. $230,000 total).*
- Released Prevention funding for 9 communities with highest number of cases of 5 µg/dL *(Detroit, Flint, Grand Rapids, Hamtramck/Highland Park, Jackson, Lansing, Muskegon, Saginaw; Kalamazoo refused funds. $177,500 total).*
- Released Intervention funding to 3 communities with highest number of cases of 10 µg/dL *(Detroit, Grand Rapids, Hamtramck/Highland Park. $265,000 total).*

Challenges/Implications

- Current funding and infrastructure for **INTERVENTION** in lead cases is not working.
  - More Health Departments are choosing not to participate with CLPPP; not a mandated service (e.g. recent case in Kalamazoo).
    - Health Departments cite low Medicaid reimbursement rates.
    - CLPPP study shows that current reimbursement does not cover costs.
    - Medicaid data shows low billing rates by Health Departments, so hard to justify increases.
  - Fewer Health Departments are conducting needed Environmental Investigations.
  - Health Departments that do provide lead-related services need additional staff training and $$ support.

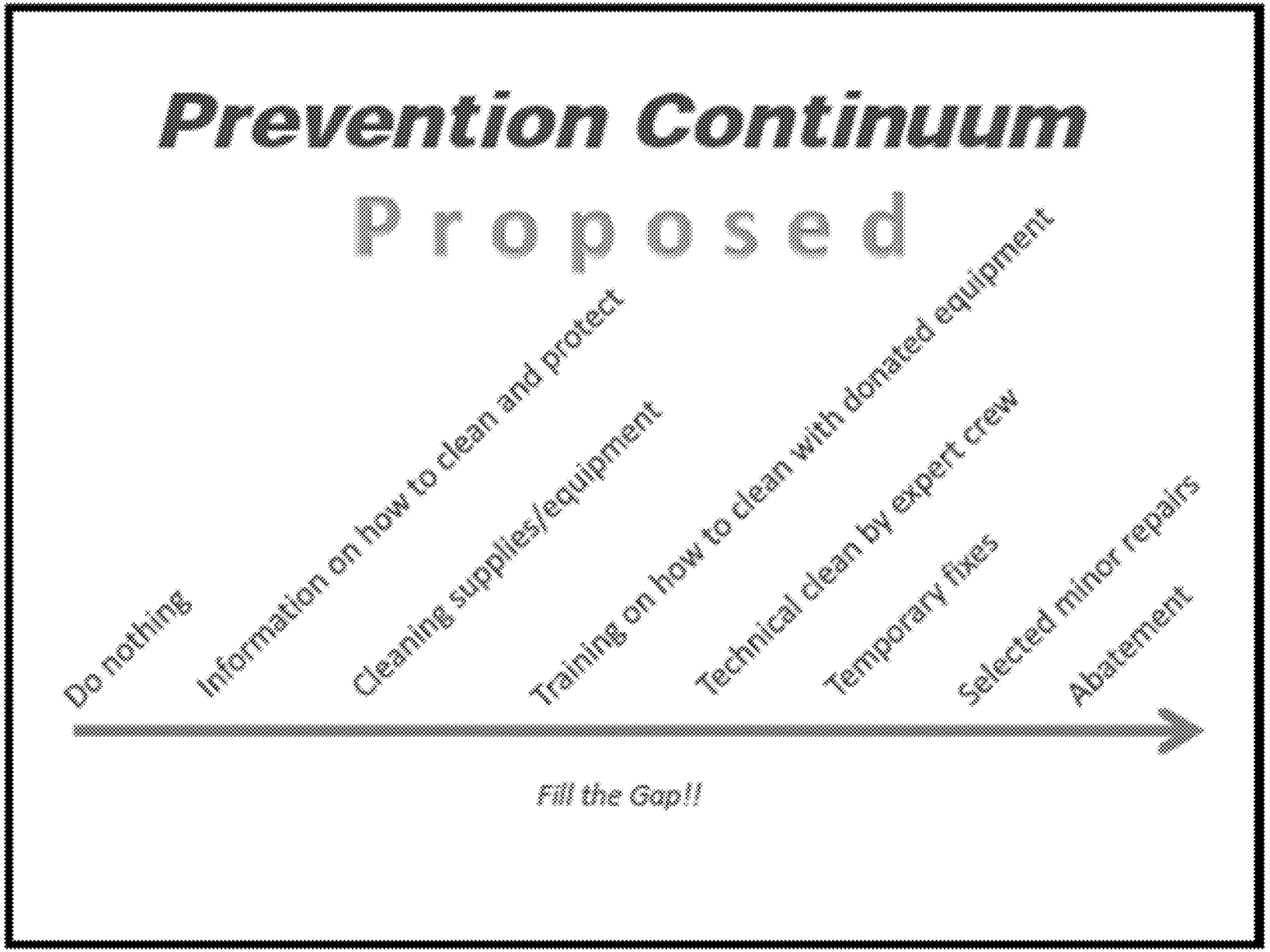
Challenges/Implications

Childhood LEAD POISONING prevention program

- Very little funding or infrastructure for **PREVENTION** of lead cases.
  - Physicians are not compensated for additional expectations.
  - A few communities have time-limited EPA/HUD funds.
  - CLPPP released $177,500 in prevention funding to 8 communities; it's a start.
  - Abatement $$ helps prevent lead poisoning, but is costly and not available to all.
  - There are lots of missed opportunities to address lead hazards; need to fill the gap between doing nothing and abating a home.

Missed Opportunities

Childhood LEAD POISONING prevention program



Challenges/Implications

Childhood LEAD POISONING prevention program

- MDCH does not have a clear, cohesive vision or approach to addressing childhood lead poisoning prevention across MCH and Environmental Health.
- For example:
  - A strategic approach for abating/repairing homes for pregnant women; this approach dramatically reduced lead poisoning in Philadelphia.
  - Duplication of effort; Division of Environmental Health applying for a grant that includes developing education materials, which CLPPP is already working on.

Opportunities/Next Steps

- New CDC grant opportunity for CLPPP; submitted on 7/21/14, potential start date of 9/1/14. Requested approx. $440,000/year for 3 years.
  - Grant must focus on using Surveillance to drive program activities.
  - Adds Coordinator and Communications support.
  - Implements grant program for Lead Care machines in high need/low testing areas, implemented by working with Medicaid Health Plans.
  - Adds evaluation and CQI for CLPPP/Surveillance activities.

Opportunities/Next Steps

Childhood LEAD POISONING prevention program

Proposed internal MDCH activities related to infrastructure:

1. Work with MSA and MHPs to establish a whole new/different infrastructure for responding to positive test results (5 µg/dL & up).
2. Work with MSA regarding possible Medicaid policy changes in Local Public Health chapter (increased reimbursement? Increased nursing visits?).
3. CDC grant will pick up some existing program costs. CLPPP would like to look at funding CHWs in highest need communities to engage in prevention activities. We would like to look at using our GF for this purpose, and open up the possibility of drawing additional Medicaid matching funds.
4. Develop cohesive MDCH vision and coordinated activities.

Opportunities/Next Steps

Childhood LEAD POISONING prevention program

Ongoing activities external to MDCH:

- Collaborating with MCMCH and their Pew/Kresge grant, which is exploring a healthy homes screening for Home Visitors.
- Collaborating with Great Start to Quality childcare system, to coordinate and align trainings related to healthy environment.

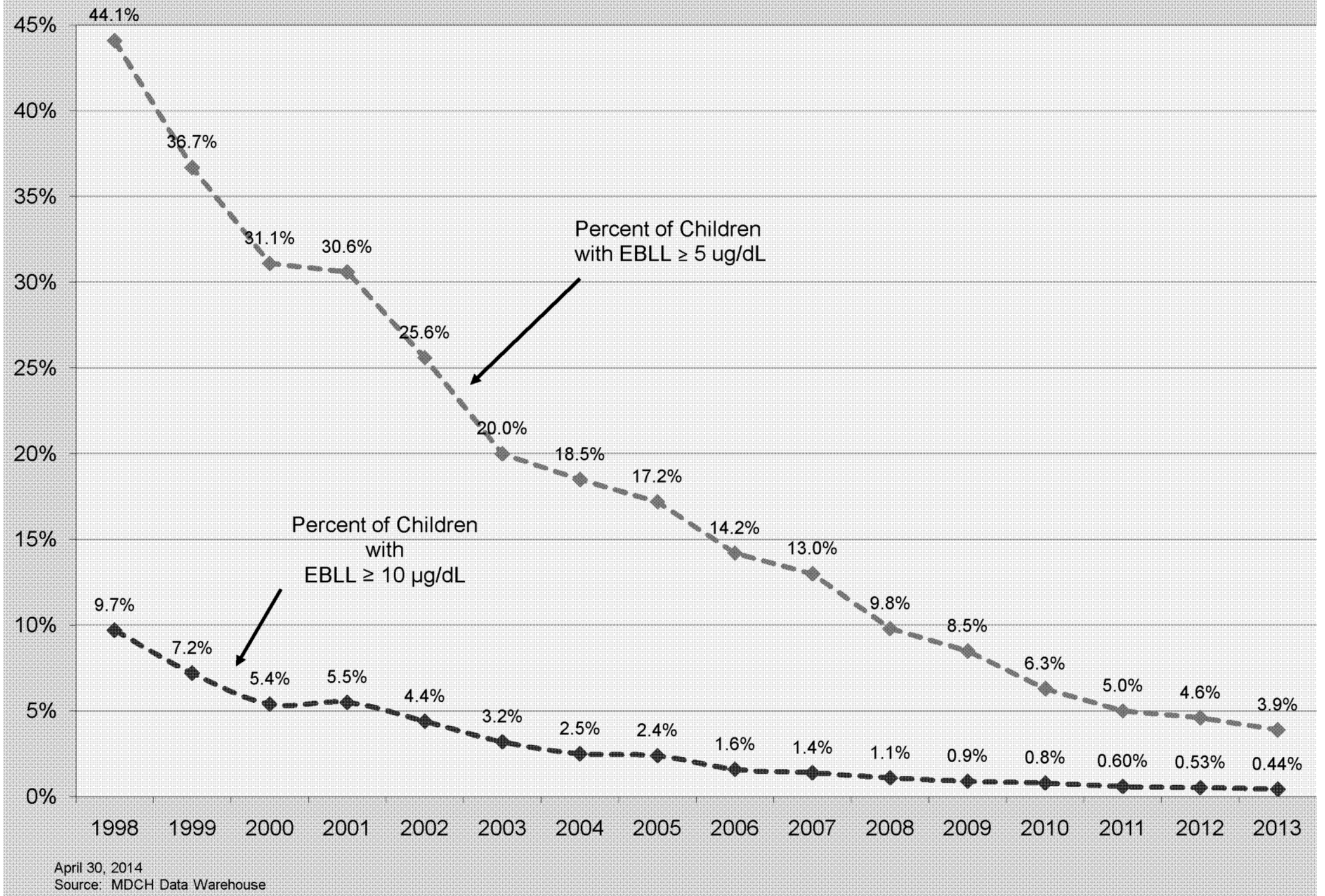
Staff & Resources

Childhood LEAD POISONING prevention program

- www.michigan.gov/lead
- 1-888-322-4453
- Karen Lishinski, Nurse Consultant, 241-3599
- Bob Scott, Surveillance Manager, 335-8178
- Jessica Cooper, 335-8912
- Javier Howard, Student Assistant, 335-9242

Figure 3

Elevated Blood Lead Levels (EBLL) in Michigan 1998 - 2013
Children less than Six Years of Age



April 30, 2014
Source: MDCH Data Warehouse

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
3	Year	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
4	% Children w/BLL >= 5 ug/dL	44.1%	36.7%	31.1%	30.6%	25.6%	20.0%	18.5%	17.2%	14.2%	13.0%	9.8%	8.5%	6.3%
5	% Children Confirmed w/EBLL >=10 ug/dL	9.7%	7.2%	5.4%	5.5%	4.4%	3.2%	2.5%	2.4%	1.6%	1.4%	1.1%	0.9%	0.8%
6	% Children Confirmed w/EBLL >=15 ug/dL	3.8%	2.8%	2.0%	1.9%	1.6%	1.2%	0.9%	0.9%	0.6%	0.5%	0.43%	0.37%	0.32%
7	% Children Confirmed w/EBLL >=20 ug/dL	1.6%	1.2%	0.8%	0.8%	0.7%	0.5%	0.41%	0.40%	0.25%	0.23%	0.20%	0.17%	0.16%
8														
9														
10	# of Children Tested													
11	# Confirmed >=10 ug/dL													
12	Percent Confirmed													
13	# Confirmed >= 15 ug/dL													
14	Percent Confirmed													
15														
16														
17														
18														
19														
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24														
25														
26							151867		410		0.002699731			
27														
28									214		0.001409128			
29			0.62661601											

	O	P	Q
3	2011	2012	2013
4	5.0%	4.6%	3.9%
5	0.60%	0.53%	0.44%
6	0.27%	0.21%	
7	0.14%	0.10%	
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From: Debra Darling <Debra.Darling@hc.msu.edu>
Sent: Monday, December 14, 2015 4:30 PM
To: Hamilton, Kimberly (DHHS);Swarnavel, Sandhya (DHHS);Slawinski, Heather (DHHS);Kwasnik, Monica (DHHS);Kreiner, Meta (DHHS);Copeland, Rachel (DHHS);LaBon, Nneka (DHHS);Greyerbiehl, Sandra (DHHS);Cannon, T'Shara (DHHS);McKellar, Mozell (DHHS);Burkitt-Wesolek, Suzette (DHHS);Dunbar, Paulette Dobynes (DHHS);Derman, Barbara (DHHS);Barnett, Lonnie D. (DHHS);Dilernia, Lisa (DHHS);LaPres, Marie (DHHS);Peeler, Nancy (DHHS);Christine Karl;Laura Houdeshell;'Griffith, Julia';'rvgodwin@cvty.com';'kweaver@midwesthealthplan.com';'cgermain@healthplus.org';'tara.oneil@mhplan.com';'beth.caughlin@mclaren.org';'hagy.wegener@molinahealthcare.com';'mkokoszk@healthplus.org';'gina.schutter@priorityhealth.com';'nwilliams@thcmi.com';'lsalswedel@uhc.com';'Anne Levandoski';'pkivela@uphp.com';'cathie.webb@mclaren.org';'nburke@thcmi.com';'fjames@midwesthealthplan.com';'teri.mcgarry@mhplan.com';'brandy.butler@mhplan.com';'adepetro@uphp.com';'childen@uphp.com';'stacey.arambula@priorityhealth.com';'lduynslager@uhc.com';'karen.wrzesinski@phpmm.org';'wgiblin@thcmi.com';'rkaji@mibluecrosscomplete.com';'djwest@cvty.com';'vgadgil@midwesthealthplan.com';'revans@harborhealthplan.com';'cleblanc@healthplus.org';'kellie.rice@mplan.com';'vicki.laney@mclaren.org';'tiffany.stone@molinahealthcare.com';'nancy.busch@priorityhealth.com';'kbunio@thcmi.com';'mparr@uhc.com';'mholmquist@uphp.com';'Jessica Jimenez (jessica.jimenez@mhplan.com)';'Mae Martin ';'Marilyn Legacy';'Meghan Harris';'Patricia Fenn';Said, Manal (DHHS);dana.brown@molinahealthcare.com;Sheila.Wilson@priorityhealth.com;'cthomas32@uhc.com';Slawinski, Heather (DHHS);Humphries, Joel (jhumphries@mibluecrosscomplete.com);Lishinski, Karen (DHHS);Houk, Emily (DHHS);Richardson, Matt (DHHS);'mmanna@midwesthealhplan.com';'fredericdkb@aetna.com';Jillian Howard (jillian.howard@mhplan.com);Mixon-Kemp, Sherian (smixonkemp1@mibluecrosscomplete.com);Kyra Lawrence (KLawrence@thcmi.com);Lalexander@thcmi.com;mcentires@aetna.com;'PKivela@uphp.com' (PKivela@uphp.com);cleblanc@healthplus.org;fjames@midwesthealthplan.com;kbunio@thcmi.com;rytramble@aetna.com;dxamosonwueg@aetna.com;'khill4@harborhealthplan.com';'rosalyn.smiecinski@mhplan.com';'CHilden@uphp.com' (CHilden@uphp.com);'Audrey.Pease@MolinaHealthcare.com';Pat.Battles@mclaren.org
Subject: Follow-Up: 12-14-15 Maternal Child Health Workgroup Meeting Materials
Attachments: Childhood Lead Poisoning Prevention in Michigan.Medicaid updated 12.14.1....pptx; Lead by ProsperityRegion.pdf; AAP Medical Management of Childhood Lead Exposure-June-2013.pdf; 2015-10-21_-_Lead_-_Flint_Water_FINAL_504265_7.pdf; Parent_Handout_Sept2015_501830_7.pdf; deq-FlintWater-FightLead-HealthyDiet_504857_7.pdf; deq-flintwater-breastfeedingandlead_503281_7.pdf; ProviderQuickReference_Sept2015_501831_7.pdf; deq-FlintWater-Provider-Ltr-FINAL_504861_7.pdf

Good afternoon,

IHP would like to thank you for participating in today's MCH Workgroup meeting. The discussion provided valuable insight for providing care to children with elevated blood lead levels.

Attached are the meeting materials including Nancy Peeler's presentation; Maps: Lead by Prosperity Region; and the AAP Recommendations on Medical Management of Childhood Lead Exposure and Poisoning.

In addition, you will find the lead resources/documents Kim Hamilton, Director, Managed Care Plan Division mentioned during the meeting:

- Frequently Asked Questions About Lead in Flint Water
- Parent Handout - Learn How to Protect Your Family: Create a Lead Safe Home
- Help Fight Lead Poisoning with a Healthy Diet
- Pregnant and Nursing Mothers: What You Need to Know About Lead Poisoning
- Blood Lead Level Quick Reference for Primary Care Providers
- Provider Letter (The letter was distributed by email to local physicians on October 30th, by the Genesee County Health Department.)

The materials are also available at: www.michigan.gov/flintwater.

Please feel free to share this email and the materials with additional health plan maternal/child health staff including health plan care/case managers, as appropriate.

The next meeting of the Maternal Child Health Workgroup is ***March 7, 2016***.
We look forward to seeing you there!

Happy Holidays!
Debbie

Debra Darling, RN, BSN, CCP
Institute for Health Policy
Interim QI Director
D- 132 West Fee Hall
909 Fee Road
E. Lansing, MI 48864
Phone: (517) 432-9822

From: Debra Darling
Sent: Tuesday, November 17, 2015 3:00 PM
To: Hamilton, Kimberly (DCH) (HamiltonK@michigan.gov); 'SwarnavelS@michigan.gov'; 'SlawinskiH@michigan.gov'; Kwasnik, Monica (DHHS); Kreiner, Meta (DCH) (KreinerM@michigan.gov); 'Copeland, Rachel (DHHS)'; LaBon, Nneka (DCH) (LaBonN@michigan.gov); Greyerbiehl, Sandra (DCH) (GreyerbiehlS@michigan.gov); Cannon, T'Shara (DCH) (CannonT1@michigan.gov); 'mckellarm@michigan.gov'; Burkitt-Wesolek, Suzette (DCH) (BurkittWesolekS@michigan.gov); 'dunbarp@michigan.gov' (dunbarp@michigan.gov); Derman, Barbara (DCH) (DermanB@michigan.gov); Barnett, Lonnie D. (DCH) (BarnettL@michigan.gov); Dilernia, Lisa (DCH) (DilerniaL@michigan.gov); LaPres, Marie (DCH); Nancy Peeler (PeelerN@michigan.gov); Christine Karl; Laura Houdeshell; 'Griffith, Julia'; 'rvgodwin@cvty.com'; 'kweaver@midwesthealthplan.com'; 'ddoede@harborhealthplan.com'; 'cgermain@healthplus.org'; 'tara.oneil@mhplan.com'; 'beth.caughlin@mclaren.org'; 'hagy.wegener@molinahealthcare.com'; 'mkokoszk@healthplus.org'; 'gina.schutter@priorityhealth.com'; linda.dickinson@phpmm.org; 'nwilliams@thcmi.com'; 'lsalswedel@uhc.com'; 'Anne Levandoski'; 'pkivela@uphp.com'; 'cathie.webb@mclaren.org'; 'nburke@thcmi.com'; 'fjames@midwesthealthplan.com'; 'teri.mcgarry@mhplan.com'; 'brandy.butler@mhplan.com'; 'adepetro@uphp.com'; 'childen@uphp.com'; 'stacey.arambula@priorityhealth.com'; 'lduynslager@uhc.com'; 'karen.wrzesinski@phpmm.org'; 'wgiblin@thcmi.com'; 'judy.wernert@phpmm.org'; 'rkaji@mibluecrosscomplete.com'; 'djwest@cvty.com'; 'vgadgil@midwesthealthplan.com'; revans@harborhealthplan.com; 'cleblanc@healthplus.org'; 'kellie.rice@mplan.com'; 'vicki.laney@mclaren.org'; 'tiffany.stone@molinahealthcare.com';

'nancy.busch@priorityhealth.com'; 'Maryanne.sesti@phpmm.org' (Maryanne.sesti@phpmm.org); 'kbunio@thcmi.com'; 'mparr@uhc.com'; 'mholmquist@uphp.com'; Jessica Jimenez (jessica.jimenez@mhplan.com); Mae Martin ; Marilyn Legacy; 'Meghan Harris'; 'Patricia Fenn'; Said, Manal (DCH) (SaidM@michigan.gov)
Cc: Debra Darling
Subject: Reminder: December 14, 2015 Maternal Child Health Workgroup Meeting
Importance: High

The next meeting of the Institute for Health Policy (IHP) Maternal Child Health Workgroup will be on ***Monday, December 14, 2015 from 10:00 am – 12:00 noon***. The meeting will be held at the Michigan Public Health Institute (MPHI) Interactive Learning Center, 2436 Woodlake Circle, Suite 380, in Okemos. To view a map and driving directions to MPHI please click on this link: https://www.mphi.org/contact/directions-maps/.

Teleconferencing will be available. The dial-in number and participate code are below:

Dial-in number: 888-204-5984
Participant code: 527197

The December meeting is for ***Medicaid Health Plans only*** and will focus on Medicaid and policy updates and provide an opportunity for open discussion among participants (agenda attached). The topic of focus will be care coordination for children with elevated blood lead levels.

Please forward or share this message with health plan maternal/child health staff including health plan care/case managers, as appropriate. Also, feel free to contact us if you have items that you would like to add to the agenda regarding maternal and/or child health issues.

If you are planning to attend the meeting either in-person or by teleconference, ***please rsvp to*** ihp@hc.msu.edu ***by Thursday December 10, 2015***.

We look forward to your participation on December 14, 2015.

Warm regards,
Debbie

Debra Darling, RN, BSN, CCP
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Quality Improvement Programs
Institute for Health Policy
College of Human Medicine
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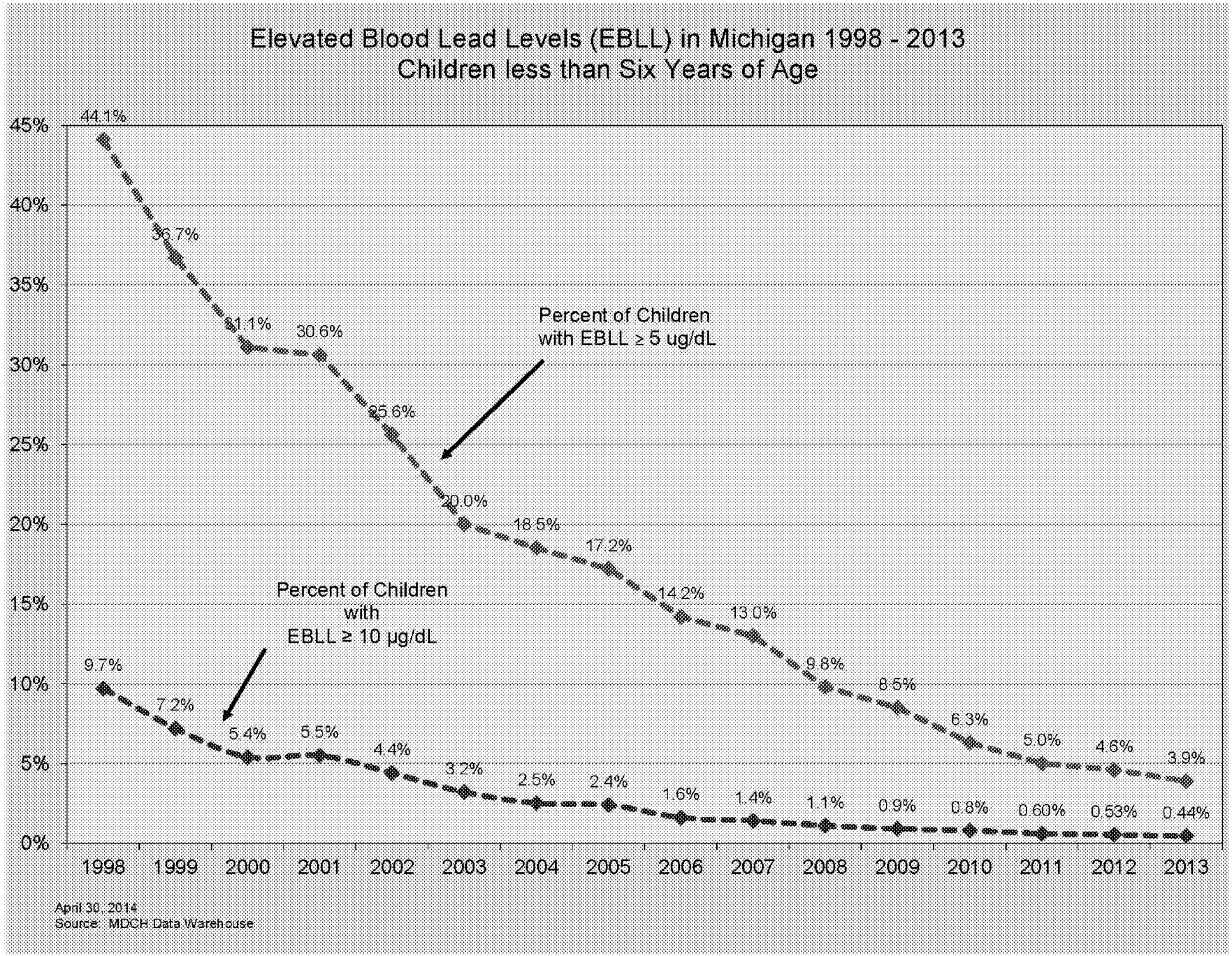
Childhood Lead Poisoning Prevention in Michigan

12.14.15

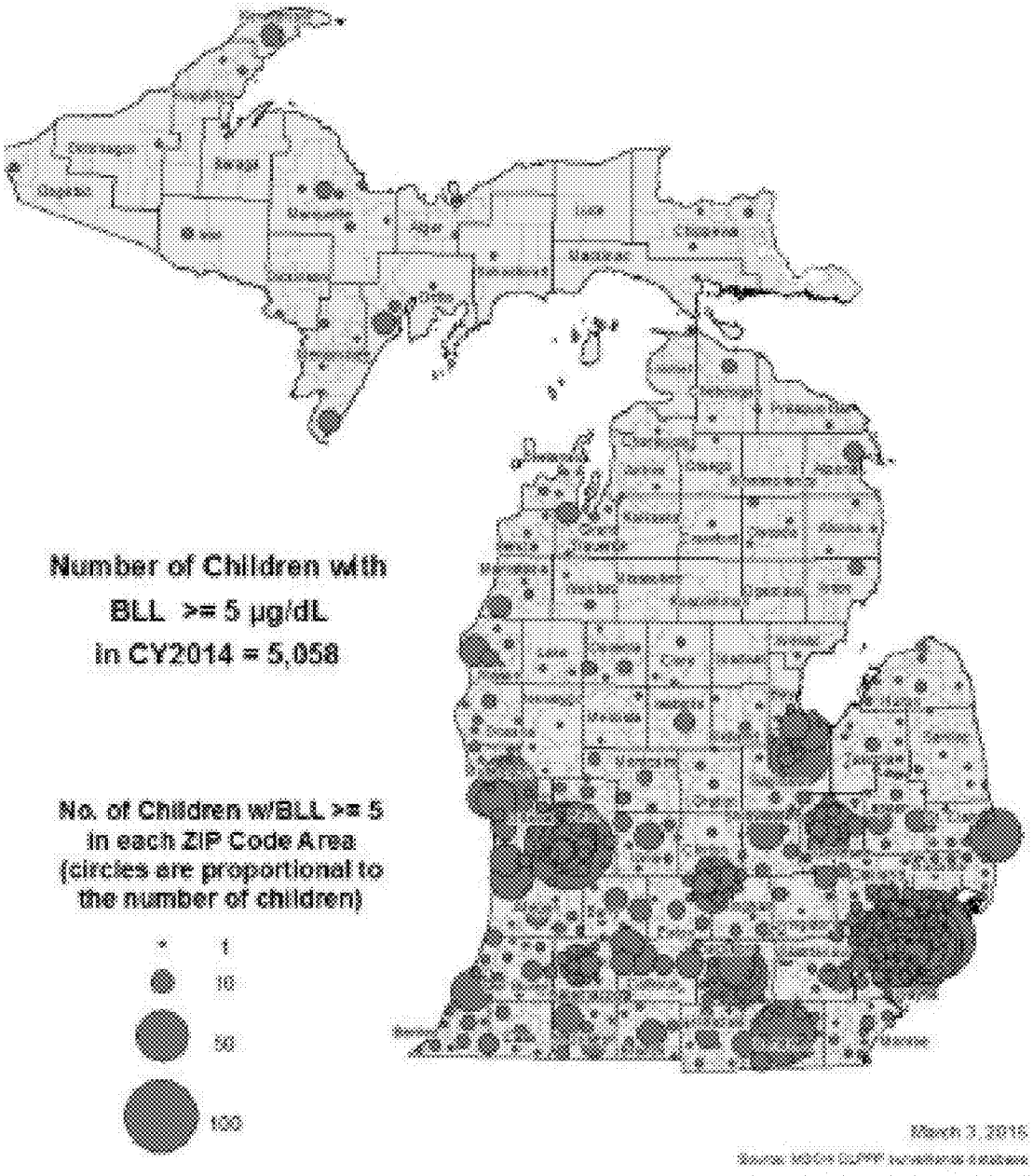

Elevated Blood Lead Levels (EBLL) in Michigan 1998 - 2013
Children less than Six Years of Age
45%
40%
35%
30%
25%
20%
15%
10%
5%
0%
44.1%
36.7%
31.1%
30.6%
25.6%
20.0%
18.5%
17.2%
14.2%
13.0%
9.8%
8.5%
6.3%
5.0%
4.6%
3.9%
Percent of Children with EBLL ≥ 5 ug/dL
Percent of Children with EBLL ≥ 10 µg/dL
9.7%
7.2%
5.4%
5.5%
4.4%
3.2%
2.5%
2.4%
1.6%
1.4%
1.1%
0.9%
0.8%
0.60%
0.53%
0.44%
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
April 30, 2014
Source: MDCH Data Warehouse

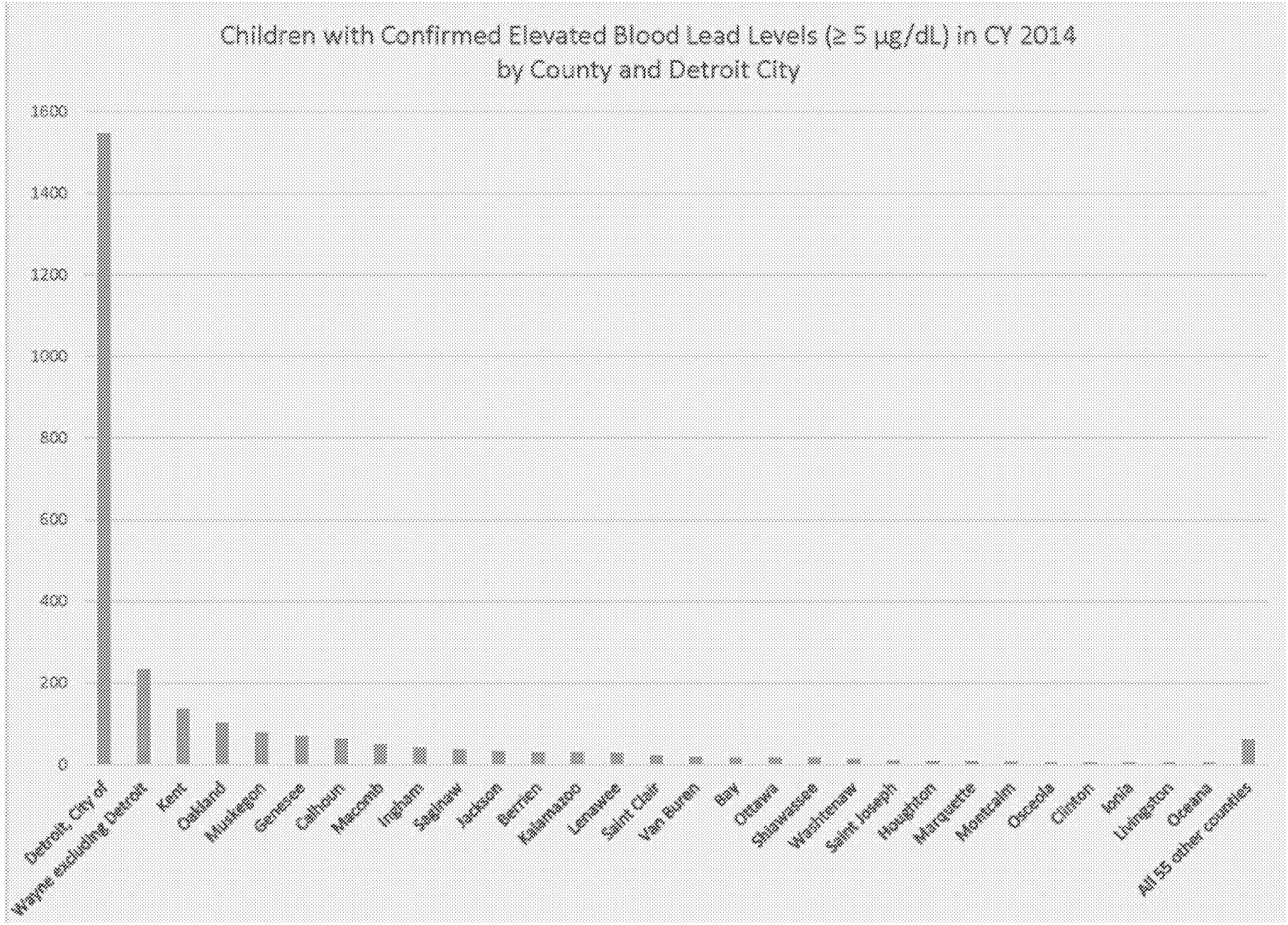
Changes

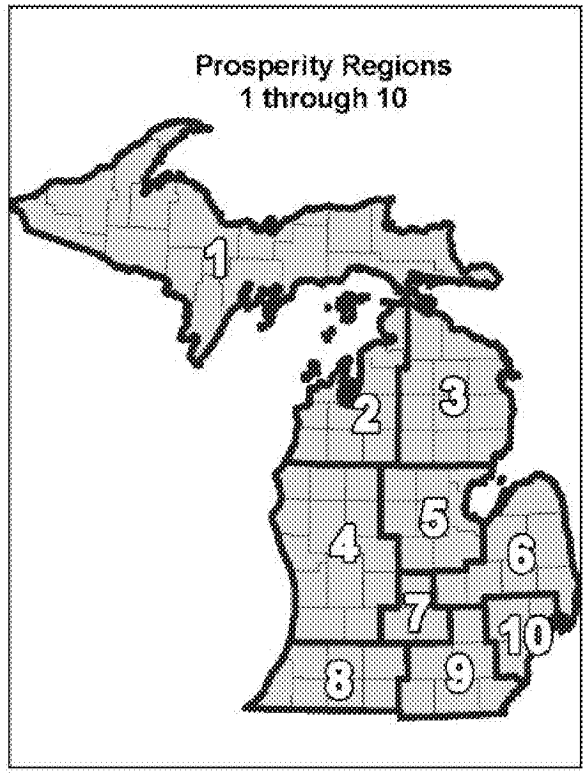
In 2012, the *CDC Advisory Committee on Childhood Lead Poisoning Prevention* recommended:

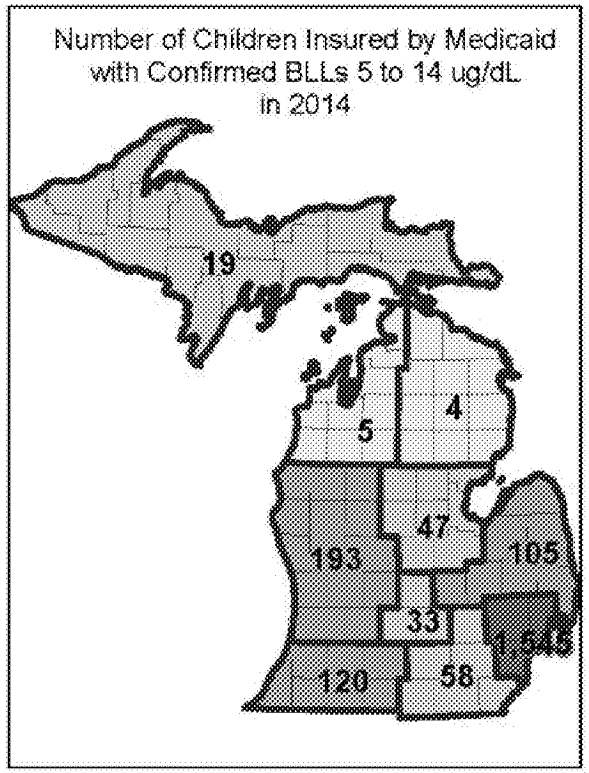
- Eliminating the term 'blood lead level of concern'.
- Using a reference value based on the 97.5 percentile of the BLL distribution among children 1-5 years old in the US, currently **5 µg/dL.**
- Shifting the focus to **primary prevention** of lead exposure, reducing or eliminating lead sources before children are exposed, especially at levels of **5-14 µg/dL.**

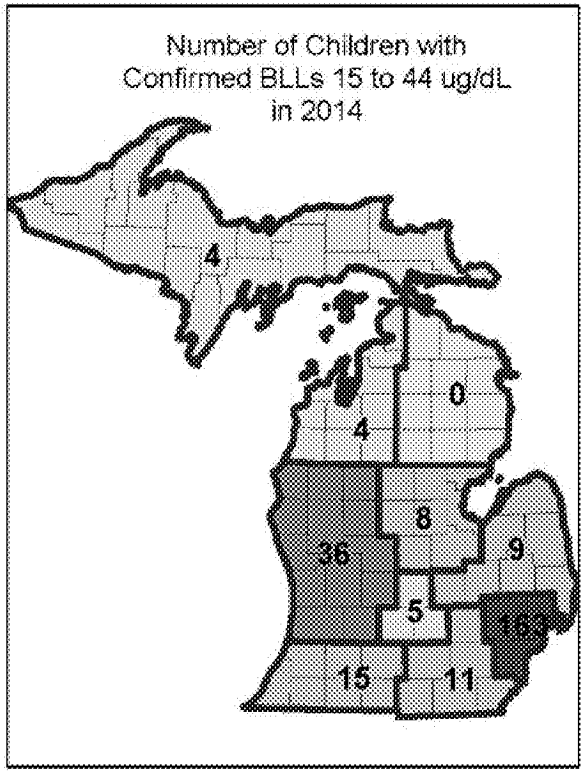
Children less than Six years of Age with Blood Lead Levels (BLL) >= 5 µg/dL Calendar Year 2014

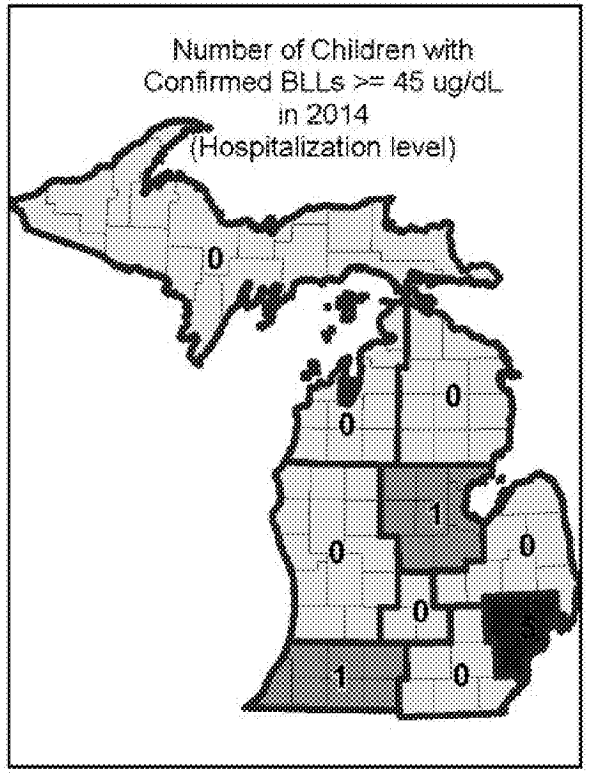



Children with Confirmed Elevated Blood Lead Levels (≥ 5 µg/dL) in CY 2014
by County and Detroit City
1600
1400
1200
1000
800
600
400
200
0
Detroit, City of
Wayne excluding Detroit
Kent
Oakland
Muskegon
Genesee
Calhoun
Macomb
Ingham
Saginaw
Jackson
Berrien
Kalamazoo
Lenawee
Saint Clair
Van Buren
Bay
Ottawa
Shiawassee
Washtenaw
Saint Joseph
Houghton
Marquette
Monroe
Alcona
Oscoda
Clinton
Ionia
Livingston
Oceana
All 55 other counties


Prosperity Regions
1 through 10
1
2
3
4
5
6
7
8
9
10


Number of Children Insured by Medicaid
with Confirmed BLLs 5 to 14 ug/dL
in 2014
19
5
4
47
193
105
33
1,545
120
58


Number of Children with
Confirmed BLLs 15 to 44 ug/dL
in 2014
4
0
4
8
36
9
5
15
11


Number of Children with
Confirmed BLLs >= 45 ug/dL
in 2014
(Hospitalization level)
0
0
0
1
0
0
0
1
0

Changes MDHHS has made

- **MEDICAID POLICY**
  - Adopted the AAP Recommendations on Medical Management of Childhood Lead Exposure and Poisoning.
- **OTHER CURRENT FUNDING**
  - Distribution of state funding to Local Public Health agencies is data-driven and supports the focus on Education and Prevention activities.

Ongoing issues for Michigan

- **TESTING**
  - All children enrolled in Medicaid are tested twice (at 12 months and at 24 months)!
  - Confirming all capillary tests ≥ 5 µg/dL.
  - Follow-up to monitor all elevated blood lead levels ≥ 5 µg/dL.
- **PREVENTION/ANTICIPATORY GUIDANCE**
  - Supporting Primary Care Providers to fulfill their enhanced role.

Ongoing issues for Michigan

- **COMMUNITY-BASED SERVICES**
  - There is no mandate in Michigan for the provision of:
    - In-home prevention education and support
    - In-home case management services
    - Elevated blood lead investigations
  - Local Public Health Departments express concern that the current Medicaid reimbursement rates do not cover their actual costs; many have stopped providing such services.

Opportunities

- **WORK MORE CLOSELY WITH MEDICAID HEALTH PLANS**
  - Assuring that health plans have necessary data; MDHHS Surveillance system data files currently go to Local Public Health weekly.
  - Enhanced monitoring/care coordination for needed testing/follow-up.
  - Enhanced anticipatory guidance offered by Primary Care Providers.

Opportunities

- **WORK MORE CLOSELY WITH MEDICAID HEALTH PLANS**
  - Referral to available community-based services:
    - Current Medicaid policy pays for 2 Nursing Assessment visits in the home.
    - Current Medicaid policy pays for 1 Environmental blood lead investigation.
    - Identify a pool of trained, certified providers (could include Local Public Health) that are willing to provide the above services.

Questions

- How can we work together to develop an approach to assure that community-based services are available?
- How might Community Health Workers play a role in primary prevention in the home of children with levels 5-14 µg/dL?
- How could Surveillance share more frequent data with MHPs? What format/frequency will be most helpful?

Contact Information

Nursing Support & Education

Nancy Peeler, Early Childhood Health Section Manager

517/335-9230

Karen Lishinski, Nurse Consultant

517/241-3599

Surveillance

Martha Stanbury, Section Manager

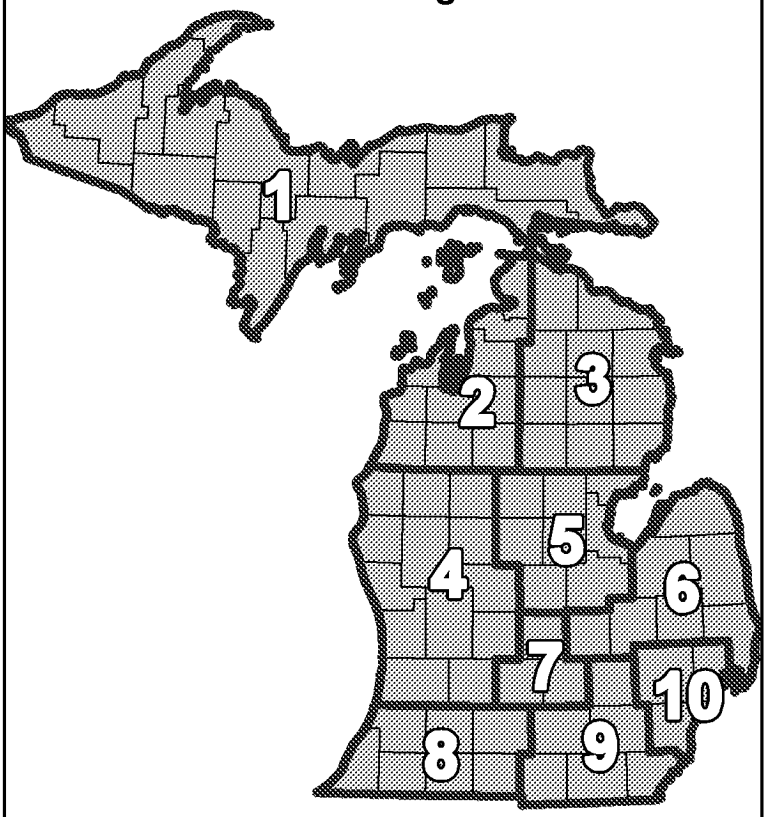
517/335-8364

Bob Scott, Surveillance Manager

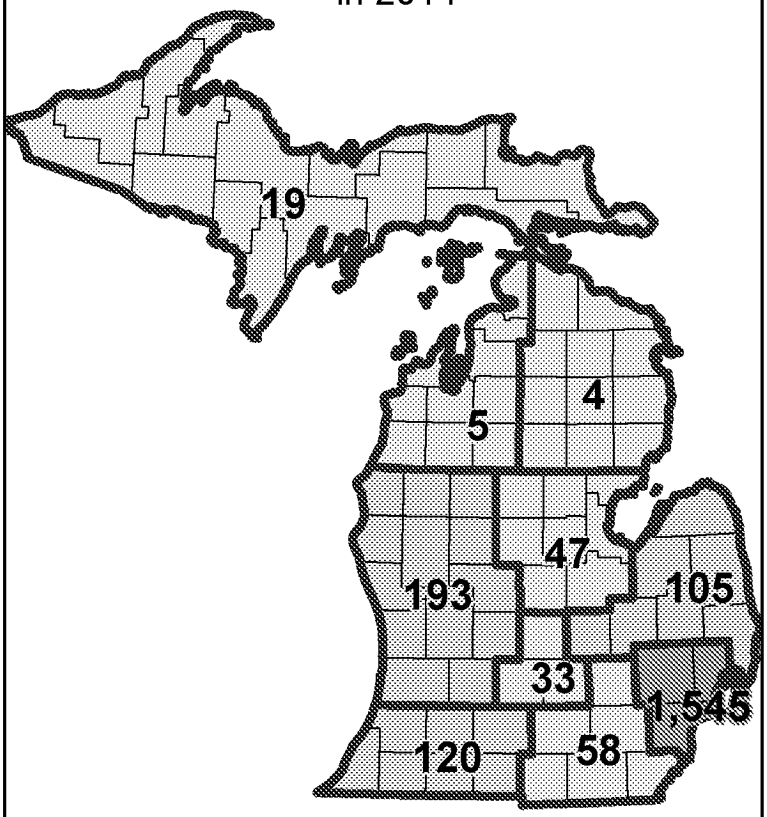
517/335-8178

www.michigan.gov/lead

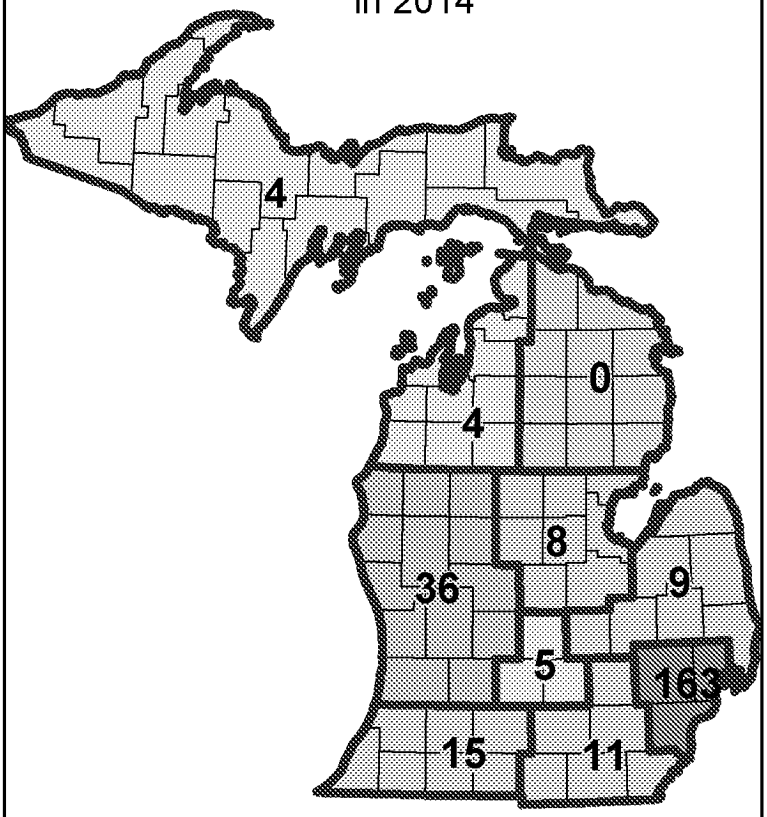
Prosperity Regions 1 through 10



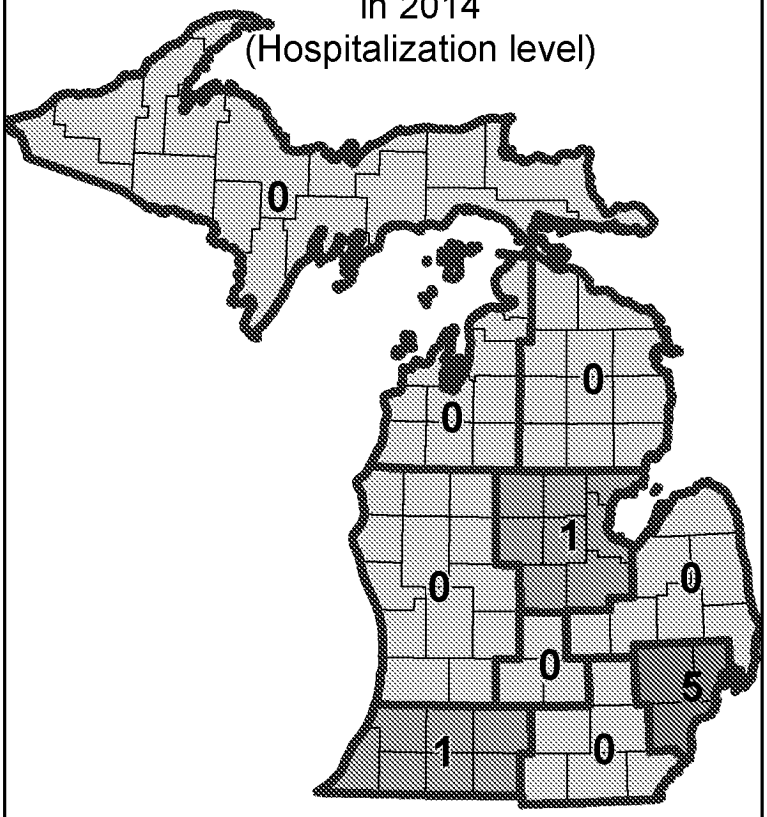
Number of Children Insured by Medicaid with Confirmed BLLs 5 to 14 ug/dL in 2014



Number of Children with Confirmed BLLs 15 to 44 ug/dL in 2014



Number of Children with Confirmed BLLs >= 45 ug/dL in 2014 (Hospitalization level)



Recommendations on Medical Management of Childhood Lead Exposure and Poisoning

No level of lead in the blood is safe. In 2012, the CDC established a new "reference value" for blood lead levels (5 mcg/dL), thereby lowering the level at which evaluation and intervention are recommended (CDC).

Lead level	Recommendation
< 5 mcg/dL	1. Review lab results with family. For reference, the geometric mean blood lead level for children 1-5 years old is less than 2 mcg/dL . 2. Repeat the blood lead level in 6-12 months if the child is at high risk or risk changes during the timeframe. Ensure levels are done at 1 and 2 years of age. 3. For children screened at age < 12 months, consider retesting in 3-6 months as lead exposure may increase as mobility increases. 4. Perform routine health maintenance including assessment of nutrition, physical and mental development, as well as iron deficiency risk factors. 5. Provide anticipatory guidance on common sources of environmental lead exposure: paint in homes built prior to 1978, soil near roadways or other sources of lead, take-home exposures related to adult occupations, imported spices, cosmetics, folk remedies, and cookware.
5-14 mcg/dL	1. Perform steps as described above for levels < 5 mcg/dL. 2. Re-test venous blood lead level within 1-3 months to ensure the lead level is not rising. If it is stable or decreasing, retest the blood lead level in 3 months. Refer patient to local health authorities if such resources are available. Most states require elevated blood lead levels be reported to the state health department. Contact the CDC at 800-CDC-INFO (800-232-4636) or the National Lead Information Center at 800-424-LEAD (5323) for resources regarding lead poisoning prevention and local childhood lead poisoning prevention programs. 3. Take a careful environmental history to identify potential sources of exposures (see #5 above) and provide preliminary advice about reducing/eliminating exposures. Take care to consider other children who may be exposed. 4. Provide nutritional counseling related to calcium and iron. In addition, recommend having a fruit at every meal as iron absorption quadruples when taken with Vitamin C-containing foods. Encourage the consumption of iron-enriched foods (e.g., cereals, meats). Some children may be eligible for Special Supplemental Nutrition Program for Women, Infants and Child (WIC) or other nutritional counseling. 5. Ensure iron sufficiency with adequate laboratory testing (CBC, Ferritin, CRP) and treatment per AAP guidelines. Consider starting a multivitamin with iron. 6. Perform structured developmental screening evaluations at child health maintenance visits, as lead's effect on development may manifest over years.
15-44 mcg/dL	1. Perform steps as described above for levels 5-14 mcg/dL. 2. Confirm the blood lead level with repeat venous sample within 1 to 4 weeks. 3. Additional, specific evaluation of the child, such as abdominal x-ray should be considered based on the environmental investigation and history (e.g., pica for paint chips, mouthing behaviors). Gut decontamination may be considered if leaded foreign bodies are visualized on x-ray. Any treatment for blood lead levels in this range should be done in consultation with an expert. Contact local PEHSU or PCC for guidance; see resources on back for contact information.
>44 mcg/dL	1. Follow guidance for BLL 15-44 mcg/dL as listed above. 2. Confirm the blood lead level with repeat venous lead level within 48 hours. 3. Consider hospitalization and/or chelation therapy (managed with the assistance of an experienced provider). Safety of the home with respect to lead hazards, isolation of the lead source, family social situation, and chronicity of the exposure are factors that may influence management. Contact your regional PEHSU or PCC for assistance; see resources on back for contact information.

Document authored by Nicholas Newman, DO, FAAP, Region 5 PEHSU, Helen J. Binns, MD, MPH, Region 5 PEHSU, Mateusz Karwowski, MD, MPH, Region 1 PEHSU, Jennifer Lowry, MD , Region 7 PEHSU and the PEHSU Lead Working Group.

American Academy of Pediatrics
DEDICATED TO THE HEALTH OF ALL CHILDREN™

PEHSU

Recommendations on Medical Management of Childhood Lead Exposure and Poisoning

Principles of Lead Exposure in Children

- A child's blood lead concentration depends on their environment, habits, and nutritional status. Each of these can influence lead absorption. Children with differing habits or nutritional status but who live in the same environment can vary on blood lead concentration. Further, as children age or change residences, habits or environments change creating or reducing lead exposure potential.
- While clinically evident effects such as anemia, abdominal pain, nephropathy, and encephalopathy are seen at levels >40 µg/dL, even levels below 10 µg/dL are associated with subclinical effects such inattention and hyperactivity, and decreased cognitive function. Levels above 100 µg/dL may result in fatal cerebral edema.
- Lead exposure can be viewed as a lifelong exposure, even after blood lead levels decline. Bone acts as a reservoir for lead over an individual's lifetime. Childhood lead exposure has potential consequences for adult health and is linked to hypertension, renal insufficiency, and increased cardiovascular-related mortality.
- Since lead shares common absorptive mechanisms with iron, calcium, and zinc, nutritional deficiencies in these minerals promotes lead absorption. Acting synergistically with lead, deficiencies in these minerals can also worsen lead-related neurotoxicity.

Principles of Lead Screening

- Lead screening is typically performed with a capillary specimen obtained by a finger prick with blood blotted onto a testing paper. Testing in this manner requires that the skin surface be clean; false positives are common. Therefore, elevated capillary blood lead levels should be followed by venipuncture testing to confirm the blood lead level. In cases where the capillary specimen demonstrates an elevated lead level but the follow-up venipuncture does not, it is important to recognize that the child may live in a lead-contaminated environment that resulted in contamination of the finger tip. Efforts should be made to identify and eliminate the source of lead in these cases. Where feasible, lead screening should be performed by venipuncture.

Principles of Iron Deficiency Screening

- The iron deficiency state enhances absorption of ingested lead.
- Hemoglobin is a lagging indicator of iron deficiency and only 40% of children with anemia are iron deficient.
- Lead exposed children (≥ 5 mcg/dL) are at risk for iron deficiency and should be screened using CBC, Ferritin, and CRP. Alternatively, reticulocyte hemoglobin can be used, if available.
- Children with iron deficiency, with or without anemia, should be treated with iron supplementation.

Resources

• Pediatric Environmental Health Specialty Unit (PEHSU)Network	• www.pehsu.net or 888-347-2632
• Poison Control Center (PCC)	• www.aapcc.org/ or 800-222-1222
• Centers for Disease Control and Prevention	• www.cdc.gov/nceh/lead/ or 800-232-4636
• U.S. Environmental Protection Agency	• www.epa.gov/lead/ or 800-424-5323

Suggested Reading and References:

Pediatric Environmental Health, 3rd edition. American Academy of Pediatrics, 2012.
Woolf A, Goldman R, Bellinger D. *Pediatric Clinics of North America* 2007;54(2):271-294.
Levin R, et al. *Environmental Health Perspectives* 2008; 116(10):1285-1293.
Baker RD, Greer FR. *Pediatrics* 2010;126(5):1040-50.
Guidelines for the Identification and Management of Lead Exposure in Pregnant and Lactating Women. CDC, 2010.
CDC Response to Advisory Committee on Childhood Lead Poisoning Prevention Recommendations in "Low Level Lead Exposure Harms Children: A Renewed Call of Primary Prevention" June 7, 2012

This document was supported by the Association of Occupational and Environmental Clinics (AOEC) and funded (in part) by the cooperative agreement award number 1U61TS000118-04 from the Agency for Toxic Substances and Disease Registry (ATSDR).

Acknowledgement: The U.S. Environmental Protection Agency (EPA) supports the PEHSU by providing funds to ATSDR under Inter-Agency Agreement number DW-75-92301301-0. Neither EPA nor ATSDR endorse the purchase of any commercial products or services mentioned in PEHSU publications.

(June 2013 update)

Genesee County Health Department

Frequently Asked Questions About Lead in Flint Water

MDHHS Michigan Department of Health & Human Services

- Lead is hard to avoid completely. It can be found in old paint, water pipes and brass water faucets, in dirt, at some job sites, and in metal used for some hobbies.
- The amount of lead found in some Flint homes' drinking water could affect kids' health.
  - Even small amounts of lead can harm kids' health because they are little and still growing.
  - Adults are less likely to be harmed by the levels found in the water.
- Filter your drinking water using a NSF-approved filter.
  - Find a NSF-approved filter at http://www.gchd.us/docs/lead_filter_information.pdf.
  - If you use City of Flint water, you can call 211 to find out where you can pick up a free water filter.
- Some filters can remove up to 99% of the lead in water when used properly. To be sure your filter is removing as much lead as it can, carefully follow the instructions that came with it.
  - Change the filter cartridge as often as you should.
  - Run only cold water through the filter.
- Even after changes to the water system, it may take a while before lead levels in your home's water drop. Use the tips below to know when it's best to use filtered water:

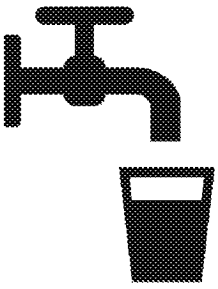
Lead in Water

Although your water may be a different color sometimes, it is not caused by lead. It's important to remember:

- **You can't see, smell, or taste lead in water.**
- **Lead won't change the color of your water.**
- **The only way to know what your home's lead levels are is by having your water tested in a lab.**

Please call the Flint Water Department at 810-787-6537 to request a free or low-cost water test.

In The Kitchen



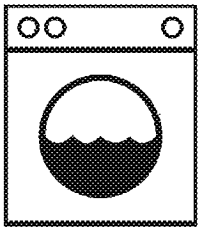
Use filtered tap water for:

- Drinking (including making coffee, drink mixes, juice, baby formula)
- Cooking (even if you boil the water, the lead will stay in the water and food)
- Washing fruits and vegetables

You can use unfiltered tap water for:

- Washing your hands
- Washing dishes
- Wiping down countertops

Cleaning



You can use unfiltered tap water for:

- Mopping floors
- Washing clothes

Your washing machine and dryer won't put lead from the water into the air of your home.

In the Bathroom

Use <u>filtered</u> tap water for:

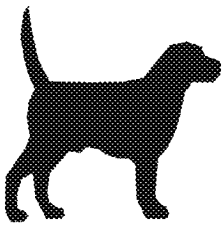
- Brushing kids' teeth

You can use <u>unfiltered</u> tap water for:

- Showers
- Baths (don't let kids drink the water as they play in the tub)
- Brushing your teeth (if you are an adult)

Lead will not cause rashes or other skin problems. However, if chlorine levels or other cleaners are high in the water, it may cause itchy or dry skin (similar to what can happen when you swim in a pool).

Caring for Pets



Use <u>filtered</u> tap water for:

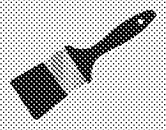
- Pets' water bowls

You can use <u>unfiltered</u> tap water for:

- Baths

If you notice your pet acting differently than normal, please contact your vet.

Other Sources of Lead in Your Home



Lead Paint

- Homes built before 1978 likely have lead paint, both inside and outside.
- Old paint is the most common way that kids are exposed to lead.

Dirt

- If you live in the city, there may be lead in the dirt outside your home.
- Before 1996, gas and the exhaust from cars contained lead. More lead will be found in dirt in busy traffic areas.

Dust

- The dust in your home can contain tiny amounts of both the paint and the dirt that contain lead.

Hobbies & Jobs

- Solder, fishing sinkers, bullets, and stained glass framing materials are some of the items in your home that may contain lead. You could also track home lead dust from your job site.

Have Questions?

For more information about protecting yourself and your family from lead, please visit:

<u>www.michigan.gov/lead</u>

Or you can call the Michigan Department of Health and Human Services at:

1-800-648-6942

The staff at this number will help direct you to the best department that can answer your questions about lead in your home.

To request a free or low-cost water test, please call the Flint Water Department at:

1-810-787-6537

To find out if you can get a free water filter, please call 211.

MDHHS

Michigan Department of Health & Human Services

IS YOUR CHILD SAFE FROM LEAD POISONING?

LEARN HOW TO PROTECT YOUR FAMILY:

CREATE A LEAD SAFE HOME

What causes lead poisoning?

There are many places in a home that can put babies and children in danger of lead poisoning.

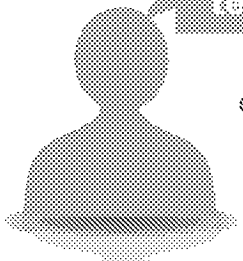
Lead paint is the #1 cause of lead poisoning in Michigan and is often found in homes built before 1978. The older the home, the more likely that painted surfaces like windows, cupboards, doors and porches will contain lead paint.

Lead poisoning occurs most often when children come in contact with lead in the air, in dust particles and in lead paint. Lead can also be found in soil, drinking water if supplied by lead pipes, certain home remedies and is used in some hobbies and occupations.

Exposure to lead particles is a serious health threat. Carefully consider where your child spends time (childcare, relatives, your home) when thinking about lead poisoning hazards.

How can I tell if my child has lead poisoning?

Talk to your doctor about testing your child's blood for lead poisoning.



When should my child be tested for lead poisoning?

Children should be tested at one and two years of age or if you think your child has been exposed to a lead hazard.

To learn more about lead poisoning prevention and blood lead testing, call the Childhood Lead Poisoning Prevention Project:

(517) 335-8885

(888) 322-4453

Take this quiz to see if your child may have lead poisoning:

Symptoms of lead poisoning can be silent—and hard to recognize. Preventing lead poisoning before it happens is the best way to keep your family safe. Take this quiz to see if your child may be at risk.

Does your child currently live in a home built before 1950 or have they lived in a home built before 1950 in the recent past? Do they spend time at or often visit a home built before 1950?

Yes No Don't know

Does your child currently live in a home built before 1978 that was recently remodeled? Have they lived in or often visited a home built before 1978 that was recently remodeled?

Yes No Don't know

Does your child have a brother, sister or playmate with lead poisoning?

Yes No Don't know

Does your child live with an adult whose job or hobby involves lead?

Yes No Don't know

Does you or your child's caregiver use home remedies that may contain lead?

Yes No Don't know

If you answered NO to all of these questions, your child is probably not at risk for lead poisoning.

If you answered YES or DON'T KNOW to any of these questions, talk to your doctor about testing your child for lead poisoning.

MAKE EVERY DAY LEAD SAFE

Safe Cleaning. Use these steps to help keep your home clean and reduce your child's risk of exposure. Use these tips to clean your windows, doors, floors, porches, stairs and child pay areas.

Put on gloves. If you do not have rubber gloves, wash your hands well after cleaning.

Use the right cleaners and disposable supplies. Use soapy cleaners or products made to remove lead dust.

Remove paint chips first. Window areas and porches often have peeling paint and lead dust. Pick up visible chips and dispose of them in a plastic bag.

Always wet-mop floors and window sills. Do not broom lead dust. Dispose of cloths after wiping each area. If using a mop, replace water frequently.

Don't use a vacuum unless it is a HEPA vacuum. It will spread lead dust into the air you breathe. Some health departments have HEPA vacuums available to borrow

Rinse after cleaning. Use clean water and a new mop head or fresh paper towels to wipe away suds.

Always empty wash water down a toilet.

Repeat these steps often when dirt and dust appear on floors, porches, window wells, window sills, stairs and children's play areas.

For Homes with Lead Pipes

If you use a water filter, be sure it meets NSF/ANSI 53 standards for lead reduction.

✓**Flush your pipes before drinking**, and only use cold water for cooking and mixing formula. Flush pipes by running the water for approximately 5 minutes.

✓**Test.** Consider contacting your local water authority to have your water tested.

Daily Lead Safe Practices

- Wash hands, bottles, pacifiers and toys often
- Always take off shoes before going into the house.
- Watch your child's diet. Foods high in calcium and iron help keep lead from being absorbed by a child's body.
- Avoid using power sanders, open-flame torches, heat guns, dry scrapers and dry sandpaper o painted surfaces.
- Fix peeling or chipping paint.
- Use a certified Repair and Remodeling Professional when making updates to your home
- Practice safe cleaning methods.

Thinking about remodeling your home? Need advice about identifying and removing lead paint? Call the Lead and Healthy Homes Section: 866-691-LEAD.

www.michigan.gov/lead

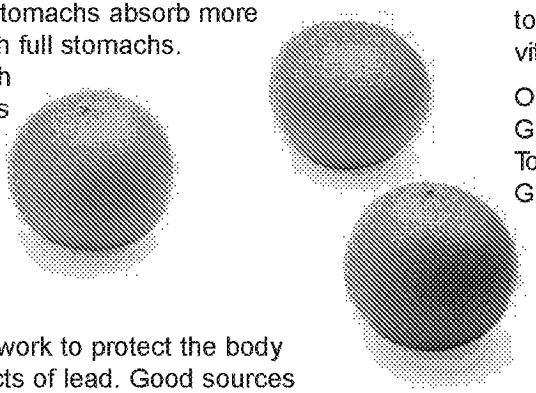
MDHHS
Michigan Department of Health & Human Services

Childhood LEAD POISONING prevention program

Help Fight Lead Poisoning with a Healthy Diet

Regularly Eat Healthy Foods

Children with empty stomachs absorb more lead than children with full stomachs. Provide your child with four to six small meals during the day. The following nutrients can help protect your child from lead poisoning:



Iron-Rich Foods
Normal levels of iron work to protect the body from the harmful effects of lead. Good sources of dietary iron include:

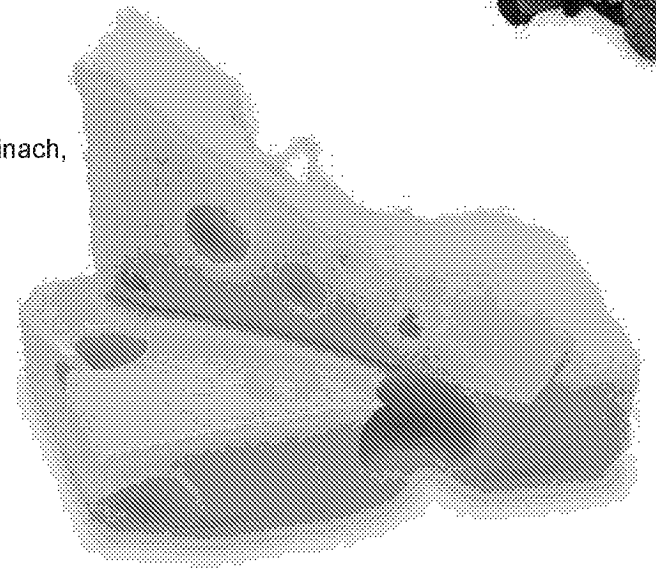
Lean red meats, fish, and chicken
Iron-fortified cereals
Dried fruits (raisins, prunes)

Calcium-Rich Foods
Calcium reduces lead absorption and also helps make teeth and bones strong. Good sources of dietary calcium include:

Milk
Yogurt
Cheese
Green leafy vegetables (spinach, kale, collard greens)

Vitamin C-Rich Foods
Vitamin C and iron-rich foods work together to reduce lead absorption. Good sources of vitamin C include:

Oranges, orange juice
Grapefruits, grapefruit juice
Tomatoes, tomato juice
Green peppers

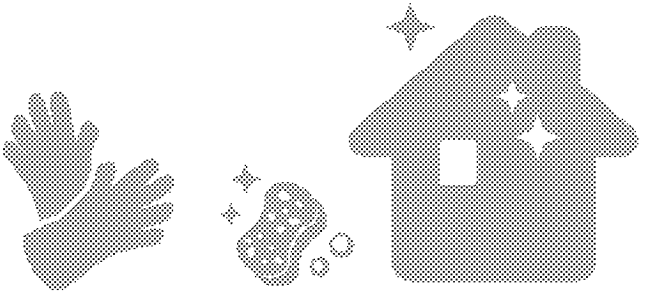


Simple Steps You Can Take

to Protect Your Family from Lead Hazards

If you think your home has high levels of lead:

- Make sure your children eat healthy, low-fat foods high in iron, calcium, and vitamin C.
- Get your children tested for lead, even if they seem healthy.
- Get your home tested for lead if it was built before 1978. Call 1-800-424-LEAD for more information.
- Always wash your hands before eating.
- Wash children's hands, bottles, pacifiers, and toys.
- Do not use imported pottery to store or serve food.
- Let tap water run for one minute before using.
- Use only cold water for making your baby's formula, drinking, and cooking.
- Regularly clean floors, windowsills, and other surfaces using wet methods that control dust.
- Wipe or remove shoes before entering your house.
- If you rent, it is your landlord's job to keep paint in good shape. Report peeling or chipping paint to your landlord and call your health department if the paint is not repaired safely.
- Take precautions to avoid exposure to lead dust when remodeling or renovating.
- Don't try to remove paint yourself!



For more information on childhood lead poisoning prevention:

Call

- Your child's pediatrician
- Genessee County Health Department Lead Program (810) 257-3833
- WIC (810) 237-4537
- Michigan Childhood Lead Poisoning Prevention (888) 322-4453
- Michigan Department of Health & Human Services (517) 373-3740

Visit

- Michigan Department of Health & Human Services http://www.michigan.gov/mdhhs
- Michigan Childhood Lead Poisoning Prevention www.michigan.gov/lead
- Genessee County Health Department Lead Program http://www.gchd.us/new_other_services/childhood_lead_poisoning_prevention_program.php

MDHHS

Childhood LEAD POISONING prevention program

PREGNANT AND NURSING MOTHERS

WHAT YOU NEED TO KNOW ABOUT LEAD POISONING

What causes lead poisoning?

There are many factors that can put a pregnant woman or nursing mother at risk for lead poisoning.

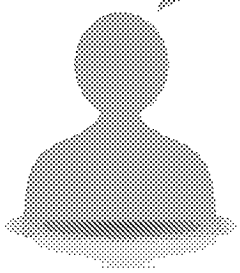
In Michigan, lead paint is still the #1 cause of lead poisoning. It is often found in homes built before 1978 and the older the home, the more likely that painted surfaces like windows, cupboards, doors and porches will contain lead paint.

Other sources of exposure may include soil and water or jobs and hobbies using lead such as factory work, soldering, ammunitions or jewelry making. Some pottery glazes, imported spices and home remedies may also contain lead.

Should I get tested?

Routine blood testing is NOT recommended for all pregnant women or nursing mothers. Talk to your doctor or local health department to learn more.

If I test positive for lead poisoning, can I continue to breastfeed?



In most cases, breastfeeding is safe. However, if your blood lead level goes above 40 ug/dl *or* your level is greater than 20 ug/dl and your baby has a level above 5 ug/dl, you should talk with your doctor about continuing to breastfeed.

Childhood LEAD POISONING prevention program

What can I do to protect myself from lead?

- Wash hands, bottles, pacifiers and toys often.
- Always take off shoes before going into the house.
- Flush your pipes before drinking, and only use cold water for drinking or mixing formula. Flush pipes by running the water for approximately 5 minutes.
- Watch your diet carefully. Foods high in calcium and iron help keep lead from being absorbed by your body.
- Avoid using power sanders, open-flame torches, heat guns, dry scrapers and dry sandpaper on painted surfaces.
- Fix peeling or chipping paint.
- Use a certified Repair and Remodeling Professional when making updates to your home.
- Practice safe cleaning methods.

To learn more about lead poisoning prevention and blood lead testing, call:

(888) 322-4453

MDHHS

Michigan Department of Health & Human Services

GRETCHEN WHITMER, GOVERNOR | NICK LYON, DIRECTOR

CHILDHOOD LEAD POISONING

Blood Lead Level (BLL) Quick Reference for Primary Care Providers

Not Yet Tested

Consider screening ALL children between ages 1-6

Need for testing can be based on risk factors

REMINDER: Medicaid requires all children to be tested at ages 1 & 2. Children who were not tested between 1 & 2 must be tested at least once between 3 & 6.

BLL <5

Review lead levels with family

Provide anticipatory guidance

REMINDER: Medicaid requires all children to be tested at ages 1 & 2. Children who were not tested between 1 & 2 must be tested at least once between 3 & 6.

BLL 5-14

Review lead levels with family

Confirm results with venous blood sample

Review venous sample with family

Perform environmental history. Consider other children who may be exposed

Consider iron sufficiency, provide nutritional counseling r/t calcium and iron

Provide anticipatory guidance

Refer to case management

FOLLOW UP: Retest venous sample within 1-3 months to ensure BLL is not rising

REMINDER: Medicaid requires all children to be tested at ages 1 & 2. Children who were not tested between 1 & 2 must be tested at least once between 3 & 6.

BLL 15-44

Review lead levels with family

Confirm results with venous blood sample

Perform environmental history. Consider other children who may be exposed

Consider if a specific evaluation of the child is necessary such as an abdominal x-ray. Gut decontamination may be needed if leaded foreign bodies are visualized in x-ray

Consider iron sufficiency, provide nutritional counseling r/t calcium and iron

Refer to case management

FOLLOW UP: Retest venous sample monthly until levels are <15, repeat every 1-3 months until levels are <5

REMINDER: Medicaid requires all children to be tested at ages 1 & 2. Children who were not tested between 1 & 2 must be tested at least once between 3 & 6.

BLL >44

Review lead levels with family

Confirm results with venous blood sample

Review venous sample with family

Any treatment at this level should be performed in consultation with an expert at Children's Hospital of Michigan in Detroit.

FOLLOW UP: As directed by expert. Monthly venous samples will be required.

REMINDER: Medicaid requires all children to be tested at ages 1 & 2. Children who were not tested between 1 & 2 must be tested at least once between 3 & 6.

Questions? Contact us at (888) 322-4453 or (517) 335-8885

MDHHS
Michigan Department of Health & Human Services
RICK SNYDER, GOVERNOR | NICK LYON, DIRECTOR

Childhood LEAD POISONING prevention program

October 30, 2015

Dear Provider:

As you may be aware from recent news reports, elevated levels of lead have been found in lead pipes within the City of Flint's water system.

To help protect the children of Flint from the current lead in water exposure, the Genesee County Health Department and Michigan Department of Health and Human Services are contacting you to assist you in providing guidance to support your families.

Children can be exposed to lead from drinking water in that runs through lead pipes, old lead paint, soil, pottery, cosmetics and toys and some home remedies. Adult jobs and hobbies, like auto repair, stained glass and jewelry making, and ammunitions handling can also put children at risk if they touch clothing or play in areas where lead is found.

As a primary care provider, you play a critical role in helping to ensure that children and families exposed to lead receive the care and reassurances they need to manage the potential health impacts of lead poisoning.

Identification. Children suffering from lead poisoning often fail to present outward symptoms. However, early clinical symptoms can include anemia, anorexia, abdominal pain and constipation. Lead is a neuro-toxin, and exposure can result in violent and aggressive behaviors, lead to learning disorders, may cause Attention Deficit Hyperactivity Disorder (ADHD) and has been known to reduce IQ by as many as 5-8 points with levels as low as 10 ug/dL. Lead is metabolized through the gastrointestinal system similar to iron and calcium, with uptake rates depending on the size and weight of the child. The blood half-life of lead is short (approximately 1 month) but the bone half-life can extend into decades.

Due to multiple risk factors facing many residents in the City of Flint (including aging housing conditions and water quality), we recommend that all children under age 6 living in the City of Flint or living in homes that use Flint water, attending school or childcare in Flint, or who spend time with a caregiver in the City of Flint, receive a blood lead test. Blood lead testing should be done through a child's primary care doctor to ensure adequate short-term and long-term follow-up. **Families should be encouraged to have their children tested immediately *either at their doctor's office or the Genesee* County Health Department**.

Management of Blood Lead Levels. The following guidance is provided for management of childhood blood lead levels:

- **BLL < 5 ug/dL**
  - A lead level of less than 5 mcg/dL is not typically cause for concern.
  - Provide education and anticipatory guidance to ensure that lead levels do not rise.
  - Consider retesting in 12 months based on risk factors or concerns.

- **BLL >5 ug/dL**
  - **Children with capillary results of 5 ug/dL and higher must have a confirmatory venous blood draw.**
  - Families should receive anticipatory guidance, nutrition counseling, instruction on safe cleaning techniques and appropriate follow-up care from their primary care provider.
  - In-home services including case management and environmental investigations are available for all children with lead levels greater than 5 ug/dL. Refer patients to the Genesee County Health Department for this service.
  - Children with confirmed venous testing results greater than 5ug/dL within the past 18 months must be retested based on Medicaid policy and AAP guidelines. (See attached "Provider Quick Reference). If a child has not been retested within these timeframes, retesting is recommended as soon as possible.
- **BLL > 44 ug/dL.**
  - **Children with capillary results of 5 ug/dL and higher must have a confirmatory venous blood draw.**
  - Lead levels over 44 ug/dL may require hospitalization. Consult with an expert at the Children's Hospital of Michigan in Detroit for additional guidance.
  - Families should receive anticipatory guidance, nutrition counseling, instruction on safe cleaning techniques and appropriate follow-up care from their primary care provider.
  - In-home services including case management and environmental investigations are available for all children with lead levels greater than 5 ug/dL. Refer patients to the Genesee County Health Department for this service.
  - Children with confirmed venous testing results greater than 5ug/dL within the past 18 months must be retested based on Medicaid policy and AAP guidelines. (See attached "Provider Quick Reference). If a child has not been retested within these timeframes, retesting is recommended as soon as possible.

  Reminder: All children covered by Medicaid must be tested at age 1 and 2.

Follow-up Care. As providers, there are steps you can take to help support your families:

1. Continue to inform and educate families regarding lead risks and preventative steps that they can take to minimize their risks.
2. Encourage your families to use filtered water for drinking, mixing formula and washing dishes. Families can contact 2-1-1 for information on free NSF Certified water filters.
3. Healthy nutrition is critical for lead-exposed children. Make sure your patients are consuming balanced diets high in iron, calcium and Vitamin C. If you have concerns about their nutrition, consider recommending a multivitamin with iron. WIC and SNAP provide assistance to parents and children who need fresh and healthy foods. Contact the Genesee County WIC office at (810) 237-4537 to learn more. In addition, SNAP offers a Double Bucks program that can provide healthy foods for less.
4. Breastfeeding is highly protective and encouraged. However, if the mother's blood lead level rises above 40ug/dL or her level is greater than 20 ug/dL and the baby has a level above 5 ug/dL breastfeeding is not recommended.

5. Because lead is a neuro-toxin, children with lead poisoning need longitudinal follow-up and may require developmental and behavioral health intervention services. Continue monitoring your patients' development at every visit.
6. Consider additional wrap-around and support services that will benefit your patients such as early childhood home visiting programs, early head start and head start. Call 2-1-1 for more information.

Local Resources. Several local resources are available to you and your patients:

- Blood Testing. Patients are encouraged to contact their primary care provider for testing. The Genesee County Health Department also administers lead tests. Patients in need of transportation should contact 2-1-1 for assistance.
- Water Testing. Water testing is free through the City of Flint Water Testing Plant. Patients can call 810-787-6537 to learn more.
- WIC and SNAP provide assistance to parents and children who need fresh and healthy foods. Contact the Genesee County WIC office at (810) 237-4537 to learn more.
- Child Development. If you have concerns about a child's growth, development or learning contact 2-1-1 for a Home Visiting Program in your area.

Websites and contact information.

- Genesee County Health Department Lead Program
  (810) 257-3833
  www.gchd.us

- Michigan Department of Health and Human Services
  Childhood Lead Poisoning Prevention Program
  (888) 322-4453
  www.michigan.gov/lead

- Michigan Department of Health and Human Services
  Lead Poisoning Prevention Video for Primary Care Providers
  http://www.youtube.com/watch?v=AnkjCW_yGaU&feature=youtu.be

- United States Environmental Protection Agency
  www.epa.gov/lead

- U.S. Centers for Disease Control and Prevention (CDC) Web site
  www.cdc.gov/nceh/lead

These recommendations will stay in effect until the Genesee County Health Department lifts the restrictions on water usage.

Sincerely,

Eden V. Wells, MD, MPH, FACPM
Chief Medical Executive
Michigan Department of Health and Human Services

Gary K. Johnson, MD, MPH
Medical Director
Genesee County Health Department

From: Peeler, Nancy (DHHS)
Sent: Wednesday, October 21, 2015 9:56 AM
To: Lishinski, Karen (DHHS)
Cc: Houk, Emily (DHHS)
Subject: Fwd: REMINDER: Version 6 of Lead Protocol and Testing
Attachments: image001.jpg; ATT00001.htm; Instructions For Sharepoint.pdf; ATT00002.htm; Blood Testing Protocol Planning Template Meeting 10-19-15 V6 (2).docx; ATT00003.htm

Here's the big document - protocol draft due by 1pm today.

Sent from my iPad

Begin forwarded message:

> **From:** "Colston, Leslie (DHHS)" <ColstonL@michigan.gov>
> **Date:** October 20, 2015 at 1:38:30 PM EDT
> **To:** "Wells, Eden (DHHS)" <WellsE3@michigan.gov>, 'Toni Larocco' <tlarocco@gchd.us>, 'Mona Hanna-Attisha' <MHanna1@hurleymc.com>, "Peeler, Nancy (DHHS)" <PeelerN@michigan.gov>
> **Cc:** "Rockefeller, Cheryl (DHHS)" <RockefellerC@michigan.gov>, "Travis, Rashmi (DHHS)" <TravisR@michigan.gov>
> **Subject: REMINDER: Version 6 of Lead Protocol and Testing**
>
> Hello all,
>
> Attached are the notes from our call.
>
> Just a little reminder to:
>
> -Please review version 6 of the lead protocol and testing, particularly areas in Aqua color for clarification or changes.
> -Connect with the SharePoint site to review, suggest, or provide any documents that should go out with the cover letters. **Nancy will send a notice out to everyone when the letters going to primary care providers and day care provided ready to view**. (Please see attached instructions for how to use the SharePoint site)
> -For our call at 9am tomorrow, we will need to discuss and hopefully come to near completion on these items: 1.) Finalize letters and materials for communications and 2.) Finalize protocol.
>
> Thanks,
> Rashmi

Rashmi Travis, MPH, CHES
Bureau Director of Family, Maternal, and Child Health
Michigan Department of Health & Human Services
Population Health and Community Services
Capitol View Building, 6th Floor
Lansing, MI 48913
Phone: 517-335-8922

Fax: 517-335-9032

Leslie A. Colston, GPC
Bureau Executive Secretary for Director Rashmi Travis, MPH, CHES

Michigan Department of Health and Human Services
Bureau of Family, Maternal & Child Health and Health Services
201 Townsend Street, 6th Floor, 6-019
Lansing, MI 48913
Phone: 517-335-9307
Email: ColstonL@michigan.gov

Blood Testing/Case Mangement Protocol Planning Template

Oct 19, 2015 v6

GCHD, Hurley Pediatrics, and MDHHS

Toni LaRocco, Nancy Peeler, Rashmi Travis, , Mona Hanna-Attisha

I. Prioritization of Testing

A. Children <6 already tested positive by capillary since April 2014 (n=75)
   1. Every week GCHD letters go out, educational material is also sent out (nutrition lead sources, etc.)
   2. Sending letters at 5ug/dL (new; previously doing at 10 ug/dL)- Letter includes in bold to follow up with PCP
   3. 10 ug/dL: making phone call (or sending letter if unable to reach) offering an office visit where clients are given a lead kit which includes: vacuum with hepa filter, mop, simple green and soon will include NSF water filter, gloves and Swiffer. Education regarding use of above, nutrition and medical follow up guidance to return to PCP.; vacuum of HEPA Filter—if don't have specifications of HEPA filter—will not pick up lead particles—Toni will get clarification on who recommended this and Nancy will ask Bob Scott to check into this as well.
   4. 20 ug/dL: two visits with nurse and sanitarian with a referral to MDHHS Lead Safe Homes

B. Retesting of Flint children with EBLL of venous samples- all due for first or subsequent follow-ups

C. School children those in the 3 schools identified as having elevated water lead (Freeman, Brunnell, Eisenhower)

D. Every school facility- prioritization in this order:
   1. 0-5 years age
      a. Daycare
      b. Great Start Readiness Pre-school (funded by MDE)
      c. Early Headstart
      d. Headstart
   2. 5-12 years of age
      a. Elementary
   3. >12 years of age
      a. Middle
      b. High

II. Implementation of Testing

A. **Payment for adults and child testing** covered by:
   1. Medicaid
   2. Insurance
   3. Local Health Department, if no Medicaid or insurance

B. Partners

1. McLaren Health Plan
    a. **Nov 5th** is a screening (capillary) event for McLaren clients as well as interested community members. This is a walk-in event-
    b. Online lead registry (HHLPS) could be accessed to check child's status
        a. McLaren has access to MCIR but not HHLPS
    c. McLaren will contact their clients, and test their clients
    d. GCHD will market to whole community, and GCHD WIC staff will draw other community members-cap or venous as indicated
    e. GCHD will look up kids prior to drawing.....if ever drawn and elevated GCHD will do a venous draw instead.
2. UM-Flint Nursing students- Toni has been in touch with Nursing school and Licensed (BSN)nursing students may be able to assist Nov 5 and other times possible
3. Hurley Pediatrics (Mona)-(n=900)
    a. Dr. Hanna- Attisha has all Hurley clinic kids that need a redraw back to April 2014
    b. Also have list of all lead labs drawn fromHurley Lab back to April 2014
        a. Dr. Hanna Attisha looked at all the Hurley lab-processed lead levels, specifically all EBLLs geocoded to the city of Flint after April 2014
        b. As expected, they come from the following providers in decreasing order of frequency. This matches with the CHAP data in regards to providers who see the most Medicaid patients in the county:
            i. Hurley Children's Clinic
            ii. Hamilton Health Center (FQHC) - multiple clinics
            iii. Mott Children's Health Center
            iv. Solo Private Practices - M Akpinar, N Ali
    c. Children's Healthcare Access Program-(CHAP) - target Medicaid groups by 4 clinics (Hamilton, Hurley, Dr. Akpinar, Mott Children's Clinic (Dr. Reynolds)
        a. Can access majority of Medicaid children in Flint and have data-sharing agreements already in place.
        b. Has social workers staff and 211 and case management, filter follow-up
        c. Housed at GFHC
        d. CHAP- GCHD Toni LaRocco spoke with Susan from CHAP 10/14
            i. they are paid from a grant through the Health Endowment Fund
            ii. Contracted (not signed yet but will be) to run Medicaid Match through GCHD.
            iii. Doing things like arranging transportation to get lead levels drawn good role for them as it is reimbursable with Medicaid Outreach.

d. Hamilton FQHC

4. Molina- Serve largest number of Peds/Medicaid-
5. GCMS Pete Levine---network information with all providers to get testing protocol information to them
6. Greater Flint Health Coalition-networking information to providers

III. Sites for Testing

A. Patient Centered Medical Home- Use primary providers whenever possible! Very important. Getting tests done outside of the medical home creates lack of continuity and lack of follow-up. Encourage as much as possible to "go see your doctor".
   a. Which then means that we need to educate the doctors with direct messaging about who to test, when to test, what is follow-up, available resources (211), premade patient education flyers, etc. Focus should be on lead in water education info.

B. GCHD
   1. GCHD (Toni LaRocco) Meeting with PIO and UMFlint Nursing in order to get assistance with Lead testing clinics.
   2. GCHD (Toni LaRocco) will be contacting other Medicaid Health Plans to try and have clinic with them at the Farmers Market

C. McLaren- at Burton Branch GCHD- all day- confirmed Nov 5, 2015

D. McLaren-(**Nov 5, 2015**) at Burton Branch GCHD- all day

E. Farmer's Market (GCHD and Hurley Peds) held on (T, TH, Saturdays)
   1. Hurley staff can draw blood at this site

F. Molina-TBD

G. Other health plans- Being contacted

H. Schools- request Friday October 16 from Flint Community Schools Superintendent Bilal Tawwab for testing to occur at schools.

- Try to contact him Superintendent – Mona will do this to let him know what our plan is.
- What is the purpose of this? It goes against the face of creating the primary care home, also signing a release is a challenge; it is natural way of place for kids to go to
- Have lowest school nurses to students—very minimal capacity to do this.
- Resolution with the Dept of Education
- Go to Primary Care doctor first
- Education with Primary Care doctors Testing

1. Daycare, Early Head Start and Head Start are priority. Two letters will be formulated to provide information to the following groups Letter for Flint area parents with children in daycare, EHS/HS, GSRP, and schools

2. Letter for primary care providers serving children from the Flint area
   -
   - Work with ISD and Flint Schools to give them education piece to work with them in the classroom—1.) elementary and secondary school education children to limit exposure – Faculty of school education—city of Flint schools and through ISD (U of M Flint schools); GISD controls Early Start and Head Start and GCARD—between these 2 resources may be able to get information out soon.
   - Work with Office of Great Start for licensed daycares—Toni can get to those groups through immunizations and through Nancy can work with Office of Great Start
   - Limit risk, great nutrition, doctor
   - Pushing for a WIC person in each clinic
   - MSU Education pushing for nutrition education—lead-exposed diet
   - go to one of 4 clinics can get children in
   - Pharmacy looking for formula for Iron, Calcium, and Vitamin C—Vitamin D supporting absorption of calcium
   - Who will get the information: Genessee Medical Society, Greater Flint Health Coalition. and Pediatrics groups that work through Hurley.

-What information will go to providers:
-Cover letter
- Make sure it is of the literacy level 4th grade level
-Nutrition
-Basics of how to get a filter
-211 and connection other wraparound services
-Basic Prevention Strategies
-Testing—4 sites
-Nancy can check about putting Share Point site—to establish a central site—by noon today and get folder where we can all access the materials prior to their release.
-It is likely that this information could go to the Lead nurse, Karen Lishinski—send Share point address and email by noon.
-The protocol team will Review materials and what goes with letter

-Nancy and her team will draft a cover letter for review
-Cover Letter could go out with Dr Wells, Dr. Johnson, and Dr. Mona Hanna-Attish signatures?
-Dr. Hanna-Attish is working with pharmacies on providing a vitamin rich in iron, calcium, vitamin C, and vitamin D
-MSU Extension in Genesesse County is also pushing out educational materials on nutrition education
-for Early On – for every family of 5 and above-- -- not going to see it right away—established criteria is 10 Ug/dcl—most of the time with them aren't seen – can you make referrals to home visiting programs—primary care providers track and see; centralized home visiting hub—take a referral and send to other—GCHD to have a conversation with Dawn (in charge of Home Visiting Hub); if Hub can serve as single point of referral
-At home services—trauma informed systems of care collaborative—toxic stress exposures—some resources in CMH, parenting resources—conversation with Dawn and GCHD—a good portion can get information through CHAP on lead issues
-Most of the Hurley kids have been followed up to reach levels below 5 or recommend follow-up testing.

-Try to contact him Superintendent –Dr. Hanna-Attish will do this to let him know what our plan is.

If the Superintendent's call came through to Eden, she can connect with him as well to explain rationale and importance getting information out to providers.

IV. Registration of lead testing clients

A. HEALTH BLOOD LEAD ANALYSIS REPORTING (By authority conferred on the department of community health by 1978 PA 368, MCL 333.5111(1) and (2)(f), 333.5474(1)(c), and 333.20531; 1978 PA 312, MCL 325.72(a)(i), MCL 325.78; and Executive Reorganization Order No. 1996-1, MCL 330.3101):

1. All clients drawn will sign a release allowing result to be shared with primary provider
2. Upon initiating a request for blood lead analysis, the physician/provider or user ordering the blood lead analysis shall collect the following information:

(a) All of the following information with respect to the individual tested:

(i) Name.

(ii) Sex

(iii) The individual's ethnicity including either of the following:

(a) Hispanic or Latino/Latina.

(b) Not Hispanic of Latino/Latina.

(iv) The individual's race, noting the following:

(a) American Indian or Alaska Native.

(b) Asian.

(c) Black or African American.

(d) Native Hawaiian or Other Pacific Islander.

(e) White or Caucasian.

(v) Birthdate.

(vi) Address, including county, and, to the extent available, whether the residence or property is owned or rented.

(vii) Telephone number.

(viii) Social security number and Medicaid number, if applicable.

(ix) If the individual is a minor, the name of a parent or guardian.

(x) If the individual is an adult, the name of his or her employer.

(xi) A secondary contact for the individual tested or, if the individual is a minor, a secondary contact for the individual's parent or guardian, including, to the extent available, name and phone number of the secondary contact.

(b) The date of the sample collection.

(c) The type of sample (capillary or venous).

(d) The physician's/provider's or user's name, name of practice (if applicable), telephone number, fax number, email address, and mailing address.

V. Handling of Results/messaging

A. CLPP and GCHD currently have protocol lab test result sharing (HHLPSS)
   1. Bob Scott can assist in navigation
   2. MDHHS Bureau of Labs can provide surge capacity for lab testing if needed

B. Secondary prevention messaging for all community
   1. nutrition, good vitamins
   2. wrap-around services
   3. Breastfeeding, breastfeeding, breastfeeding – breastfeeding is protective for lead in water! Increase number of LC's, support breastfeeding peer programs, etc. Flint has low breastfeeding rate.
   4. positive parenting/nurse family partnership, infant support services
   5. WIC enrollment
   6. SNAP double bucks enrollment

EBL Investigations/Case Management Protocol

A. Payment for EBL Investigations:

1. Budgeted currently for 250 EBL investigations (to include water testing) for every child with elevated blood lead > 5mcg/dl.
2. The U.S. Department of Health and Human Services recommends that BLLs among all adults be reduced to <10 µg/d- so follow-up for adults will be at levels >10 mcg/dl (http://www.cdc.gov/niosh/topics/ables/description.html)
3. Medicaid will pay for 2 nursing visits following up for their clients

B. **EBL Investigation Implementation**

I. **Actions and Assignments for Week of October 19, 2015 (Highlighted red is complete)**

A. GCHD/Toni LaRocco and CHAP will contact Molina and other health plans to set up similar program as McLaren

B. GCHD/Toni la Rocco will contact all health plans- if issues, contact Wells

C. MDHHS will provide support as requested for any events

D. Hilda at GCHD needs to blast provider information about lead to all providers (blast fax and list serves)

E. FAQ water lead sheet to be sent out (completed October 15, 2015)

F. Dr. Hanna- Attisha and GCHD-If need for increased capillary testing machines---advise MDHHS

G. Activities/follow up by Nancy/Bob

1. Work with Communications to support linkage to other early childhood/school state partners at MDE that we already work with that were listed in the plan - Office of Great Start is the link to child care providers (related to subsidy payments and to their subcontract to ECIC to run regional child care resource/TA centers); they are also the state liaison to Head Start/Early Head Start and the Great Start Readiness at-risk preschools. And of course their School Health office.

2. Access to HHLPSS data system - currently only GCHD has access - Bob thinks that 2 staff there have been trained to use the system, but we need to confirm when we are back at the office. As I referenced above, we are looking at lead privacy laws to see who else (besides GCHD) might be able to have access to the CLPPP data about follow-up testing.

3. Also, Bob can attend the event on November 5th

4. Regarding CLPPP sending our list of children needing follow-up to Hurley (when we think there is a Hurley provider), we are also confirming that we can do that based on privacy laws.

5. We will follow up to make sure that the new CLPPP toolkit materials for providers get out to all of you - our Provider Quick Reference document, and the video Eden referenced is coming soon

6. Exploring legal issues around access to the data.

H. Wells will get back with Flint City Superintendent regarding issues of school clinics depending upon October 19 meeting

I. ALL- Develop messaging for all healthcare providers in Flint regarding testing, getting their clients in for testing, and using an approved form that requests required reporting information.

J. MDHHS Wes Priem-Develop form for blood test registration/required information

K. ALL - Disseminate form

Questions from Nancy/Bob –October 14

- Medicaid will pay for 2 nursing visits. Toni, I wanted to double check, at what levels is GCHD currently sending out nurses to follow up on elevated blood lead levels (even if only 2 visits) ? And I wasn't sure if I understood on the call - is GCHD billing Medicaid for those visits for children enrolled in Medicaid? Are billing for those visits
- We agree that CHAP could be a good resource that could try to find kids and help get them connected for testing/follow-up testing. Are they paid by health plans/clinics to carry out activities, e.g. that is who their direction comes from (I know that was the model in Kent County)? I ask that related to our thinking about who the CLPPP data (e.g. access to the HHLPSS data system) could go to - we have to explore the privacy laws for the lead data.
- We concur about using Lead Care machines, but only if there is a better protocol to ensure that children with an elevated capillary test get back for venous testing.

-McLaren doing filter paper –if show up at GCHD doing Lead care machine—can get results that day—elevated capillary—nutrition information, send results with all of that regardless of elevated

-Release signed at Nov 5th event—mailing letter to family and letter to doctor.

-Other clinics—Toni has connected Molina, Meridian, and McLaren; Total HealthCare has small % of clients—looking at HEDIS results and looking to those kids of who haven't been tested; biggest offer is transportation—CHAP can help arrange for transportation—for Medicaid outreach.—include same phone number for school letter.

Next Call – Wed morning 10/21 9AM to finalize documents for distribution to providers and schools.

From: Houk, Emily (DCH)
Sent: Monday, October 27, 2014 4:19 PM
To: Peeler, Nancy (DCH)
Subject: In Case of Emergency.....
Attachments: Rashmi OGS 1014.ppt

Bust this out and finish for Rashmi. I'm pretty sure Charlie is OK--but Rashmi asked me to send it to her tomorrow (Tuesday)--and in the event something happens, I don't want to leave you hanging (I also don't have internet at home yet)...

So:
1. I am waiting for you to approve the interagency slides for lead and HV
2. I need the interagency bullet points from Stan Bein for WIC
3. I need to address a comment with Rashmi--she asked me to change the MHVI or references to early childhood home visiting to MIECHV...I wanted to explain in an email that MHVI is the correct term, not MIECHV (I'm sure she thinks I mis spelled it...)
4. All done:)

Anyway, hope CAN went great! And HOPEFULLY, talk to you tomorrow!!!

Em

Emily Houk, Communications Consultant
Michigan Home Visiting Initiative
Michigan Department of Community Health
517-896-2712
www.michigan.gov/homevisiting/

From: Houk, Emily (DHHS)
Sent: Monday, October 19, 2015 11:30 AM
To: Peeler, Nancy (DHHS)
Subject: Re: Flint parent letter

Quick question on tone--what is the opening messaging strategy.....or would you like me to call Angela on this?

(Ie., "As you are aware, lead has been found" or "in an ongoing effort to promote the safety"...or something else)?

Emily Houk, Communications Consultant
Michigan Department of Community Health
517-896-2712

From: Peeler, Nancy (DHHS)
Sent: Monday, October 19, 2015 10:52 AM
To: Houk, Emily (DHHS)
Subject: Flint parent letter

Content we need in the letter (either in or attached, we need to develop the recommendation) -

letter to parents (at 4th grade reading level) --intro, why they should care, lead in water, lead in other sources --how to get filters --nutrition information (including vitamins) and breastfeeding --TESTING - list the community clinics that we know about and also GO TO YOUR PRIMARY CARE PROVIDER --WIC and SNAP benefits --HV programs/other community resources referrals --help with transportation

Attachments about some of the above (and which ones)

need to leave space to insert info about community testing clinics need to leave space to insert a phone number to call (CHAP) for help with transportation

Hope this helps

Sent from my iPad

From: Houk, Emily (DHHS)
Sent: Thursday, December 10, 2015 9:13 AM
To: Peeler, Nancy (DHHS)
Subject: Fw: Sit-Rep 12/9

Anything YOU want to add?

Emily Houk, Communications Consultant
Michigan Department of Community Health
517-896-2712

From: Dykema, Linda D. (DHHS)
Sent: Thursday, December 10, 2015 8:31 AM
To: Houk, Emily (DHHS)
Cc: Bruneau, Michelle (DHHS)
Subject: FW: Sit-Rep 12/9

Hi Emily,

Do you have any other items to add to Michelle's updates or are you ok with her providing these for the daily briefing?

Linda

From: Bruneau, Michelle (DHHS)
Sent: Wednesday, December 09, 2015 5:05 PM
To: Dykema, Linda D. (DHHS) <DykemaL@michigan.gov>
Cc: Barr, Jacqui (DHHS) <BarrJ3@michigan.gov>
Subject: Sit-Rep 12/9

Health Education Resources Updates - Michelle Bruneau, Emily Houk

- Facilitated and attended technical meeting regarding phosphate and health between GCHD and MDHHS toxicologists
- Continuing to write and coordinate additions to the EBL Case Manager Binder, now known as the MDHHS Lead Safe Family Guide Book.
- Filled out publications forms for Phosphate fact sheet and Bath Time poster and submitted for signature on 12/9
- Pending: Aerator/Filter Maintenance Fact Sheet; Flint Parent Letter re-do in partnership with Emily Houk

><{{{'> www.michigan.gov/eatsafefish <'}}}><

Michelle Bruneau, MA
Project Manager & Health Educator

Michigan Department of Health & Human Services
201 Townsend, 4th Fl
Lansing, MI 48913
Direct: (517) 335-8984
Toll free: 1-800-648-6942
Fax: (517) 335-8800
bruneaum@michigan.gov

From: Houk, Emily (DHHS)
Sent: Thursday, December 10, 2015 9:18 AM
To: Peeler, Nancy (DHHS)
Subject: Re: Sit-Rep 12/9

I'm good for now unless you have something you want to add. Just let me know.

Emily Houk, Communications Consultant
Michigan Department of Community Health
517-896-2712

From: Peeler, Nancy (DHHS)
Sent: Thursday, December 10, 2015 9:17 AM
To: Houk, Emily (DHHS)
Subject: Re: Sit-Rep 12/9

I agree, good additions. Will call you ASAP.

Sent from my iPad

On Dec 10, 2015, at 9:16 AM, Houk, Emily (DHHS) <HoukE@michigan.gov> wrote:

> Emily Houk, Communications Consultant
> Michigan Department of Community Health
> 517-896-2712
>
> Hi Linda,
> I think I would add:
> Facilitated conversations about distribution of EPA Healthy Diet brochures;
> Pending: coordination of updates to Healthy Diet brochures with Emily Houk
>
> ---
>
> **From:** Dykema, Linda D. (DHHS)
> **Sent:** Thursday, December 10, 2015 8:31 AM
> **To:** Houk, Emily (DHHS)
> **Cc:** Bruneau, Michelle (DHHS)
> **Subject:** FW: Sit-Rep 12/9
>
> Hi Emily,

Do you have any other items to add to Michelle's updates or are you ok with her providing these for the daily briefing?

Linda

From: Bruneau, Michelle (DHHS)
Sent: Wednesday, December 09, 2015 5:05 PM
To: Dykema, Linda D. (DHHS) <DykemaL@michigan.gov>
Cc: Barr, Jacqui (DHHS) <BarrJ3@michigan.gov>
Subject: Sit-Rep 12/9

Health Education Resources Updates - Michelle Bruneau, Emily Houk

- Facilitated and attended technical meeting regarding phosphate and health between GCHD and MDHHS toxicologists
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Michelle Bruneau, MA
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Lansing, MI 48913
Direct: (517) 335-8984
Toll free: 1-800-648-6942
Fax: (517) 335-8800
bruneaum@michigan.gov

From: Houk, Emily (DHHS)
Sent: Friday, December 11, 2015 9:45 AM
To: Bruneau, Michelle (DHHS)
Cc: Peeler, Nancy (DHHS);Dykema, Linda D. (DHHS)
Subject: Re: Sit Rep for 12/10

Will do!

Emily Houk, Communications Consultant
Michigan Department of Community Health
517-896-2712

From: Bruneau, Michelle (DHHS)
Sent: Friday, December 11, 2015 9:11 AM
To: Houk, Emily (DHHS)
Cc: Peeler, Nancy (DHHS); Dykema, Linda D. (DHHS)
Subject: RE: Sit Rep for 12/10

Hi Emily!

If it's ok with you, you add anything else to your plate for Flint, please let me know by 3pm each day, and I'll tack it in to the report…Otherwise, I'll assume everything stands as is and quit bugging you on a daily basis…☺

- Michelle

><{{{'> www.michigan.gov/eatsafefish <'}}}><

Michelle Bruneau, MA
Michigan Department of Health & Human Services
Project Manager & Health Educator
(517) 335-8984
bruneaum@michigan.gov

From: Dykema, Linda D. (DHHS)
Sent: Friday, December 11, 2015 9:07 AM
To: Houk, Emily (DHHS) <HoukE@michigan.gov>; Bruneau, Michelle (DHHS) <BruneauM@michigan.gov>
Cc: Barr, Jacqui (DHHS) <BarrJ3@michigan.gov>; Peeler, Nancy (DHHS) <PeelerN@michigan.gov>
Subject: RE: Sit Rep for 12/10

thanks

From: Houk, Emily (DHHS)
Sent: Friday, December 11, 2015 7:46 AM
To: Bruneau, Michelle (DHHS) <BruneauM@michigan.gov>; Dykema, Linda D. (DHHS) <DykemaL@michigan.gov>
Cc: Barr, Jacqui (DHHS) <BarrJ3@michigan.gov>; Peeler, Nancy (DHHS) <PeelerN@michigan.gov>
Subject: Re: Sit Rep for 12/10

Nope. This covers what I'm working on for Flint.

Emily Houk, Communications Consultant
Michigan Department of Community Health
517-896-2712

From: Bruneau, Michelle (DHHS)
Sent: Thursday, December 10, 2015 6:05 PM
To: Dykema, Linda D. (DHHS)
Cc: Barr, Jacqui (DHHS); Houk, Emily (DHHS)
Subject: Sit Rep for 12/10

Emily – do you have anything to add that you're working on for Flint? (Sorry, I didn't realize you weren't in the loop before. ☹)

Health Education Resources Updates - Michelle Bruneau, Emily Houk

- Working on aerator cleaning and filter cartridge changing fact sheet; clarifying uses of filtered/vs unfiltered water (MB)
- Continuing to write and coordinate additions to the EBL Case Manager Binder, now known as the MDHHS Lead Safe Family Guide Book. (MB)
- Awaiting Communications Office approval on Bath Time poster; submitted publication form on 12/9. (MB)
- Made or responded to suggested edits on phosphate fact sheet from EPA and MDEQ on 12/10; Awaiting Communications Office approval; submitted publication form on 12/9. (MB)
- Pending: Lead and Nutrition fact sheet and Flint Parent Letter re-do in partnership with Emily Houk.

><{{{'> www.michigan.gov/eatsafefish <'}}}><

Michelle Bruneau, MA
Project Manager & Health Educator
Michigan Department of Health & Human Services
201 Townsend, 4th Fl
Lansing, MI 48913
Direct: (517) 335-8984
Toll free: 1-800-648-6942
Fax: (517) 335-8800
bruneaum@michigan.gov

From: Houk, Emily (DHHS)
Sent: Friday, December 18, 2015 12:01 PM
To: Peeler, Nancy (DHHS)
Cc: Lishinski, Karen (DHHS)
Subject: Re: letter to parents
Attachments: ST generic result Letter 2015 (2) (1).doc

Now....go PLAY

Emily Houk, Communications Consultant
Michigan Department of Community Health
517-896-2712

From: Peeler, Nancy (DHHS)
Sent: Friday, December 18, 2015 11:58 AM
To: Houk, Emily (DHHS)
Cc: Lishinski, Karen (DHHS)
Subject: Re: letter to parents

Interesting. Could one of you forward me the letter itself, as I'd like to read it? Karen, let's put this on the list for our Tuesday call with them - I'd like to better understand how it is used, and we can share what we noticed about it, for their information (e.g. it is sent after what kind of call?). We could possibly email them feedback on Monday, to discuss on Tuesday...what are your thoughts?

Nancy

Sent from my iPad

On Dec 18, 2015, at 11:47 AM, Houk, Emily (DHHS) <HoukE@michigan.gov> wrote:

> No. This is not "the parent letter"...I THINK that letter is the one that we sent to ALL parents in the area. Although you've raised an interesting question and I will check with Michelle.
>
> Here are some thoughts:
>
> 1. This letter doesn't address water--at all. Nothing on filters, cooking or any of the water-related guidance.
>
> 2. Do you know how this is used? Does it come with info that directs the family to CM if they are above 5? When I read this it is a little unclear to me what a parent should do....what if I'm a

20 cap? Shouldn't I be going for a confirmatory right away? (I assume they are going to call them directly, but still).

3. According to the Kincaid scale--this is a 7.5 grade reading level-with 60% readability at that level (meaning it's hard for readers who are competent at that level to grasp the content easily).

Hope this is helpful.

Emily Houk, Communications Consultant
Michigan Department of Community Health
517-896-2712

From: Lishinski, Karen (DHHS)
Sent: Thursday, December 17, 2015 1:56 PM
To: Houk, Emily (DHHS)
Subject: letter to parents

This is a copy of the letter sent to parents by the CMs after they talk to the families. Is this the one they are looking at to change? I don't think this is third grade level-Go figure!

Karen Lishinski RN MA AE-C
Nurse Consultant
Michigan Department of Health and Human Services
Childhood Lead Poisoning Prevention Program
517 241 3599
109 Michigan Ave
4th Floor
Lansing, Mi 48913
Fax 517 335 8509

Genesee County Health Department

Mark Valacak, M.P.H., Health Officer
Gary K. Johnson, M.D., M.P.H., Medical Director

12/15/2015

Dear parent(s)/guardian(s):

Thank you for having your child screened for lead poisoning. Please find enclosed the result of your child's lead level. A lead level **equal to or above 5.0 ug/dL** means that your child may have been exposed to lead. Lead poisoning is a serious illness which can cause behavior and learning problems. If your child's lead level is **5.0 ug/dL** or above another test should be completed within 1 to 3 months to confirm this level is not going up. A follow up venous blood lead test needs to be taken from the vein to confirm the first test results. Keep this letter and your results for your child's record.

Lead most often enters a child's body through their mouth from the lead dust on their hands, toys, or food. Frequent handwashing is the simplest way to reduce lead exposure.

You can also reduce your child's exposure to lead and risk for lead poisoning by following these simple tips:

- Provide a balanced diet with three meals & 2-3 snacks per day. A full stomach is less likely to absorb lead.
- Provide a diet high in protein, iron, calcium and Vitamin C. Children with good diets absorb less lead.
- Foods high in these vital nutrients include meats, dairy foods, fortified cereals & fruits & vegetables.
- Teach your child to wash his/her hands before eating snacks or meals using soap and warm water.
- Wash toys and pacifiers frequently with hot soapy water.
- Vacuum carpeting frequently; use door mats; take off shoes while indoors.
- Damp mop & damp dust floors weekly or more often.
- Clean windowsills weekly using hot, soapy water.
- Cover outside play areas with grass, wood chips, pebbles or decking.
- Closely supervise your child; watch what your child puts in his/her mouth.
- Teach your child "yucky" and "yummy"; dirt is "yucky"; yogurt is "yummy"

YOU MUST CALL YOUR CHILD'S DOCTOR TO SCHEDULE AN APPOINTMENT for the follow up lead test. If your child does not have health insurance coverage, he/she may be eligible for MIChild or Healthy Kids. For more information on these programs, please call (810) 257-3039 or 1-888-988-6300.

The Women, Infants and Children program provides nutritious foods, health assessments and nutrition education for families with children. If you are not currently on WIC, you may be eligible for WIC. Please call (810) 237-4537 or 1-800-26-BIRTH for more information. If you have any other questions please feel free to contact this office at (810) 257-3833.

Best regards,

Sherry Taylor, RN BSN
Public Health Nurse Coordinator
Genesee County Health Department
Childhood Lead Poisoning Prevention Program
(810) 257-3833

From: Moran, Susan (DHHS)
Sent: Thursday, October 29, 2015 1:49 PM
To: Lasher, Geralyn (DHHS)
Subject: MDHHS action plan summary
Attachments: Week 10-29-15_Action Plan summary.docx

Per our discussion

Susan Moran MPH, Senior Deputy Director
Population Health and Community Services Administration
Capitol View Building
201 Townsend St 6th Floor
Lansing, MI
48913
Phone: 517 335 8024
Fax: 517 335 9032
morans@michigan.gov

Flint Water Public Health Response: MDHHS Action Plan Summary

Updated 10-28-15

TASK	STATUS	ACTION	DATE COMPLETED
Filter Distribution	Residents may continue to obtain filters from GCCARD (both sites 9-4PM) and MDHHS clients can continue to obtain filters at the two MDHHS office locations or the GCCARD sites. As of October 22, DHHS/GCCARD has issued 9728 filters, 95 pitchers.	No action indicated, informational only.	NA
Filter Replacement Distribution	The procedure is in place for replacement cartridge distribution including an abbreviated application for residents to apply for and obtain cartridge replacement. Cartridge replacement will occur at same locations as filter sites. DHHS is also placing an order for 750 replacement filters for the 8-cup Zerowater filters. 9000 Brita replacement filters on hand with an additional 10,000 readily available when needed. Total available= 19,000 MDHHS is currently coordinating with GCARD on publicity for distribution of the replacement filters.	DHHS and GCCARD will begin issuing the replacement filters the week of November 2nd.	**Pending**
Public Education Proper Filter Use	When used improperly, the filters will exceed their capacity limit in a much shorter time frame thereby increasing need for filter replacement much sooner than expected. Develop NEW public education material about proper use of cartridge AND how to obtain filter replacement cartridges, targeted for release week of October 26 during lead awareness week.	MDHHS PIO coordinating with GCHD	**Estimated completion date: 10-30-15**
	Video created with Home Depot demonstrating replacement of the Brita replacement filter.	The video will be posted on the gov/flintwater website.	**Pending**
Lead Testing Protocol:	Draft protocol has been completed, undergoing final review. Protocol calls for testing: Priority groups- • Confirmatory venous testing for children who had venous testing (115 children)	Protocol will be announced in a joint MDHHS/GCHD Press release.	**Pending**

TASK	STATUS	ACTION	DATE COMPLETED
	• Children in day care, Head Start • children attending 3 schools (Freeman, Eisenhower, Brownell) • Children residing in high risk zip codes (03, 04) • All other students		
Lead Testing: 9/28/15-10/23/15	CLPPP processed 580 tests from Flint zip codes since 9-28-15; 5 children were reported with elevated lead blood levels. 10-21-15 Funding for case management nurses will be disseminated to GCHD through new project: *Flint Water*, for $425,000 through the Comprehensive Contract Egrams system, to fund the: Follow-up of Children Reported with Elevated Lead Levels: Case Management Services. GCHD has secured approvals for use of these funds and has begun procedures to place staff in appropriate positions to conduct the work.	MDHHS has arranged a contract with the GCHD to provide nurses for the follow-up.	Contract in Egrams as of 10-23-15
Parent education	Parent education material completed. Discuss dissemination of parent material through Flint schools.	Call with Flint school superintendent, GCHD, and MDHHS scheduled 10-26-15 to discuss dissemination process.	
	Schools require 6000+ information packets for distribution to all students. Print order sent to DTMB. Hardcopy will be distributed to GCHD for issuing to the schools, and to Headstart, daycare, and other agencies in Flint with children ages 0-5.	Expect hardcopy delivery by 11-2-15.	Dissemination week of 11-2-15
Provider Education	Provider Education material completed. Communication to providers will occur through GCHD and MDHHS networks (GCMS, GCARD, hospitals, etc).MDHHS will distribute through the Medicaid Health Plans.	Electronic distribution through various listservs is pending. (all parties).	Week of 11-2-15
Community public education and testing event	McLaren Health Plan in conjunction with GCHD hosting a public testing and awareness event on November 5 at the Burton GCHD site. McLaren will have providers on site to perform testing for their members; GCHD onsite to perform testing for all others. Event will also include Medicaid application assistance. GCHD will be at a community event on Nov. 12, from 2 PM to 7 PM, to focus on testing for children 0-5. (Brownell and Holmes Schools)		
Environmental	$275 k contract with ETC requested on Oct. 21st, 2015.	MDHHS finalizing	

TASK	STATUS	ACTION	DATE COMPLETED
Investigation	Will work with GCHD to coordinate with Flint Housing/other authorities to deal with recalcitrant landlords.	contracts	

From: Lyon, Nick (DHHS)
Sent: Monday, November 02, 2015 7:19 AM
To: Lasher, Geralyn (DHHS)
Cc: Grijalva, Nancy (DHHS)
Subject: Fwd: updated Flint action plan
Attachments: Flint Action Plan 10-30-15.docx; ATT00001.htm

If this looks ok, and it's not out of date because of the weekend, we should send to Dan for inclusion in his report.

Begin forwarded message:

> **From:** "Robinson, Mikelle (DHHS)" <RobinsonM18@michigan.gov>
> **Date:** October 30, 2015 at 4:36:14 PM EDT
> **To:** "Lyon, Nick (DHHS)" <LyonN2@michigan.gov>
> **Cc:** "Grijalva, Nancy (DHHS)" <GrijalvaN@michigan.gov>, "Miller, Mark (DHHS)" <millerm1@michigan.gov>, "Lasher, Geralyn (DHHS)" <lasherg@michigan.gov>, "Wells, Eden (DHHS)" <WellsE3@michigan.gov>, "Dykema, Linda D. (DHHS)" <DykemaL@michigan.gov>
> **Subject: updated Flint action plan**
>
> Please let me know if you have questions.
>
> Have a nice weekend everyone.
>
> Mikelle

Flint Water Public Health Response: MDHHS Action Plan

Updated 10-28-15

TASK	STATUS	ACTION	DATE COMPLETED
Filter Distribution	Residents may continue to obtain filters from GCCARD (both sites 9-4PM) and MDHHS clients can continue to obtain filters at the two MDHHS office locations or the GCCARD sites. As of October 22, DHHS/GCCARD has issued 9728 filters, 95 pitchers.	No action indicated, informational only.	NA
Filter Replacement Distribution	The procedure is in place for replacement cartridge distribution including an abbreviated application for residents to apply for and obtain cartridge replacement. Cartridge replacement will occur at same locations as filter sites. DHHS is also placing an order for 750 replacement filters for the 8-cup Zerowater filters. 9000 Brita replacement filters on hand with an additional 10,000 readily available when needed. Total available= 19,000 MDHHS is currently coordinating with GCARD on publicity for distribution of the replacement filters. **United Way will provide Pur Filter Replacements.**	DHHS and GCCARD will begin issuing the replacement filters the week of November 2nd. **Press release planned Monday 11/2 re:pick up of replacement filters, videos to be posted on websites and you tube**	**Pending**
Public Education Proper Filter Use	When used improperly, the filters will exceed their capacity limit in a much shorter time frame thereby increasing need for filter replacement much sooner than expected. Develop NEW public education material about proper use of cartridge AND how to obtain filter replacement cartridges, targeted for release week of October 26 during lead awareness week.	Jen Eisner will work with Hilda McShane	**Completed**
	Video created with Home Depot demonstrating replacement of the Brita replacement filter.	The video will be posted on the gov/flintwater website.	**Completed**
Lead Testing Protocol:	Draft protocol has been completed, undergoing final review. Protocol calls for testing: Priority groups- • Confirmatory venous testing for children who had venous testing (115 children)	Protocol has been cleared with Governor's Office.	**Completed 10-28**

TASK	STATUS	ACTION	DATE COMPLETED
	• Children in day care, Head Start • children attending 3 schools (Freeman, Eisenhower, Brownell) • Children residing in high risk zip codes (03, 04) • All other students **Protocol will be announced in a joint MDHHS/GCHD Press release.**		
Blood Lead Testing: 9/28/15-10/23/15	CLPPP processed 580 tests from Flint zip codes since 9-28-15; 5 children were reported with elevated lead blood levels. **There are currently 147 children that have been identified for follow-up.**	MDHHS has arranged a contract with the GCHD to provide nurses for the follow-up.	Contract completed in Egrams as of 10-23-15
	Cross reference list of children with elevated lead levels with filter distribution data to ensure household has a filter. (Peeler/Scott) So far only about 20% of the 147 children with EBL are known to have received a filter. GCHD will deliver filters to these homes as they are doing the case follow-up. GCHD will provide weekly updates.	Send list to Kris S (done)	**in process**
	Would like to obtain the student list from the three schools and cross reference with our lead testing data to determine children tested/not tested A group will develop reporting metrics and system to track same: Linda Dykema, Wes Priem, Michele Bruneau,, Bob Scott **Group met to discuss metrics. plan to produce first detailed report for internal review the week of Nov. 9th A simplified version for external dissemination will be released after internal review.** Linda is working on an analysis of blood lead tests done since 9-28-25. Epi will assist with this analysis	Hertel to contact MDE	**Estimated completion date: 11-2-15** **November 9**
Parent education	Parent education material completed. Discuss dissemination of parent material through Flint schools.	Call with Flint school superintendent, GCHD, and MDHHS scheduled 10-26-15 to discuss dissemination process.	**Completed**
	Schools require 6000+ information packets for distribution to all students. Print order sent to DTMB.	Geralyn Lasher arranged for printing.	**10-30-15 printing completed and**

TASK	STATUS	ACTION	DATE COMPLETED
	Hardcopy will be distributed to GCHD for issuing to the schools, and to Headstart, daycare, and other agencies in Flint with children ages 0-5. **Mark will drop off hard copies at GCHD.** **Toni LaRocco will take the lead in distribution of the materials to the schools and other agencies.**		**Mark dropped off 6,000 copies at the Flint School Admin. Building , and 2,500 to health dept.** **Remainder will be dropped off on Monday.**
	Ensure legislators receive material in advance	Elizabeth Hertel coordinate legislator notification	
Provider Education	**Provider Education material completed.** Communication to providers will occur through GCHD and MDHHS networks (GCMS, GCARD, hospitals, etc).MDHHS will distribute through the Medicaid Health Plans. **Hurley providers received the packet and the remainder of providers will receive the information next week.**	**Mark Valacek Wells/Peeler** **Electronic distribution through various listservs next week.**	**completed 10/30/15**
Community public education and testing event	McLaren Health Plan in conjunction with GCHD hosting a public testing and awareness event on November 5 at the Burton GCHD site. McLaren will have providers on site to perform testing for their members; GCHD onsite to perform testing for all others. Event will also include Medicaid application assistance. Tony Larocco (GCHD) has contacted Molina and Meridian Health Plan regarding sponsorship of community testing and awareness event. Molina and Meridian Health Plan testing dates to be determined. GCHD will be at a community event on Nov. 12, from 2 PM to 7 PM, to focus on testing for children 0-5. (Brownell and Holmes Schools)>	**Elizabeth will follow up with Molina**	
	There will be a combination school testing/townhall/education event, sponsored by Rep. Neeley, on Nov. 2nd. A telephonic townhall is slated for Oct. 28 by Rep. Neely. Gongwer reported that 4,000 people participated in this call.		
Environmental	$275 k contract with ETC requested on Oct. 21st, 2015.	Wes Priem to finalize	**Contract completed**

TASK	STATUS	ACTION	DATE COMPLETED
Investigation	Wes will work with GCHD to coordinate with Flint Housing/other authorities to deal with recalcitrant landlords. DEH meeting on 11/5 with MDEQ staff to harmonize EBL investigation protocol with water testing protocol.	contract with MDHHS Contracts.	**10/29/15**
Nurse Follow Up	Project sent to Contracts for inclusion in Egrams 10-23-15. 10-21-15 Funding for case management nurses will be disseminated to GCHD through new project: *Flint Water*, for $425,000 through the Comprehensive Contract Egrams system, to fund the: Follow-up of Children Reported with Elevated Lead Levels: Case Management Services. GCHD advised to secure approvals for use of these funds and begin procedures to place staff in appropriate positions to conduct the work. GCHD has shifted one nurse over for follow-up. That nurse if fully trained on elevated lead patient management. 1.5 nurse FTE's will be assigned and trained on 11-10-15. **Mark V. said that the nurses will start a week earlier than expected. Rashmi will look into whether training can occur earlier than the 10th.**	Eden will contact Bob to send the list to Toni at GCHD so they can facilitate case management of children with elevated lead levels (done). Contract approved by GCHD Board on 10/26	**10/27**
Water Testing	DEQ will be testing at Freeman Elementary the week of 10-26-15, with plans to expand to 14 schools. Residential testing will have a different protocol. GCHD has been in contact with DEQ to possibly assist in sampling. Linda Dykema has a draft Executive Summary for Health-Based Drinking Water Lead Levels developed. Once testing is completed, this document will serve as a decision guide on reopening of school and/or daycare water fountains/faucets for student use. Linda will revise the model to include paint chip values/risk levels. GCHD sanitarians are assisting DEQ with water sampling.	No action indicated, informational only – DEQ.	
Misc.	**City of Flint is asking when the county will life the emergency order. Jim Henry from GCHD mentioned he was hearing some concerns raised again about Legionella. Eden said that Jim Collins can help address this. Mark V. said that an extensive data analysis was done on this previously and it isn't an issue.** **DEQ gave permission to increase phosphate levels in the water temporarily.**	**Add a statement on the FAQ document on phosphates?**	**11/6**

TASK	STATUS	ACTION	DATE COMPLETED
	Some health concerns might be raised about this particularly for infants. Eden said that it is unlikely to cause health problems.		

From: Robinson, Mikelle (DHHS)
Sent: Friday, November 13, 2015 4:55 PM
To: Moran, Susan (DHHS);Lasher, Geralyn (DHHS);Miller, Mark (DHHS)
Subject: Flint work plan
Attachments: Flint Action Plan 11-13-15.docx

Updates in bold. Genesee hasn't been reporting total numbers of filters distributed this week so I took that out of the plan for now.

Highlights this week:

Genesee CHD Nurse training
Suggested language for health threshold
Testing event held at Brownell School held
Follow-up with Molina regarding testing
Congressional Call re: Ready to Feed Formula

Please let me know if you have any changes or additions before I send to Nick and all.

Flint Water Public Health Response: MDHHS Action Plan

Weekly Update 11-13-15

TASK	STATUS	ACTION	DATE COMPLETED
Filter Distribution	Residents may continue to obtain filters from GCCARD (both sites 9-4PM) and MDHHS clients can continue to obtain filters at the two MDHHS office locations or the GCCARD sites.	No action indicated.	NA
Filter Replacement Distribution	The procedure is in place for replacement cartridge distribution including an abbreviated application for residents to apply for and obtain cartridge replacement. Cartridge replacement will occur at same locations as filter sites. DHHS is also placing an order for 750 replacement filters for the 8-cup Zerowater filters. 9000 Brita replacement filters on hand with an additional 10,000 readily available when needed. Total available= 19,000 MDHHS is currently coordinating with GCARD on publicity for distribution of the replacement filters. United Way will provide Pur Filter Replacements. United Way will also be purchasing filter units for school water fountains.	DHHS and GCCARD will begin issuing the replacement filters the week of November 2nd. Press release planned Monday 11/2 re: pick up of replacement filters, videos to be posted on websites and you tube	**Ongoing** Completed 11/2
Public Education Proper Filter Use	When used improperly, the filters will exceed their capacity limit in a much shorter time frame thereby increasing need for filter replacement much sooner than expected. Develop NEW public education material about proper use of cartridge AND how to obtain filter replacement cartridges, targeted for release week of October 26 during lead awareness week. Request made for written instructions on filter cartridge replacements for nurse case managers to take on home visits. **Wes is working to complete a packet for nurse case managers which will include information on filters.**	Jen Eisner will work with Hilda McShane	Completed **Pending**
	Video created with Home Depot demonstrating replacement of the Brita replacement filter. DEQ receiving questions about meters on the water filter pitchers delivered to the schools which are likely Zerowater Filters. **Mark M will check with Mark V about streaming filter videos when available. Discussion held about streaming at Flint Secretary of State offices as well.**	The video added to the gov/flintwater website. Video will be	Completed 11/2 Completed 11-10 **pending**

TASK	STATUS	ACTION	DATE COMPLETED
		added to nurse training- CLPPP.	
Lead Testing Protocol:	Draft protocol has been completed, undergoing final review. Protocol calls for testing: Priority groups- • Confirmatory venous testing for children who had venous testing (115 children) • Children in day care, Head Start • children attending 3 schools (Freeman, Eisenhower, Brownell) • Children residing in high risk zip codes (03, 04) • All other students Protocol will be announced in a joint MDHHS/GCHD Press release.	Press release has been cleared with Governor's Office.	Completed 10-28
Blood Lead Testing: 9/28/15-10/23/15	CLPPP processed 580 tests from Flint zip codes since 9-28-15; 5 children were reported with elevated lead blood levels. There approximately 200 children that have been identified for follow-up.	MDHHS has arranged a contract with the GCHD to provide nurses for the follow-up.	Contract completed in E-grams as of 10-23
	Cross reference list of children with elevated lead levels with filter distribution data to ensure household has a filter. (Peeler/Scott) So far only about 20% of approximately 200 children with EBL are known to have received a filter. GCHD will deliver filters to these homes as they are doing the case follow-up. GCHD will provide weekly updates.	Send list to Kris S (done)	**In process**
	A group will develop reporting metrics and system to track same: Linda Dykema, Wes Priem, Michele Bruneau, Bob Scott and group met to discuss metrics. Plan to produce first detailed report for internal review the week of Nov. 9th. A simplified version for external dissemination will be released after internal review. Linda is working on an analysis of blood lead tests done since 9-28-25. Epi will assist with this analysis. Still fine-tuning the report.		**Completed**
Parent education	Parent education material completed. Discuss dissemination of parent material through Flint schools.	Call with Flint school superintendent, GCHD, and MDHHS	**Completed**

TASK	STATUS	ACTION	DATE COMPLETED
		scheduled 10-26-15 to discuss dissemination process.	
	Schools require 6000+ information packets for distribution to all students. Print order sent to DTMB. Hardcopy will be distributed to GCHD for issuing to the schools, and to Headstart, daycare, and other agencies in Flint with children ages 0-5. Mark will drop off hard copies at GCHD. Toni LaRocco will take the lead in distribution of the materials to the schools and other agencies.	Geralyn Lasher arranged for printing.	10/30 printing completed and Mark dropped off 6,000 copies at the Flint School Admin. Building , and 2,500 to health dept. Remainder dropped off on 11/2.
	Ensure legislators receive material in advance	Elizabeth Hertel coordinate legislator notification	Completed
Provider Education	Provider Education material completed. Communication to providers will occur through GCHD and MDHHS networks (GCMS, GCARD, hospitals, etc).MDHHS will distribute through the Medicaid Health Plans. Hurley providers received the packet and the remainder of providers will receive the information next week.	Mark Valacek Wells/Peeler Electronic distribution through various listservs next week.	completed 10/30 Completed 11/2
Community public education and testing event	McLaren Health Plan in conjunction with GCHD hosted a public testing and awareness event on November 5 at the Burton GCHD site. 40 children were tested. McLaren will have providers on site to perform testing for their members; GCHD onsite to perform testing for all others. Event will also include Medicaid application assistance. Tony Larocco (GCHD) has contacted Molina and Meridian Health Plan regarding sponsorship of community testing and awareness event. Molina and Meridian Health Plan testing dates to be determined.	**Dr. Forschee has been contacted. Tony contacted Molina and there is interest in a future testing event.**	**pending**

TASK	STATUS	ACTION	DATE COMPLETED
	GCHD will be at a community event on Nov. 12, from 2 PM to 7 PM, to focus on testing for children 0-5. (Brownell and Holmes Schools)> Molina doesn't have the staff to offer lead testing events. **Another testing event was held at Brownell School on 11/12. Many organizations were present to provide information and services. 27 children were tested, 60 filters distributed.**		
	There will be a combination school testing/townhall/education event, sponsored by Rep. Neeley, on Nov. 2nd. A telephonic townhall is slated for Oct. 28 by Rep. Neely. Gongwer reported that 4,000 people participated in this call.	FYI	
Environmental Investigation	$275 k contract with ETC requested on Oct. 21st, 2015. About 275 EBL investigations are budgeted for Flint. Wes will work with GCHD to coordinate with Flint Housing/other authorities to deal with recalcitrant landlords. DEH meeting on 11/5 with MDEQ staff to harmonize EBL investigation protocol with water testing protocol. 11/12 The EBL contractor met with GCHD staff to coordinate activities with case management.	Wes Priem to finalize contract with MDHHS Contracts.	Contract completed 10/29
Nurse Follow Up	Project sent to Contracts for inclusion in E-grams 10-23-15. 10-21-15 Funding for case management nurses will be disseminated to GCHD through new project: *Flint Water*, for $425,000 through the Comprehensive Contract E-grams system, to fund the: Follow-up of Children Reported with Elevated Lead Levels: Case Management Services. GCHD advised to secure approvals for use of these funds and begin procedures to place staff in appropriate positions to conduct the work. GCHD has shifted one nurse over for follow-up. That nurse if fully trained on elevated lead patient management. 1.5 nurse FTE's will be assigned and trained on 11-10-15. Lead Safe Home Program worked with GCHD on protocol to harmonize the flow of outreach to families with children with elevated blood levels. **11/10 Training has been completed for 2.5 FTE nurses. Some follow-up training will be**	Eden will contact Bob to send the list to Toni at GCHD so they can facilitate case management of children with elevated lead levels (done). Contract approved 10/26	Completed 10/27 Completed 11-10

TASK	STATUS	ACTION	DATE COMPLETED
	scheduled as well.		
Water Testing	DEQ will be testing at Freeman Elementary the week of 10-26-15, with plans to expand to 14 schools. Residential testing will have a different protocol. GCHD has been in contact with DEQ to possibly assist in sampling. Linda Dykema has a draft Executive Summary for Health-Based Drinking Water Lead Levels developed. Once testing is completed, this document will serve as a decision guide on reopening of school and/or daycare water fountains/faucets for student use. Linda will revise the model to include paint chip values/risk levels. GCHD sanitarians are assisting DEQ with water sampling. We should anticipate some differences in opinion on actionable pb levels. **Linda recommends the following language that DC used be adapted for our purposes instead of setting a value: "The removal of lead in drinking water is most effective if the full lead service line is removed from both the public and private property. If you choose not to replace your private side pipe, lead can continue to dissolve in your drinking water. You should also replace galvanized plumbing, older lead soldered pipes, and brass fixtures and use a different plumbing material in your home. Until all potential sources of lead in drinking water are removed from your private property, be sure to follow the flushing and filter instructions provided."**	No action indicated, informational only – DEQ. Need to decide the health threshold for school water testing.	**Pending discussion and modification**
Misc.	City of Flint is asking when the county will lift the emergency order. Jim Henry from GCHD mentioned he was hearing some concerns raised again about Legionella. Eden said that Jim Collins can help address this. Mark V. said that an extensive data analysis was done on this previously and it isn't an issue. DEQ gave permission to increase phosphate levels in the water temporarily. Some health concerns might be raised about this particularly for infants. Dr. Eden Wells said that it is unlikely to cause health problems but we can add information on the FAQ to help reassure citizens. DEQ released its Freeman School water testing results this week. EPA released its report from its expedited review of the response as well. **Mark Johnson, is the regional representative for ASTDR and CDC. He has been designated as our contact. A call was held with Mark on 11/13 regarding lowering the readability level of the lead materials for the public to 3rd or 4th grade reading level.** **A call was held on the 10th with MDHHS staff, Karla, the regional USDA staff and congressional staff, on the ready to feed formula issue. There has not been a demand for it in the Flint WIC clinic. Talking points have been developed by WIC staff and sent to the**	Add a statement on the FAQ document on phosphates. Dykema's staff working on this. CLPPP staff will review documents and work with the communication office on any	**Pending** **Pending**

TASK	STATUS	ACTION	DATE COMPLETED
	communication office for review.	changes. FYI	

From: Lyon, Nick (DHHS)
Sent: Tuesday, November 17, 2015 12:08 PM
To: Lasher, Geralyn (DHHS)
Subject: Fwd: Childhood lead poisoning- grand rounds talk

Begin forwarded message:

From: Mona Hanna-Attisha <MHanna1@hurleymc.com>
Date: October 16, 2015 at 8:24:10 AM EDT
To: "wellse3@michigan.gov" <wellse3@michigan.gov>, "'LyonN2@michigan.gov'" <LyonN2@michigan.gov>
Subject: FW: Childhood lead poisoning- grand rounds talk

Nick, thank you for your phone call yesterday. These past couple months have been a blur, and I wanted to go back and see exactly when I first communicated with the state.

My first contact with MDDHS was with Karen Lishinski on Sept 8 (she had come to Hurley a year prior to give a grand rounds on lead). I called her and asked her about the lead concerns and she said that the state had looked at the blood lead data and that there was a possible increase, I asked her for the data over the phone, she said ok, but then I never heard back from her. I sent her the below email the day after.

And then my first communication with Bob Scott was on Sept 16 asking for the data again.

From: Mona Hanna-Attisha
Sent: Wednesday, September 09, 2015 9:37 AM
To: 'Lishinski, Karen (DCH)'
Subject: RE: Childhood lead poisoning- grand rounds talk

Hi Karen, Hope you are well. Thanks for speaking with me yesterday. Since we spoke, we have been able to run a report on all the blood lead levels in our peds clinic since before and after the water switch . Our research team is still analyzing the data, but it appears that there is an increase. I will share more once the analysis is complete.

Can you please share the MCIR data that you mentioned. That would be most helpful since the sample size is much greater. If there is someone else I should contact regarding the MCIR data request, please let me know.

Thanks! Mona

Mona Hanna-Attisha MD MPH FAAP
Program Director Pediatric Residency
Hurley Children's Hospital at Hurley Medical Center
Michigan State University College of Human Medicine
Department of Pediatrics and Human Development

Mhanna1@hurleymc.com

HURLEY CHILDREN'S HOSPITAL

From: Lishinski, Karen (DCH) [mailto:LishinskiK@michigan.gov]
Sent: Monday, July 14, 2014 2:00 PM
To: Mona Hanna-Attisha
Subject: Childhood lead poisoning- grand rounds talk

Hi Dr. Hanna-Attisha,

Dr. Reynolds told me that you were interested in having a speaker at a grand rounds talk. Could you give me a call and let me know when and what you would need in the way of specific information to be presented?

Looking forward to speaking with you!

Karen Lishinski RN MA AE-C
Nurse Consultant
Michigan Department of Community Health
Division of Family and Community Health
Childhood Lead Poisoning Prevention Program
109 Michigan Ave
PO Box 30195
4th Floor
Lansing, MI 48909
lishinskik@michigan.gov
Phone: 517-241-3599
Fax: 517-335-8509

From: Moran, Susan (DHHS)
Sent: Monday, December 28, 2015 1:23 PM
To: Lasher, Geralyn (DHHS)
Cc: Becker, Timothy (DHHS);Granger, Patricia (DHHS);Grijalva, Nancy (DHHS)
Subject: RE: Timeline
Attachments: Timeline 12 28 15.docx

Attached is timeline, I received information from Rashmi today that I added to the document.

-----Original Message-----
From: Lasher, Geralyn (DHHS)
Sent: Monday, December 28, 2015 1:13 PM
To: Moran, Susan (DHHS) <MoranS@michigan.gov>
Cc: Becker, Timothy (DHHS) <beckert1@michigan.gov>; Granger, Patricia (DHHS) <GrangerP@michigan.gov>; Grijalva, Nancy (DHHS) <GrijalvaN@michigan.gov>
Subject: Timeline

Sue--Tim and I will need the timeline on Tuesday so we can complete some work for the State of the State. Please let us know when we can have this on Tuesday.

Thank you.

Sent from my iPad

Michigan Department of Health and Human Services
Flint Water Crisis: Timeline of Key Events

Prepared December 23, 2015

1 Pre July 2015

- Fall of 2014 – GCHD identified increase in cases of Legionella; MDHHS assisted GCHD in Epidemiologic analysis
- January 2015: MDHHS assisted with case interviews
- 6-4-15 Final Legionellosis outbreak report sent to Genesee County Health Department and Centers for Disease Control and Prevention
- 2/26/2015 - (2 calls) initiated by LeAnn Walters. Contacted Childhood Lead Poisoning Prevention Program-CLPPP (Karen Lishinski) – Ms. Walters expressed concern about Flint water quality and provider refusing to test her children; during second call she related that provider agreed to testing
- 3/4/2015 - (1 call) LeAnn Walters contacted CLPPP because child had elevated blood lead level; city officials wouldn't talk to her about her water; Karen provided EPA contact information

2 July 2015

- 7-22-15 Contact from Mark Johnson (ATSDR) to L. Dykema regarding Flint drinking water status; asking if Environmental Health was engaged
- 7-23-15 Director office inquiry forwarded to Population Health Administration for review/response
- 7-23-15 Division of Environmental Health (Dykema) contacted DEQ for update on drinking water testing/status. S. Busch relates that city in compliance with lead copper rule; one house with high lead level in water was an anomaly as house was connected to old water main but had since been corrected
- 7-24-15 Childhood Lead Poisoning Prevention Program (CLPPP) requests assistance from Epidemiology to asess magnitude of change in 2014 Blood Lead Levels (in children) for city of Flint
- Results indicate higher high percentage of Elevated Blood Lead Levels 9EBLs) for summer 2014, followed seasonal trends and the levels showed decrease by October. Further analysis would be needed to establish causation.
- 7-28-15 Response sent to Director's office

3 August 2015

- 8-4-15 Meeting with Governor's office and Flint pastors. Flint pastors had information provided to Director in response to 7-23-15 inquiry

- 8-6-15 Informal request from Liane Shekter Smith (DEQ) to Kory Groetsch (MDHHS-DEH) after a meeting (unrelated to Flint situation) to assist with health education regarding lead in drinking water. MDHHS-DEH-supervisor made aware of request.
- 8-24-15 Dr. Mona Hanna Attisha contacts Genesee County Health Department for Blood Lead Level data/information
- 8-31-15 DEH staff meet to discuss communication plan for Flint/DEQ per request from DEQ

4 SEPTEMBER 2015

- 9-2-15 Marc Edwards contacts Bob Scott regarding Flint BLL data
- 9-8-15 Dr. Mona Hanna Attisha contacts CLPPP (K. Lishinski) regarding BLL data
- 9-9-15 Email sent from Dr. Mona Hanna Attisha to CLPPP (K. Lishinski) requesting the BLL data
- 9-11-15 DEH/DEQ conference call regarding draft communication plan; overview.
- 9-15-15 B. Scott responds to Dr. Larry Reynolds, provides chart
- 9-16-15 Dr. Mona Hanna Attisha emailed B. Scott requesting the MCIR (BLL) data
- 9-16-15 Dr. Mona Hanna Attisha contacts Senator Ananich regarding data request
- 9-22-15 Senator Ananich spoke with Director Lyon regarding Dr. Mona Hanna Attisha's data request and Flint water situation
- 9-22-15 DEQ communications office contacted DHHS communications (A. Minicucci) about Healthy Homes Program
- 9-22-15 MDHHS receives copy of Dr. Mona Hanna Attisha's presentation to be presented at upcoming press event
- 9-23-15 MDHHS WIC office receives an inquiry about availability of bottled water through the WIC program. (Per federal regulations, clients can use SNAP benefits to purchase water, but water is not an allowable food item for purchase under the WIC program).
- 9-24-15 Hurley Press Event
- 9-24-15 Director requests response to Flint water situation
- 9-24-15 Bureau of Epidemiology begins analysis of Flint zip code data (Poisson Regression)
- 9-25-15 MDHHS responds to Detroit Free Press reporter inquiries
- 9/28/2015 Mark Valacak-Genesee County Health Department Health Officer- contacted M. Miller regarding timeframe for completion of MDHHS data analysis
- 9-29-15 Dr. Eden Wells contacts Dr. Mona Hanna Attisha regarding her study results
- 9-30-15 Briefing to Director comparing Lead Copper Rule Testing and Marc Edwards protocol.
- 9/23/15

5 OCTOBER 2015

- 10-2-15 Governor's press conference-MDHHS study results consistent with Hurley findings
- 10-2-15 State Budget Office approval to use carryover emergency funds and transfer of DEQ funds to purchase water filters
- 10-2-15 R.Travis and S. Bien received an inquiry about what Michigan is re: the Flint lead water situation from Jacqlyn Schneider, Deputy Director and Policy Director of US Senate Committee

on Agriculture, Nutrition, & Forestry. Ms Schneider inquired about the availability of Ready -to - Feed formula and asked if we are confident that the water filters that are being provided are sufficient to address the concerns about lead.

- 10-5-15 Filter distribution planning meeting held in Flint with local organizations
- 10-5-15 A teleconference was held with Rashmi Travis, Nancy Peeler, Dr. Eden Wells, Bob Scott, Corinne Miller, Sarah LyonCallo, Patti McKane (MDHSS), and Dr. Mona Hanna-Attisha, Jenny Latanz, and Dr. Richard Sandler (Hurley Lead Research Team) to discuss the nuances of the raw data that was sent to the Hurley Research Team.
- 10-5-15 S. Bien provided a response to the Jaclyn Schneider indicating the following: that we are in regular contact with the local health department, the majority of WIC clients were already using bottled water to reconstitute infant formula, that a mass distribution (about 4000 filters) of filters was underway, and lead testing was being done adjunct with WIC clinics, and the local health department had additional lead testing opportunities scheduled.
- 10-7-15 Flint Mayor's Water Technical Advisory Committee meeting (E. Wells, L. Dykema); recommends switch back to Detroit Water Authority
- 10-8-15 GCHD issues Public Health Advisory
- 10-12-15 Daily calls with GCHD begin. Topics Include:
    - Distribution and tracking of filters
    - Development and implementation of case management in Flint by GCHD
    - Development and implementation of lead environmental inspection contract
    - Development and distribution of educational materials – to providers and parents
    - Testing events (blood lead)
    - Testing events (water mainly / DEQ activtity in the schools)
    - Data analysis (internal meeting)
- 10-13-15 MDEQ/MDHHS/toxic steering group committee meeting discusses use of the IEUBK modeling for the Flint water situation; requested a subcommittee to identify the exposure assumptions that would be developed for schools and homes
- 10-13-15 CLPPP provided Lead Week Toolkit to DEH
- 10-13-15 Began development of the Lead & Your Body infographic
- 10-13-15 MDHHS Division of Environmental Health, MDEQ, and LARA begin weekly briefing regarding school drinking water sampling
- 10-16-15 First of weekly meetings with city of Flint meeting DEQ HHS LARA GCHD (Jim Henry) at the Mayor's office
- 10-16-15 MDHHS (L. Dykema) participates in meeting with superintendent of Flint schools
- 10-19-15 Supplemental funding legislation passed
- 10-20-15 Daily calls to GCHD changed biweekly (ongoing)
- 10-21-15 Dr. Wells and N. Peeler speak to Medicaid Health Plans (Clinical Advisory Committee meeting) regarding Blood lead testing protocol and case management follow up
- 10-27-15 ETC contracted to provide EBL investigation services
- 10-27-15 Briefing to Director regarding IEUBK modeling for school drinking water screening value.
- 10-27-15 S.Bien received an email from USDA regional representative, Bruce Hillman, indicating that our Congressional Representatives had sent a letter to Tom Vilsack, Secretary of USDA

inquiring about community response to address immediate and long-term needs. Regional USDA representative indicated he would be in contact with MDHHS WIC office to receive an update. MDHHS WIC office responded that we continue to work with the local health department to assure that clients are getting access to filters and bottled water to mix their infant formula. WIC also indicated that at that time there had not been any requests from WIC clients for Ready to Feed Formula.

- 10-28-15 DEH requested by Eden Wells to help clarify CLPPP report for the Director
- 10-30-15 Case management (nursing) contract with Genesee County Health Department begin
- 10-30-15 (approx.) 8500 parent information packets distributed to GCHD

6 NOVEMBER 2015

- 11-3-15 Director's office received a letter from Tim English, Midwest Regional Administrator for USDA
- 11-5-15 Response to Tim English's inquiry drafted and sent to Director Lyon's office. MDHHS indicates continued monitoring of Ready to Feed formula use and coordinating with Ready to Feed manufacturer and WIC retailers to proactively address any supply or distribution issues with infant formula availability.
- 11-6-15 11/6/15 Bruce Hillman, Regional Representation from USDA, notified S. Bien that they had received questions from Katie Bergh from Senator Stabenow's office regarding availability of Ready to Feed, our communication plan, how many clients had requested Ready to Feed.
- 11-6-15 Additional 3500 parent packets distributed to GCHD
- 11-9-15 Transition of 2.0 CLPPP staff to DEH
- 11-12-15 Phone conference with Karla Ruest, Rashmi Travis (MDHHS), Stan Bien (MDHSS-WIC), Kristin Hanulcik (MDHSS- WIC), Bruce Hillman (USDA), Anne Bartholomew (USDA), Katie Bergh (Senator Stabenow's office), and Jaclyn Schneider (Deputy Staff Director US Senate Committeee on Agriculture, Nurtrition, and Forestry) in regards to the legislative inquiries. Information was provided on how MDHHS is working with the local health department to monitor requests for Ready to Feed formula, continuing to work with the local health department to assure filters and bottled water are provided to clients, and providing educational materials on Ready to Feed formula to WIC clients. To date, only one WIC client had requested Ready to Feed formula.
- 11-13-15 Call with ATSDR, GCHD and MDHS to discuss outreach material
- 11/16/15 Information on Ready to Feed formula (including Talking Points, WIC Provider Letter, and infographic on Ready to Feed formula) was shared with the local health department to share with providers in the community. This same information was provided to Congressional delegates on 11-12-15 phone conference.
- 11-18-15 DHHS Meets with Governor's Flint Water Task Force
- 11-24-15 DEH Project Management Structure implemented
    - Daily Sit-Reps begin
    - Bi-weekly calls with GCHD change to weekly (ongoing)
- 11-24-15 Information on Ready to Feed formula (including Talking Points, WIC Provider Letter, and infographic on Ready to Feed formula) was shared with Medicaid to share with the Medicaid Health Plans.

7 DECEMBER 2015

- 12-3-15 MDHHS BLL Summary Report released
- 12-11-15 MDHHS BLL Summary Report released
- 12-14-15 Meeting with MSA to develop specifications for production of Medicaid population based blood lead testing reports for children in Flint exposed to Flint city water source

From: Grijalva, Nancy (DHHS)
Sent: Tuesday, January 05, 2016 8:23 PM
To: Lyon, Nick (DHHS);Lasher, Geralyn (DHHS);Eisner, Jennifer (DHHS)
Subject: Fwd: Summary of MDHHS Actions
Attachments: Summary of Actions 12 30 15.docx; ATT00001.htm

This is what Sue came up with for a listing of actions to date

Sent from my iPad

Begin forwarded message:

> **From:** "Moran, Susan (DHHS)" <MoranS@michigan.gov>
> **Date:** January 5, 2016 at 4:45:41 PM EST
> **To:** "Grijalva, Nancy (DHHS)" <GrijalvaN@michigan.gov>
> **Cc:** "Anderson, Paula (DHHS)" <AndersonP3@michigan.gov>
> **Subject: Summary of MDHHS Actions**
>
> Nancy- per your request, attached is a summary of MDHHS actions for the period 10-1-15 through 12-30-15. Please let me know if Nick requires additional detail or information.

Michigan Department of Health and Human Services
Flint Water: Summary of MDHHS Actions (as of 12-30-15)

October 2015

- MDHHS provides information for Flint Water website, including the following documents: Parent Handbook: Is Your Child Safe From Lead Poisoning, Blood Lead Level (BLL) Quick Reference for Primary Care Providers, Lead Screening & Testing for Safe, Healthy Michigan Kids, and finally, Pregnant and Nursing Mothers: What You Need to Know
- MDHHS announces water filters will be available to the public on Oct. 6, extended hours for filter distribution.
- Regular calls with Genesee County Health Department. Topics include distribution and tracking of filters, case management, lead environmental inspections, development and distribution of educational materials, testing events (blood lead), testing events, data analysis.
- MDHHS Division of Environmental Health, MDEQ, and LARA begin weekly briefing regarding school drinking water sampling
- Supplemental funding legislation passed
- Dr. Wells and N. Peeler speak to Medicaid Health Plans (Clinical Advisory Committee meeting) regarding blood lead testing protocol and case management follow up
- ETC contracted to provide EBL investigation services
- Case management (nursing) contract with Genesee County Health Department begins
- 8500 parent information packets distributed to GCHD

November 2015

- MDHHS monitoring of Ready to Feed formula use and coordinating with Ready to Feed manufacturer and WIC retailers to proactively address any supply or distribution issues with infant formula availability.
- Additional 3500 parent packets distributed to GCHD
- Call with ATSDR, GCHD and MDHHS to discuss improving our outreach material
- DHHS Met with Governor's Flint Water Task Force
- Project Management Structure implemented
    - Daily Situation Reports-Reps begin being compiled and distributed to MDHHS staff
    - Bi-weekly calls with GCHD change to weekly (ongoing)
- Information on Ready to Feed formula (including Talking Points, WIC Provider Letter, and infographic on Ready to Feed formula) was shared with Medicaid to share with the Medicaid Health Plans.

December 2015

- 12-3-15 MDHHS BLL Summary Report #1 released and is posted to Flint water website
- 12-11-15 MDHHS BLL Summary Report #2 released and is posted to Flint water website
- 12-23-15 MDHHS BLL Summary Report #3 noting change in method, report posted to Flint Water website
- Met with MSA to develop specifications for production of Medicaid population based blood lead testing reports for children in Flint exposed to Flint city water source
- MSA issues L 15-73 – Blood Lead Guidelines to Address the City of Flint Residents' Potential Exposure to Lead. This letter was sent to Practitioners, Clinics, Laboratories and Maternal Infant Health Program (MIHP) Providers in the City of Flint.

This Document is a Non-Responsive Attachment.

From: Eisner, Jennifer (DHHS)
Sent: Tuesday, January 05, 2016 9:18 PM
To: Grijalva, Nancy (DHHS);Lyon, Nick (DHHS);Lasher, Geralyn (DHHS)
Subject: RE: Summary of MDHHS Actions
Attachments: Action Summary.docx

The attached is more of a communications document -- it has been updated to capture the info provided by Sue.

Jennifer Eisner
Public Information Officer
Michigan Department of Health and Human Services
Office: 517-241-2112 or EisnerJ@michigan.gov
Cell: PPI

From: Grijalva, Nancy (DHHS)
Sent: Tuesday, January 05, 2016 8:23 PM
To: Lyon, Nick (DHHS) <LyonN2@michigan.gov>; Lasher, Geralyn (DHHS) <lasherg@michigan.gov>; Eisner, Jennifer (DHHS) <EisnerJ@michigan.gov>
Subject: Fwd: Summary of MDHHS Actions

This is what Sue came up with for a listing of actions to date

Sent from my iPad

Begin forwarded message:

> **From:** "Moran, Susan (DHHS)" <MoranS@michigan.gov>
> **Date:** January 5, 2016 at 4:45:41 PM EST
> **To:** "Grijalva, Nancy (DHHS)" <GrijalvaN@michigan.gov>
> **Cc:** "Anderson, Paula (DHHS)" <AndersonP3@michigan.gov>
> **Subject: Summary of MDHHS Actions**
>
> Nancy- per your request, attached is a summary of MDHHS actions for the period 10-1-15 through 12-30-15. Please let me know if Nick requires additional detail or information.

Michigan Department of Health and Human Services

Steps Taken Since October 1, 2015

Water Filters

- The state began distributing free waters to Flint residents in early October. Free water filters and replacement cartridges are currently available to all Flint at multiple locations.
    - The state has distributed 11,415 free water filters and 235 pitchers as of Dec. 31.
    - Free replacement cartridges are also available to residents – 1,475 have been distributed as of Dec. 31.
    - Water filters are available at four locations Monday – Friday from 9 a.m. to 4 p.m.
        - Michigan Department of Health and Human Services offices
          125 E. Union St. and 4809 Clio Road
        - Genesee County Community Action Resource Department offices
          2727 Lippincott and 601 N. Saginaw
- In addition to the water filters purchased and distributed by the Michigan Department of Health and Human Services, many local organizations and community partners including the United Way have held evening and weekend events to distribute water filters to Flint residents.

Enhanced Blood Lead Level Testing

- The Michigan Department of Health and Human Services is working closely with local partners to ensure that all children, especially those younger than six years of age, are being tested for elevated blood lead levels.
- The Michigan Medicaid and WIC programs require testing for children at ages one and two. To promote and increase testing in the community, MDHHS issued a Health Alert Network notification for local Flint providers recommending blood lead testing for all children younger than six years of age who has not previously been tested.
- MDHHS is working closely with the local primary care provider community and WIC clinics to emphasize the importance of blood lead level screening for children.
- Many children in Flint have health benefits through the Medicaid program. MDHHS is coordinating with the Michigan Medicaid Health Plans to promote lead testing efforts.
- Additionally, a technical workgroup comprised of Medicaid data and public health surveillance experts are meeting to develop Medicaid specific EBLL testing goals.
- MDHHS Chief Medical Executive Dr. Eden Wells is in regular communication with Dr. Mona Hanna-Attisha and other local and national experts regarding the Flint Water Crisis.

Blood Lead Level Testing Reports

- The Michigan Department of Health and Human Services has updated its data surveillance methods for blood lead level testing to ensure the most up-to-date, accurate information is being reviewed.

- Results are made available through summary reports on the www.michigan.gov/flintwater website. The report shows how many tests have been completed and how many people tested had elevated blood lead levels.
- On Dec. 3, 2015, the first MDHHS BLL Summary Report was released and posted to Flint water website.
- On Dec. 11, MDHHS issued the second BLL Summary Report and posted to Flint water website.
- On Dec. 23, MDHHS the third BLL Summary Report was issued, noting change in method.
- The reports include data from the city of Flint, Genesee County, and the State levels.
- Between Oct. 1 and Dec. 18, 2,182 children and adults in Flint had their blood lead levels tested.
- Of those 2,182 individuals, 23 children 5 years of age or younger had a test greater than or equal to 5 micrograms per deciliter. Seven children ages 6 to 17 had an elevated blood lead level test, and tests for 13 adults exceeded the federal action level.

Case Management

- The Michigan Department of Health and Human Services is partnering with the Genesee County Health Department to ensure families are being offered case management support.
- Additional state funds were allocated to the Genesee County Health Department to supplement their case management efforts. These state dollars paid for two and half full-time employees – nurses who are trained to provide education and assistance to families of Flint children with elevated blood lead levels – to work directly in the community.
- Through Dec. 18, a total of 192 contacts have been attempted to start case management.
- Of those, 115 were reached and offered case management.
- 26 children are currently receiving case management.
- MDHHS holds weekly status calls with the GCHD Case Management staff

Environmental EBL Investigations

- Another resource being offered to families where an elevated blood lead level has been detected is environmental investigations.
- Environmental investigations help identify potential lead exposures which could be from water, paint, soil, plumbing and other sources.
- 12 EBL investigations have been completed and five EBL investigation reports have been received. Of those, the following exposures have been found:
    - Four homes with lead dust hazards
    - Three homes with lead in soil hazards
    - Five homes with lead-based paint hazards
    - Two homes with lead detected in tap water

Communications and Education

- MDHHS and DEQ coordinated with the governor's office to launch the www.michigan.gov/flintwater website.
- In October, MDHHS, in partnership with the Genesee County Health Department, developed and distributed 8,500 packets with educational materials for parents and families in Flint. An additional 3,500 were distributed to GCHD in November.
- Education materials were distributed to all children in Flint schools and discussed the importance of blood lead level testing and the effects of lead exposure. The materials also outlined who should be tested and how to get children tested.

- **FAQs: Lead in Flint Water** – this document details when one should use filtered water versus unfiltered water. Available at: http://www.michigan.gov/documents/deq/2015-10-21_-_Lead_-_Flint_Water_FINAL_504265_7.pdf?20151207171149

- **FAQs: Lead and Your Body** – this document explains the potential health effects of lead poisoning through all life stages, and includes information about exposure pathways of lead from water. Available at: http://www.michigan.gov/documents/deq/2015-10-29_-_Lead_and_your_Body_-_Flint_-_no_background_507727_7.pdf?20151207171149

- **Adding Phosphates to Flint Water** – this document explains the process by which adding extra phosphates can potentially reduce the lead levels in Flint homes' water and the health implications of the phosphates at the levels they're being added. Approved for publication by GCHD, MDHHS approval and posting pending.

WIC and Medicaid

- MDHHS monitoring of Ready to Feed formula use and coordinating with Ready to Feed manufacturer and WIC retailers to proactively address any supply or distribution issues with infant formula availability.

- Information on Ready to Feed formula (including Talking Points, WIC Provider Letter, and infographic on Ready to Feed formula) was shared with Medicaid to share with the Medicaid Health Plans.

- Met with MSA to develop specifications for production of Medicaid population based blood lead testing reports for children in Flint exposed to Flint city water source

- MSA issues L 15-73 – Blood Lead Guidelines to Address the City of Flint Residents' Potential Exposure to Lead. This letter was sent to Practitioners, Clinics, Laboratories and Maternal Infant Health Program (MIHP) Providers in the City of Flint.

From: Lasher, Geralyn (DHHS)
Sent: Monday, November 23, 2015 9:01 AM
To: Eisner, Jennifer (DHHS);Lyon, Nick (DHHS);Grijalva, Nancy (DHHS)
Subject: FW: EBL Data---clarification

Correction from Eden on the 18% explanation

From: Wells, Eden (DHHS)
Sent: Saturday, November 21, 2015 9:52 AM
To: Lasher, Geralyn (DHHS) <lasherg@michigan.gov>
Cc: Miller, Corinne (DHHS) <MillerC39@michigan.gov>; Moran, Susan (DHHS) <MoranS@michigan.gov>
Subject: EBL Data---clarification

Geralyn--sorry, yesterday I was caught without my file--a slight correction (hope it is not too late) actual talking point from the first press conference about our data---note that below were doing a model:

"Blood lead level rates among children under six years of age in the high risk Zip codes (48503, 48504) were 2.7 times higher than the rest of Genesee County before the switch to Flint River Water (p<0.0001). After the switch to Flint River Water, rates in the high risk Zip codes were 3.2 times that of the rest of Genesee County (p<0.0001).

Thus, compared to rates during 2010-2013, the rates after the switch to Flint River water in the high risk Zip codes increased 18 percent, although this difference did not reach statistical significance.

Other Zip codes in Flint

Rates of elevated blood lead levels among children under six years of age in other parts of the city of Flint were 2 times that of the rest of Genesee County before the switch to Flint River Water (p<0.0001). The magnitude of the elevated rate remained roughly the same during the period after the water source switch."

However, when we look at percentages bu ip and by quarter, note that there are ways you can see doubling in certain zips, but there is a seasonal quality to the data so we have never said "rates doubled" in a certain area---but the Hurley folks have been.

From: Lasher, Geralyn (DHHS)
Sent: Friday, December 04, 2015 9:11 AM
To: Lyon, Nick (DHHS)
Subject: Re: FOR IMMEDIATE RELEASE: MDHHS releases latest data outlining blood lead levels in Flint; Follow-up care, case management resources continue for families

I am fine with it. As long as it is a joint announcement when we have a deal.

Sent from my iPhone

On Dec 4, 2015, at 9:07 AM, Lyon, Nick (DHHS) <LyonN2@michigan.gov> wrote:

Note only to you. I think this sounds like a good idea. You?

From: Wells, Eden (DHHS)
Sent: Thursday, December 03, 2015 7:21 PM
To: Lyon, Nick (DHHS) <LyonN2@michigan.gov>; Lasher, Geralyn (DHHS) <lasherg@michigan.gov>
Subject: Fwd: FOR IMMEDIATE RELEASE: MDHHS releases latest data outlining blood lead levels in Flint; Follow-up care, case management resources continue for families

See below/ this is a great idea... In my opinion/

Sent from my iPhone

Begin forwarded message:

From: "Wells, Eden (DHHS)" <WellsE3@michigan.gov>
Date: December 3, 2015 at 7:19:48 PM EST
To: Mona Hanna-Attisha <MHanna1@hurleymc.com>
Subject: Re: FOR IMMEDIATE RELEASE: MDHHS releases latest data outlining blood lead levels in Flint; Follow-up care, case management resources continue for families

I like that idea- and I don't foresee an issue with such an agreement. I hope you understand that this is just one form of a surveillance report, and there can be others- but we really wanted to get the testing data started.

Shall we discuss with State Epidemiologist-/could set up call even tomorrow- will share your request with Nick right now

Sent from my iPhone

On Dec 3, 2015, at 6:59 PM, Mona Hanna-Attisha <MHanna1@hurleymc.com> wrote:

Do you think it would be possible to create a data sharing agreement so that we could do the real-time geocoding of kids with EBLL's? So whenever a EBLL comes in for Genesee county, my team can map it, trend it, etc? You guys may already be doing this, but we easily have the GIS support. This real time mapping will further help us identify hot spots for resource delivery and remediation.

Mona Hanna-Attisha MD MPH

Director, Pediatric Residency Program

Hurley Children's Hospital at Hurley Medical Center

Assistant Professor, Department of Pediatrics and Human Development

Michigan State University College of Human Medicine

mhanna1@hurleymc.com

From: Wells, Eden (DHHS) [WellsE3@michigan.gov]
Sent: Thursday, December 03, 2015 4:19 PM
To: Reynolds, Lawrence; Lawrence Reynolds; Kirk Smith; Mona Hanna-Attisha; Peter Levine; Laura Caravallah; Kay Doerr; Laura Sullivan; Laura Carravallah; Marc Edwards; Valacak, Mark; Andy Leavitt; Base Camp Email; Lasher, Geralyn (DHHS); Eisner, Jennifer (DHHS); Dykema, Linda D. (DHHS)
Subject: Re: FOR IMMEDIATE RELEASE: MDHHS releases latest data outlining blood lead levels in Flint; Follow-up care, case management resources continue for families

You are correct, Larry, that the MDHHS data is pulled out of the Data Warehouse by Flint zip.

Eden

From: Reynolds, Lawrence <LawrenceR@mottchc.org>
Sent: Thursday, December 3, 2015 3:49 PM
To: Wells, Eden (DHHS); Lawrence Reynolds; Kirk Smith; Mona Hanna-Attisha; Peter Levine; Laura Caravallah; Kay Doerr; Laura Sullivan; Laura Carravallah; Marc Edwards; Valacak, Mark; Andy Leavitt; Base Camp Email; Lasher, Geralyn (DHHS); Eisner, Jennifer (DHHS); Dykema, Linda D. (DHHS)
Subject: RE: FOR IMMEDIATE RELEASE: MDHHS releases latest data outlining blood lead levels in Flint; Follow-up care, case management resources continue for families

My understanding is that the other data set is by 9 Flint wards so only Flint homes are in the data set vs including those with Flint mailing addresses with zip codes.Please correct me if needed.

From: Wells, Eden (DHHS) [mailto:WellsE3@michigan.gov]
Sent: Thursday, December 03, 2015 3:39 PM
To: Lawrence Reynolds; Kirk Smith; Mona Hanna-Attisha; Peter Levine; Laura Caravallah; Kay Doerr; Laura Sullivan;

Reynolds, Lawrence; Laura Carravallah; Marc Edwards; Valacak, Mark; Andy Leavitt; Base Camp Email; Lasher, Geralyn (DHHS); Eisner, Jennifer (DHHS); Dykema, Linda D. (DHHS)
Subject: Re: FOR IMMEDIATE RELEASE: MDHHS releases latest data outlining blood lead levels in Flint; Follow-up care, case management resources continue for families

Hi Dr. Reynolds,

I just got done with an email with Mona---

This is a general public report that is high level--not a technical report, and was not meant to represent a technical report. This is general information--of course our surveillance program is tracking by zip, Medicaid, locality, etc.

We can discuss further what type of reporting may be useful to a technical audience---as long as not identifiable (some zips have to be suppressed) I don't see why this can't be done (probably not every two weeks like this public one would be)

Warm Regards,

Eden

Eden V. Wells, MD, MPH, FACPM

Chief Medical Executive

Michigan Department of Health and Human Services

201 Townsend Street, 5th Floor CVB

Lansing, MI 48913

Phone: 517-335-8011

wellse3@michigan.gov

From: Lawrence Reynolds <lrey52@gmail.com>
Sent: Thursday, December 3, 2015 3:25 PM
To: Wells, Eden (DHHS); Kirk Smith; Mona Hanna-Attisha; Peter Levine; Laura Caravallah; Kay Doerr; Laura Sullivan; Dr. Lawrence Reynolds, M.D.; Laura Carravallah; Marc Edwards; Valacak, Mark; Andy Leavitt; Base Camp Email
Subject: Fwd: FOR IMMEDIATE RELEASE: MDHHS releases latest data outlining blood lead levels in Flint; Follow-up care, case management resources continue for families

This is a good start but maybe lacking context . Would GIS software identify clusters ? I am disappointed to see, at this moment , thatDr. Edward's study and Dr. Mona's study which have more granular reporting are given no credence. Is there a reason ?
---------- Forwarded message ----------
From: **Kirk Smith** <ksmith@flint.org>
Date: Thu, Dec 3, 2015 at 3:01 PM
Subject: Fwd: FOR IMMEDIATE RELEASE: MDHHS releases latest data outlining blood lead levels in Flint; Follow-up care, case management resources continue for families
To: "lrey52@gmail.com" <lrey52@gmail.com>, "MHanna1@hurleymc.com" <MHanna1@hurleymc.com>, "plevine@gcms.org" <plevine@gcms.org>, "lsulliva@kettering.edu" <lsulliva@kettering.edu>

Begin forwarded message:
From: Michigan Department of Health and Human Services <MDHHS@govsubscriptions.michigan.gov>
Date: December 3, 2015 at 2:32:05 PM EST
To: <ksmith@flint.org>
Subject: FOR IMMEDIATE RELEASE: MDHHS releases latest data outlining blood lead levels in Flint; Follow-up care, case management resources continue for families
Reply-To: <MDHHS@govsubscriptions.michigan.gov>

Press Release

FOR IMMEDIATE RELEASE: December 3, 2015

CONTACT: Jennifer Eisner, (517) 241-2112

MDHHS releases latest data outlining blood lead levels in Flint

Follow-up care, case management resources continue for families

LANSING, Mich. – Preliminary data indicates that 30 of 1,361 adults and children tested in Flint since October 1 had elevated blood lead levels, according to a report issued today by the Michigan Department of Health and Human Services.

This marks the first summary report on lead testing called for in the state's action plan related to health concerns about Flint's water infrastructure.

"Our goal is to help families reduce their exposure to lead sources," said Dr. Eden Wells, MDHHS chief medical executive. "We have made progress in testing and identifying those with elevated blood lead levels, and the department will continue to work closely with the Genesee County Health Department to reach these families. We will remain diligent in our ongoing outreach and education efforts."

Information comes from tests administered citywide to 1,361 children and adults since October 1. Tests showed that 21 of 969 children age 17 or younger and 9 of 392 adults over the age 18 were identified with elevated blood lead levels.

The report covers test results reported to MDHHS since the state action plan was put in place Oct. 2. It includes the number of tests and number of elevated blood lead levels greater than 5 micrograms per deciliter, and captures both capillary and venous blood tests that have been reported to MDHHS since the beginning of October. People who have had multiple tests are counted only once. Five micrograms per deciliter is the level that the Centers for Disease Control and Prevention considers elevated and triggers health care professional follow up with families.

The full report is posted online at www.michigan.gov/flintwater and will be updated as more data becomes available.

When reviewing historical trend data, the risk of lead exposure is highest during the third quarter of each year – July through September. Seasonal variation is the result of a number of factors including increased exposure to lead in dust and soil in the summer months.

In the third quarter of 2010, 8.3 percent of Flint children 6 and under showed elevated blood lead levels. The figure gradually decreased to 4.1 percent in the third quarter of 2013. During the same months in 2014, the figure increased to 7.5 percent and decreased to 6.4 percent in the third quarter of 2015.

Last month, MDHHS collaborated with the county health department and local partners to distribute educational resources and informational letters to Flint parents regarding lead testing. The state is providing

funding for GCHD nurses to work with families when an elevated blood lead level has been detected. During these follow-up visits, nurses coordinate with environmental health investigators to meet with families in their homes to identify lead exposures, address questions and provide water filters. People can be exposed to lead from paint, soil, plumbing and other sources.

MDHHS continues to provide free water filters and replacement cartridges to Flint residents at four locations, including the MDHHS Flint offices and the Genesee County Community Action Resource Department. For a full list of locations and hours of distribution, visit www.michigan.gov/flintwater.

To help residents properly install water filters, and to demonstrate how to replace the original when it expires, MDHHS has created an instructional video on its YouTube channel. For updates, visit www.michigan.gov/flintwater.

# # #

- Flint Blood Lead Level Summary Report December.pdf
- Flint EBL Data Press Release.pdf

Become a foster parent through Michigan Department of Health & Human Services foster care program.

Questions? Contact Us

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This email was sent to ksmith@flint.org using GovDelivery, on behalf of: Michigan Dept of Health & Human Services · 235 S. Grand Ave W. Lansing, MI 48909 · 1-855-275-5424

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Lawrence Reynolds

From: Lasher, Geralyn (DHHS)
Sent: Tuesday, December 29, 2015 2:28 PM
To: Moran, Susan (DHHS)
Cc: Becker, Timothy (DHHS);Granger, Patricia (DHHS);Grijalva, Nancy (DHHS)
Subject: RE: Timeline
Attachments: Timeline 12 29 15 track changes.docx; Timeline 12 29 15.docx

Thanks Sue. We have made some edits and I have attached both the track changes version so you can see what edits were made and the final version.

-----Original Message-----
From: Moran, Susan (DHHS)
Sent: Monday, December 28, 2015 1:23 PM
To: Lasher, Geralyn (DHHS) <lasherg@michigan.gov>
Cc: Becker, Timothy (DHHS) <beckert1@michigan.gov>; Granger, Patricia (DHHS) <GrangerP@michigan.gov>; Grijalva, Nancy (DHHS) <GrijalvaN@michigan.gov>
Subject: RE: Timeline

Attached is timeline, I received information from Rashmi today that I added to the document.

-----Original Message-----
From: Lasher, Geralyn (DHHS)
Sent: Monday, December 28, 2015 1:13 PM
To: Moran, Susan (DHHS) <MoranS@michigan.gov>
Cc: Becker, Timothy (DHHS) <beckert1@michigan.gov>; Granger, Patricia (DHHS) <GrangerP@michigan.gov>; Grijalva, Nancy (DHHS) <GrijalvaN@michigan.gov>
Subject: Timeline

Sue--Tim and I will need the timeline on Tuesday so we can complete some work for the State of the State. Please let us know when we can have this on Tuesday.

Thank you.

Sent from my iPad

Michigan Department of Health and Human Services Flint Water Crisis: Timeline of Key Events

Prepared December 23, 2015

1 PRE JULY 2015

- Fall of 2014 – GCHD Genesee County Health Department (GCHD) identified increase in cases of Legionella; MDHHS assisted GCHD in Epidemiologic analysis
- January 2015: MDHHS assisted with case interviews
- 6-4-15 Final Legionellosis outbreak report sent to Genesee County Health Department and discussed with Centers for Disease Control and Prevention. There were 45 cases laboratory confirmed cases of legionella. Healthcare-associated Legionella was suspected for a subset of cases. Results demonstrated that over half (27/45) of the cases had a healthcare facility exposure in the two weeks prior to their illness onset. In response, the healthcare facility has implemented multiple environmental and procedural measures to alleviate the situation.
    - The source of water at the primary residence was evaluated for all cases. Twenty-one of 45 (47%) cases occurred in people whose residence received City of Flint water. Of the 18 persons that did not report healthcare visits, 8 (44%) were exposed to Flint water at their home.
    - Ten cases had no exposure to a Flint hospital in the 2 weeks prior to illness nor were their homes on the Flint water system.
    - Other possible exposures were evaluated and no other known community exposures were identified.
    - Enhanced surveillance has continued for the remainder of 2015.
- 2/26/2015 - (2 calls) initiated by LeAnn Walters. Contacted Childhood Lead Poisoning Prevention Program-CLPPP (Karen Lishinski) – Ms. Walters expressed concern about Flint water quality and provider refusing to test her children; during second call she related that provider agreed to testing
- 3/4/2015 - (1 call) LeAnn Walters contacted CLPPP because child had elevated blood lead level; city officials wouldn't talk to her about her water; Karen provided EPA contact information

2 JULY 2015

- 7-22-15 Contact from Mark Johnson U.S. Agency for Toxic Substances and Disease Registry (ATSDR) to L. Dykema regarding Flint drinking water status; asking if Environmental Health was engaged
- 7-23-15 Director office inquiry forwarded to Population Health Administration for review/response
- 7-23-15 Division of Environmental Health (Dykema) contacted DEQ for update on drinking water testing/status. S. Busch relates that city in compliance with lead copper rule; one house with

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high lead level in water was an anomaly as house was connected to old water main but had since been corrected. This home was the residence of LeAnne Walters from 3-4-15 calls.

- 7-24-15 Childhood Lead Poisoning Prevention Program (CLPPP) requests assistance from Epidemiology to assess magnitude of change in 2014 Blood Lead Levels (in children) for city of Flint
  - Results indicate ~~higher high~~ percentage of Elevated Blood Lead Levels ~~9EBLs~~(EBLs) for summer 2014, followed seasonal trends and the levels showed decrease by October. Further analysis would be needed to establish causation.
- 7-28-15 Response sent to Director's office

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3 AUGUST 2015

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From: Lasher, Geralyn (DHHS)
Sent: Tuesday, December 29, 2015 4:07 PM
To: Brownfield, Michael (GOV);Lyon, Nick (DHHS)
Cc: Becker, Timothy (DHHS)
Subject: RE: State of the State update
Attachments: Timeline 12 29 15.docx; MDHHS ISD Overview.docx; OPPORTUNITIES FOR IMPROVED OUTCOMES FOR FAMILIES-SOS2016 (002).docx

Mike—Tim and I have worked to come up with some additional information for you on our topics. Attached you will find:

1. Document titled "Timeline 12 29 15" that will give you the timeline of the Flint Water situation from MDHHS.
2. Document titled "MDHHS ISD Overview" that will give you additional Integrated Service Delivery detail from item B in your outline.
3. Document titled "Opportunities for Improved Outcomes for Families" that will give you additional information for items A.1 and A.3

We still need to work a bit more on item A.2. from the outline so we will see what we can get to you after the first of the year.

Please let us know if this is helpful and what additional information you may need.

Thanks--g

From: Brownfield, Michael (GOV)
Sent: Tuesday, December 22, 2015 3:59 PM
To: Lyon, Nick (DHHS) <LyonN2@michigan.gov>
Cc: Lasher, Geralyn (DHHS) <lasherg@michigan.gov>
Subject: State of the State update

Nick,

Geralyn provided some great info to help me put together the Quality of Life section of the governor's state of the state address (pasted below).

The governor is generally happy with how it's laid out, but he says it needs additional detail and some further work / development. He also noted that the integrated service delivery section will depend on budget issues and hopes that makes the cut, but I think he will want additional detail there, as well. (Detail in this case means more info in the outline, but also supporting briefs and other documents on the proposals).

This is well outside of my wheelhouse, so I'm hoping you can provide some assistance on this. I'm sending the governor another update on the state of the state outline at the end of the day tomorrow, then will be providing him additional materials next week (and after the New Year, of course).

I'm available to talk tomorrow if you want to catch up then.

Thanks,

Mike

A. River of Opportunity (poverty): Lift people out of poverty by putting them on a self-sustainable pathway to success.
    1. MDHHS and TIA to increase collaboration with Michigan Works! agencies to help people on assistance programs reach self-sufficiency through education, training, and employment opportunities.
    2. Place success coaches in Michigan Works! agencies to aid clients in assistance programs with finding job training and employment opportunities. Clients will work on specific measurable employment goals with their success coaches.
    3. MDHHS and TIA will also be focused on a two-generation approach to poverty that would include the whole family. If there are youth aged 14-24 in the home, we will connect them with the Workforce Investment Opportunity Act youth programs.
        a) Striving for the outcomes of increased employment, increased wages, long term employment and cases closing because of earned income.
        b) Allow people ages 20-26 to continue post-secondary education and/or skilled trades training.
        c) Develop training programs that are aligned with in demand occupations by local areas. This would include looking at labor market demands and developing a plan of action to match the skills training to the employers.
B. River of Opportunity -- The Next Step
    1. Smarter, better service (Integrated Service Delivery)
        a) Move to well-rounded, localized and targeted support, instead of manual processes and fragmented services.
        b) One virtual location for consistent customer service: Leverage technology for better service; simplify processes, provide a platform for engagement with modern interfaces and functionality
        c) Case workers and community service partners will serve as success coaches using a shared information technology platform.

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    - Development and implementation of case management in Flint by GCHD
    - Development and implementation of lead environmental inspection contract
    - Development and distribution of educational materials – to providers and parents
    - Testing events (blood lead)
    - Testing events (water mainly / DEQ activtity in the schools)
    - Data analysis (internal meeting)
- 10-13-15 MDEQ/MDHHS/toxic steering group committee meeting discusses use of the Integrated Exposure Update Biokinetic (IEUBK) model for lead in childrenfor the Flint water situation; requested a subcommittee to identify the exposure assumptions that would be developed for schools and homes
- 10-13-15 CLPPP provided Lead Week Toolkit to DEH
- 10-13-15 Began development of the Lead & Your Body infographic

- 10-13-15 MDHHS Division of Environmental Health, MDEQ, and LARA begin weekly briefing regarding school drinking water sampling
- 10-16-15 First of weekly meetings with city of Flint meeting DEQ HHS LARA GCHD (Jim Henry) at the Mayor's office
- 10-16-15 MDHHS (L. Dykema) participates in meeting with superintendent of Flint schools
- 10-19-15 Supplemental funding legislation passed
- 10-20-15 Daily calls to GCHD changed biweekly (ongoing)
- 10-21-15 Dr. Wells and N. Peeler speak to Medicaid Health Plans (Clinical Advisory Committee meeting) regarding Blood lead testing protocol and case management follow up
- 10-27-15 ETC contracted to provide EBL investigation services
- 10-27-15 Briefing to Director regarding IEUBK modeling for school drinking water screening value.
- 10-27-15 S.Bien received an email from USDA regional representative, Bruce Hillman, indicating that our Congressional Representatives had sent a letter to Tom Vilsack, Secretary of USDA inquiring about community response to address immediate and long-term needs. Regional USDA representative indicated he would be in contact with MDHHS WIC office to receive an update. MDHHS WIC office responded that we continue to work with the local health department to assure that clients are getting access to filters and bottled water to mix their infant formula. WIC also indicated that at that time there had not been any requests from WIC clients for Ready to Feed Formula.
- 10-28-15 DEH requested by Eden Wells to help clarify CLPPP report for the Director
- 10-30-15 Case management (nursing) contract with Genesee County Health Department begin
- 10-30-15 (approx.) 8500 parent information packets distributed to GCHD

6 NOVEMBER 2015

- 11-3-15 Director's office received a letter from Tim English, Midwest Regional Administrator for USDA
- 11-5-15 Response to Tim English's inquiry drafted and sent to Director Lyon's office. MDHHS indicates continued monitoring of Ready to Feed formula use and coordinating with Ready to Feed manufacturer and WIC retailers to proactively address any supply or distribution issues with infant formula availability.
- 11/6/15 Bruce Hillman, Regional Representation from USDA, notified S. Bien that they had received questions from Katie Bergh from Senator Stabenow's office regarding availability of Ready to Feed, our communication plan, how many clients had requested Ready to Feed.
- 11-6-15 Additional 3500 parent packets distributed to GCHD
- 11-9-15 Transition of 2.0 CLPPP staff to DEH
- 11-12-15 Phone conference with Karla Ruest, Rashmi Travis (MDHHS), Stan Bien (MDHSS-WIC), Kristin Hanulcik (MDHSS- WIC), Bruce Hillman (USDA), Anne Bartholomew (USDA), Katie Bergh (Senator Stabenow's office), and Jaclyn Schneider (Deputy Staff Director US Senate Committeee on Agriculture, Nurtrition, and Forestry) in regards to the legislative inquiries. Information was provided on how MDHHS is working with the local health department to monitor requests for Ready to Feed formula, continuing to work with the local health department to assure filters

and bottled water are provided to clients, and providing educational materials on Ready to Feed formula to WIC clients. To date, only one WIC client had requested Ready to Feed formula.

- 11-13-15 Call with ATSDR, GCHD and MDHS to discuss outreach material
- 11/16/15 Information on Ready to Feed formula (including Talking Points, WIC Provider Letter, and infographic on Ready to Feed formula) was shared with the local health department to share with providers in the community. This same information was provided to Congressional delegates on 11-12-15 phone conference.
- 11-18-15 DHHS Meets with Governor's Flint Water Task Force
- 11-24-15 DEH Project Management Structure implemented
    - Daily Siutation Reports-Reps begin being compiled and distributed to MDHHS staff
    - Bi-weekly calls with GCHD change to weekly (ongoing)
- 11-24-15 Information on Ready to Feed formula (including Talking Points, WIC Provider Letter, and infographic on Ready to Feed formula) was shared with Medicaid to share with the Medicaid Health Plans.

7 DECEMBER 2015

- 12-3-15 MDHHS BLL Summary Report released
- 12-11-15 MDHHS BLL Summary Report released
- 12-14-15 Meeting with MSA to develop specifications for production of Medicaid population based blood lead testing reports for children in Flint exposed to Flint city water source

From: Lasher, Geralyn (DHHS)
Sent: Tuesday, December 29, 2015 4:50 PM
To: Brownfield, Michael (GOV);Lyon, Nick (DHHS)
Cc: Becker, Timothy (DHHS)
Subject: RE: State of the State update
Attachments: Timeline 12 29 15.docx

Mike---I am sorry to do this, but please use this updated timeline on the Flint water issue instead of the one I sent earlier today. Unfortunately the earlier version did not have some additional detail regarding some of our public messaging on this issue. This should be reflected in this new version.

Thanks.

From: Lasher, Geralyn (DHHS)
Sent: Tuesday, December 29, 2015 4:07 PM
To: Brownfield, Michael (GOV) <BrownfieldM2@michigan.gov>; Lyon, Nick (DHHS) <LyonN2@michigan.gov>
Cc: Becker, Timothy (DHHS) <beckert1@michigan.gov>
Subject: RE: State of the State update

Mike---Tim and I have worked to come up with some additional information for you on our topics. Attached you will find:

1. Document titled "Timeline 12 29 15" that will give you the timeline of the Flint Water situation from MDHHS.
2. Document titled "MDHHS ISD Overview" that will give you additional Integrated Service Delivery detail from item B in your outline.
3. Document titled "Opportunities for Improved Outcomes for Families" that will give you additional information for items A.1 and A.3

We still need to work a bit more on item A.2. from the outline so we will see what we can get to you after the first of the year.

Please let us know if this is helpful and what additional information you may need.

Thanks--g

From: Brownfield, Michael (GOV)
Sent: Tuesday, December 22, 2015 3:59 PM
To: Lyon, Nick (DHHS) <LyonN2@michigan.gov>
Cc: Lasher, Geralyn (DHHS) <lasherg@michigan.gov>
Subject: State of the State update

Nick,

Geralyn provided some great info to help me put together the Quality of Life section of the governor's state of the state address (pasted below).

The governor is generally happy with how it's laid out, but he says it needs additional detail and some further work / development. He also noted that the integrated service delivery section will depend on budget issues and hopes that makes the cut, but I think he will want additional detail there, as well. (Detail in this case means more info in the outline, but also supporting briefs and other documents on the proposals).

This is well outside of my wheelhouse, so I'm hoping you can provide some assistance on this. I'm sending the governor another update on the state of the state outline at the end of the day tomorrow, then will be providing him additional materials next week (and after the New Year, of course).

I'm available to talk tomorrow if you want to catch up then.

Thanks,

Mike

A. River of Opportunity (poverty): Lift people out of poverty by putting them on a self-sustainable pathway to success.
    1. MDHHS and TIA to increase collaboration with Michigan Works! agencies to help people on assistance programs reach self-sufficiency through education, training, and employment opportunities.
    2. Place success coaches in Michigan Works! agencies to aid clients in assistance programs with finding job training and employment opportunities. Clients will work on specific measurable employment goals with their success coaches.
    3. MDHHS and TIA will also be focused on a two-generation approach to poverty that would include the whole family. If there are youth aged 14-24 in the home, we will connect them with the Workforce Investment Opportunity Act youth programs.
        a) Striving for the outcomes of increased employment, increased wages, long term employment and cases closing because of earned income.
        b) Allow people ages 20-26 to continue post-secondary education and/or skilled trades training.
        c) Develop training programs that are aligned with in demand occupations by local areas. This would include looking at labor market demands and developing a plan of action to match the skills training to the employers.
B. River of Opportunity -- The Next Step
    1. Smarter, better service (Integrated Service Delivery)
        a) Move to well-rounded, localized and targeted support, instead of manual processes and fragmented services.
        b) One virtual location for consistent customer service: Leverage technology for better service; simplify processes, provide a platform for engagement with modern interfaces and functionality
        c) Case workers and community service partners will serve as success coaches using a shared information technology platform.

Michigan Department of Health and Human Services
Flint Water: Timeline of Key Events

1 Pre July 2015

- Fall 2014 – Genesee County Health Department (GCHD) identified increase in cases of Legionella; MDHHS assisted GCHD in Epidemiologic analysis
- January 2015: MDHHS assisted with case interviews
- 6-4-15 Final Legionellosis outbreak report sent to Genesee County Health Department and discussed with Centers for Disease Control and Prevention. There were 45 cases laboratory confirmed cases of legionella. Healthcare-associated Legionella was suspected for a subset of cases. Results demonstrated that over half (27/45) of the cases had a healthcare facility exposure in the two weeks prior to their illness onset. In response, the healthcare facility has implemented multiple environmental and procedural measures to alleviate the situation.
    - The source of water at the primary residence was evaluated for all cases. Twenty-one of 45 (47%) cases occurred in people whose residence received City of Flint water. Of the 18 persons that did not report healthcare visits, 8 (44%) were exposed to Flint water at their home.
    - Ten cases had no exposure to a Flint hospital in the 2 weeks prior to illness nor were their homes on the Flint water system.
    - Other possible exposures were evaluated and no other known community exposures were identified.
    - Enhanced surveillance has continued for the remainder of 2015.
- 2-26-2015 - (2 calls) initiated by LeAnn Walters. Contacted Childhood Lead Poisoning Prevention Program-CLPPP (Karen Lishinski) – Ms. Walters expressed concern about Flint water quality and provider refusing to test her children; during second call she related that provider agreed to testing
- 3-4-2015 - (1 call) LeAnn Walters contacted CLPPP because child had elevated blood lead level; city officials wouldn't talk to her about her water; Karen provided EPA contact information

2 July 2015

- 7-22-15 Contact from Mark Johnson U.S. Agency for Toxic Substances and Disease Registry (ATSDR) to L. Dykema regarding Flint drinking water status; asking if Environmental Health was engaged
- 7-23-15 Director office inquiry forwarded to Population Health Administration for review/response
- 7-23-15 Division of Environmental Health (Dykema) contacted DEQ for update on drinking water testing/status. S. Busch relates that city in compliance with lead copper rule; one house with high lead level in water was an anomaly as house was connected to old water main but had since been corrected. This home was the residence of LeAnne Walters from 3-4-15 calls.

- 7-24-15 Childhood Lead Poisoning Prevention Program (CLPPP) requests assistance from Epidemiology to assess magnitude of change in 2014 Blood Lead Levels (in children) for city of Flint
    - Results indicate percentage of Elevated Blood Lead Levels (EBLs) for summer 2014, followed seasonal trends and the levels showed decrease by October. Further analysis would be needed to establish causation.
- 7-28-15 Response sent to Director's office

3 AUGUST 2015

- 8-4-15 Meeting with Governor's office and Flint pastors. Flint pastors had information provided to Director in response to 7-23-15 inquiry
- 8-6-15 Informal request from Liane Shekter Smith (DEQ) to Kory Groetsch MDHHS-Division of Environmental Health (DEH) after a meeting (unrelated to Flint situation) to assist with health education regarding lead in drinking water. MDHHS-DEH-supervisor made aware of request.
- 8-24-15 Dr. Mona Hanna Attisha contacts Genesee County Health Department for Blood Lead Level data/information
- 8-31-15 DEH staff meet to discuss communication plan for Flint/DEQ per request from DEQ

4 SEPTEMBER 2015

- 9-2-15 Marc Edwards contacts Bob Scott regarding Flint BLL data
- 9-8-15 Dr. Mona Hanna Attisha contacts CLPPP (K. Lishinski) regarding BLL data
- 9-9-15 Email sent from Dr. Mona Hanna Attisha to CLPPP (K. Lishinski) requesting the BLL data
- 9-11-15 DEH/DEQ conference call regarding draft communication plan; overview.
- 9-15-15 B. Scott responds to Dr. Larry Reynolds, provides chart
- 9-16-15 Dr. Mona Hanna Attisha emailed B. Scott requesting the MCIR (BLL) data
- 9-16-15 Dr. Mona Hanna Attisha contacts Senator Ananich regarding data request
- 9-22-15 Senator Ananich spoke with Director Lyon regarding Dr. Mona Hanna Attisha's data request and Flint water situation
- 9-22-15 DEQ communications office contacted DHHS communications (A. Minicucci) about Healthy Homes Program
- 9-22-15 MDHHS receives copy of Dr. Mona Hanna Attisha's presentation to be presented at upcoming press event
- 9-23-15 MDHHS WIC office receives an inquiry about availability of bottled water through the WIC program. (Per federal regulations, clients can use SNAP benefits to purchase water, but water is not an allowable food item for purchase under the WIC program).
- 9-24-15 Hurley Press Event
- 9-24-15 Director requests response to Flint water situation
- 9-24-15 Bureau of Epidemiology begins analysis of Flint zip code data utilizing the Poisson Regression for statistical analysis
- 9-25-15 MDHHS responds to Detroit Free Press reporter inquiries

- 9/28/2015 Mark Valacak-Genesee County Health Department Health Officer- contacted M. Miller regarding timeframe for completion of MDHHS data analysis
- 9-29-15 Dr. Eden Wells contacts Dr. Mona Hanna Attisha regarding her study results
- 9-30-15 Briefing to Director comparing Lead Copper Rule Testing and Marc Edwards protocol.

5 OCTOBER 2015

- 10-1-15 MDHHS provides information for Flint Water website, including the following documents: Parent Handbook: Is Your Child Safe From Lead Poisoning, Blood Lead Level (BLL) Quick Reference for Primary Care Providers, Lead Screening & Testing for Safe, Healthy Michigan Kids, and finally, Pregnant and Nursing Mothers: What You Need to Know
- 10-2-15 Governor's press conference-MDHHS study results consistent with Hurley findings
- 10-2-15 State Budget Office approval to use carryover emergency funds and transfer of DEQ funds to purchase water filters
- 10-2-15 R.Travis and S. Bien received an inquiry about what Michigan is doing regarding the Flint lead water situation from Jacqlyn Schneider, Deputy Director and Policy Director of US Senate Committee on Agriculture, Nutrition, & Forestry. Ms. Schneider inquired about the availability of Ready -to -Feed formula and asked if we are confident that the water filters that are being provided are sufficient to address the concerns about lead.
- 10-5-15 Filter distribution planning meeting held in Flint with local organizations
- 10-5-15 A teleconference was held with Rashmi Travis, Nancy Peeler, Dr. Eden Wells, Bob Scott, Corinne Miller, Sarah LyonCallo, Patti McKane (MDHSS), and Dr. Mona Hanna-Attisha, Jenny Latanz, and Dr. Richard Sandler (Hurley Lead Research Team) to discuss the nuances of the raw data that was sent on 10-2-15 to the Hurley Research Team.
- 10-5-15 S. Bien provided a response to Jaclyn Schneider indicating the following: that we are in regular contact with the local health department, the majority of WIC clients were already using bottled water to reconstitute infant formula, that a mass distribution (about 4000 filters) of filters was underway, and lead testing was being done adjunct with WIC clinics, and the local health department had additional lead testing opportunities scheduled.
- 10-5-15 MDHHS announces water filters will be available to the public on Oct. 6
- 10-6-15 MDHHS announces extended hours for filter distribution, updates Parent Handout on Flint Water website
- 10-7-15 Flint Mayor's Water Technical Advisory Committee meeting (E. Wells, L. Dykema); recommends switch back to Detroit Water Authority
- 10-8-15 GCHD issues Public Health Advisory
- 10-12-15 Daily calls with GCHD begin. Topics Include:
    - Distribution and tracking of filters
    - Development and implementation of case management in Flint by GCHD
    - Development and implementation of lead environmental inspection contract
    - Development and distribution of educational materials – to providers and parents
    - Testing events (blood lead)
    - Testing events (water mainly / DEQ activtity in the schools)

    - Data analysis (internal meeting)
- 10-13-15 MDEQ/MDHHS/toxic steering group committee meeting discusses use of the Integrated Exposure Update Biokinetic (IEUBK) model for lead in childrenfor the Flint water situation; requested a subcommittee to identify the exposure assumptions that would be developed for schools and homes
- 10-13-15 CLPPP provided Lead Week Toolkit to DEH
- 10-13-15 Began development of the Lead & Your Body infographic
- 10-13-15 MDHHS Division of Environmental Health, MDEQ, and LARA begin weekly briefing regarding school drinking water sampling
- 10-15-15 Angela Minicuci requests the addition of the MDHHS/GCHD Lead Flint Water Fact Sheet to the Flint Water website
- 10-16-15 First of weekly meetings with city of Flint meeting DEQ HHS LARA GCHD (Jim Henry) at the Mayor's office
- 10-16-15 MDHHS (L. Dykema) participates in meeting with superintendent of Flint schools
- 10-19-15 Supplemental funding legislation passed
- 10-20-15 Daily calls to GCHD changed biweekly (ongoing)
- 10-21-15 Dr. Wells and N. Peeler speak to Medicaid Health Plans (Clinical Advisory Committee meeting) regarding Blood lead testing protocol and case management follow up
- 10-22-15 Angela Minicuci requests updates to the Flint Water website of the Lead Flint Water, and Lead and Your Body documents after GCHD edits; Angela Minicuci contacted Sheryl Thompson about recording a video about how to replace a water filter in collaboration with Home Depot
- 10-23-15 DEQ's videographer, Eric Shaw, met with Home Depot employee in Flint to record his instructions about how to install and replace a filter
- 10-27-15 ETC contracted to provide EBL investigation services
- 10-27-15 Briefing to Director regarding IEUBK modeling for school drinking water screening value.
- 10-27-15 S.Bien received an email from USDA regional representative, Bruce Hillman, indicating that our Congressional Representatives had sent a letter to Tom Vilsack, Secretary of USDA inquiring about community response to address immediate and long-term needs. Regional USDA representative indicated he would be in contact with MDHHS WIC office to receive an update. MDHHS WIC office responded that we continue to work with the local health department to assure that clients are getting access to filters and bottled water to mix their infant formula. WIC also indicated that at that time there had not been any requests from WIC clients for Ready to Feed Formula.
- 10-28-15 DEH requested by Eden Wells to help clarify CLPPP report for the Director
- 10-28-15 – Brita filter replacement video was picked up by Angela Minicuci from Eric Shaw
- 10-30-15 Case management (nursing) contract with Genesee County Health Department begin
- 10-30-15 Angela Minicuci requests that the parent and provider letters, along with their attachments, be posted to the Flint Water website
- 10-30-15 (approx.) 8500 parent information packets distributed to GCHD

6 NOVEMBER 2015

- 11-3-15 Director's office received a letter from Tim English, Midwest Regional Administrator for USDA
- 11-4-15 Brita filter replacement video posted to the MDHHS YouTube channel
- 11-5-15 Response to Tim English's inquiry drafted and sent to Director Lyon's office. MDHHS indicates continued monitoring of Ready to Feed formula use and coordinating with Ready to Feed manufacturer and WIC retailers to proactively address any supply or distribution issues with infant formula availability.
- 11/6/15 Bruce Hillman, Regional Representation from USDA, notified S. Bien that they had received questions from Katie Bergh from Senator Stabenow's office regarding availability of Ready to Feed, our communication plan, how many clients had requested Ready to Feed.
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- 11-18-15 DHHS Meets with Governor's Flint Water Task Force
- 11-24-15 DEH Project Management Structure implemented
    - Daily Situation Reports-Reps begin being compiled and distributed to MDHHS staff
    - Bi-weekly calls with GCHD change to weekly (ongoing)
- 11-24-15 Information on Ready to Feed formula (including Talking Points, WIC Provider Letter, and infographic on Ready to Feed formula) was shared with Medicaid to share with the Medicaid Health Plans.

7 DECEMBER 2015

- 12-3-15 MDHHS BLL Summary Report released and is posted to Flint water website
- 12-7-15 Angela Minicuci requests update to the Flint Water website of the Lead and Your Body FAQ
- 12-8-15 Angela Minicuci requests removal of the Fight Lead with a Healthy Diet PDF until it's updated
- 12-11-15 MDHHS BLL Summary Report released and is posted to Flint water website

- 12-14-15 Meeting with MSA to develop specifications for production of Medicaid population based blood lead testing reports for children in Flint exposed to Flint city water source
- 12-23-15 MDHHS issues third summary EBLL report noting change in method, report posted to Flint Water website

From: Moran, Susan (DHHS)
Sent: Monday, November 23, 2015 9:14 AM
To: Scott, Jackie (DHHS)
Subject: FW: Management ICS Draft
Attachments: IAP Flint Drinking Water 20Nov2015.pdf

Importance: High

Per our discussion this AM.

From: Dykema, Linda D. (DHHS)
Sent: Friday, November 20, 2015 2:11 PM
To: Wells, Eden (DHHS)
Cc: Moran, Susan (DHHS); Miller, Corinne (DHHS)
Subject: RE: Management ICS Draft
Importance: High

All,

Attached are the main components of an ICS Incident Action Plan (including ICS 202,203,204, and 207) as requested. We've included only one ICS 204 Assignment Form for the EBL Investigation Group...others can be built if you want to go forward.

Kudos to Kory and Jennifer: we sequestered ourselves in a conference room to create this draft.

Linda

From: Wells, Eden (DHHS)
Sent: Friday, November 20, 2015 11:20 AM
To: Dykema, Linda D. (DHHS)
Cc: Moran, Susan (DHHS); Miller, Corinne (DHHS)
Subject: Management ICS Draft

Hi Linda,

I talked with Corinne and Sue—

Could you develop what would, in your eyes, be an optimal ICS structure if EH would become the operations center? Goals would be:

1. Coordinate interagency and federal/state/local issues as we proceed into this EBL investigation phase
2. Coordinate interagency and federal/state/local communications as we proceed into this EBL investigation phase
3. Enhance blood level testing of children if not reaching maximum capacity as monitored by the CLPP and EPID teams on a bi-weekly basis.

If we can get even a schematic (doe s not need to be perfect, and is your draft first cut) sent to Corinne and Sue asap, that would be great--

Eden

Eden V. Wells, MD, MPH, FACPM
Chief Medical Executive
Michigan Department of Health and Human Services
201 Townsend St., 5th Floor CVB
Lansing, MI 48913

INCIDENT OBJECTIVES (ICS 202)

1. Incident Name:	2. Operational Period: Date From: Friday Date To: Thursday Time From: Time To:
Flint Drinking Water	

3. Objective(s) and Strategies:

Objective 1. Protect children from exposure to lead in drinking water.

Strategy 1.1. Promote blood lead testing of children to reach maximum capacity.
Strategy 1.2. Ensure that all residents in the city of Flint are provided with water filters and replacement cartridges.
Strategy 1.3. Provide case management services to families of children with blood lead levels greater than or equal to 5 micrograms of lead per deci-liter of blood
Strategy 1.4. Provide EBL environmental investigations to identify sources and levels of exposure to lead in drinking water and other environmental media.

Objective 2. Coordinate inter-agency response and federal/state/local communications.

Strategy 2.1. Create a communications plan to coordinate messaging, health education, and outreach materials for the public.
Strategy 2.2. Coordinate MDHHS intra-agency response activities.
Strategy 2.3. Facilitate inter-agency coordination to address lead in Flint drinking water.

4. Operational Period Command Emphasis:

Intra-agency coordination within MDHHS and with all local/state/federal partners.

General Situational Awareness

Winter weather conditions and firearm deer hunting season may complicate travel to Flint.

5. Site Safety Plan Required? Yes ☐ No ☑

Approved Site Safety Plan(s) Located at:

6. Incident Action Plan (the items checked below are included in this Incident Action Plan):

☐	ICS 202	☐	ICS 206	Other Attachments:
☑	ICS 203	☐	ICS 207	☐ _____
☑	ICS 204	☐	ICS 208	☐ _____
☐	ICS 205	☐	Map/Chart	☐ _____
☐	ICS 205A	☐	Weather Forecast/Tides/Currents	☐ _____

7. Prepared by: Name: Linda Dykema Position/Title: Ops/Planning Chief Signature: _____

8. Approved by Incident Commander: Name: Eden Wells Signature: _____

ICS 202	IAP Page 1	Date/Time: _____

ORGANIZATION ASSIGNMENT LIST (ICS 203)

1. Incident Name:	2. Operational Period: Date From:	Date To:
Flint Drinking Water	Friday Time From:	Thursday Time To:

3. Incident Commander(s) and Command Staff:	
IC/UCs	Eden Wells
Deputy	
Safety Officer	Kory Groetsch
Public Info. Officer	Jennifer Eisner
Liaison Officer	Linda Dykema

4. Agency/Organization Representatives:	
Agency/Organization	Name
MDEQ	Jim Sygo
GCHD	Jim Henry
City of Flint	TBD
CDC	Mark Johnson
EPA	TBD

5. Planning Section:	
Chief	Linda Dykema
Deputy	
CLPPP Unit	Martha Stanbury
EPI Unit	Patti McKane
Documentation Unit	TBD
Tech Specialists Grp	Kory Groetsch
Single Resources	
	Corinne Miller
	Sarah Lyon-Callo

6. Logistics Section:	
Chief	MDHHS existing structure
Deputy	
Support Branch	
Director	
Supply Unit	
Facilities Unit	
Ground Support Unit	
Service Branch	
Director	
Communications Unit	
Medical Unit	
Food Unit	

7. Operations Section:		
Chief	Linda Dykema	
Deputy		
Staging Area		
Branch		
Branch Director		
Deputy		
Blood Testing Grp	TBD	
Case Manage. Grp	Jim Henry GCHD	
EBL Env. Grp	Wes Priem	
Filters Grp	TBD	
Branch		
Branch Director		
Deputy		
Division/Group		
Division/Group		
Division/Group		
Division/Group		
Division/Group		
Branch		
Branch Director		
Deputy		
Division/Group		
Division/Group		
Division/Group		
Division/Group		
Division/Group		
Air Operations Branch		
Air Ops Branch Dir.	NA	

8. Finance/Administration Section:	
Chief	MDHHS existing structure
Deputy	
Time Unit	
Procurement Unit	
Comp/Claims Unit	
Cost Unit	

9. Prepared by: Name: _____ Position/Title: _____ Signature: _____

ICS 203 | **IAP Page** _____ Date/Time: _____

ASSIGNMENT LIST (ICS 204)

1. Incident Name:	2. Operational Period:	3.
Flint Drinking Water	Date From: Friday Date To: Thursday Time From: Time To:	Branch:

4. Operations Personnel:

	Name	Contact Number(s)
Operations Section Chief:	Linda Dykema	517-335-8566
Branch Director:		
Division/Group Supervisor:	Wesley Priem	517-335-9699

Division:

Group: EBL Env. Grp

Staging Area:

5. Resources Assigned:

Resource Identifier	Leader	# of Persons	Contact (e.g., phone, pager, radio frequency, etc.)	Reporting Location, Special Equipment and Supplies, Remarks, Notes, Information
Project Coordinator	Courtney Wisinski	1	517-335-8252	CVB 4th Floor
ETC Field Staff	Various	3		Various

6. Work Assignments:

Coordinate and schedule EBL home visits and environmental investigations.
Conduct EBL investigations to include collection of potable water supply samples, dust samples, outdoor soil samples, and XRF readings of painted household surfaces per established protocols.
Deliver water samples to the State Laboratory.
Deliver all other samples to commercial laboratory.
Compile data into an EBL Report to be provided to the home residents and the state.
Document all activities and provide requested reports to Division of Environmental Health for purposes of tracking activities.

7. Special Instructions:

Maintain situation awareness when driving in winter weather conditions. Be aware of slip, trip, fall hazards. Use appropriate PPE as indicated by the Health & Safety Plan located at ETC office.

8. Communications (radio and/or phone contact numbers needed for this assignment):

Name/Function	Primary Contact: indicate cell, pager, or radio (frequency/system/channel)
/	
/	
/	
/	

9. Prepared by: Name: Linda Dykema Position/Title: Ops/Planning Chief Signature: _____

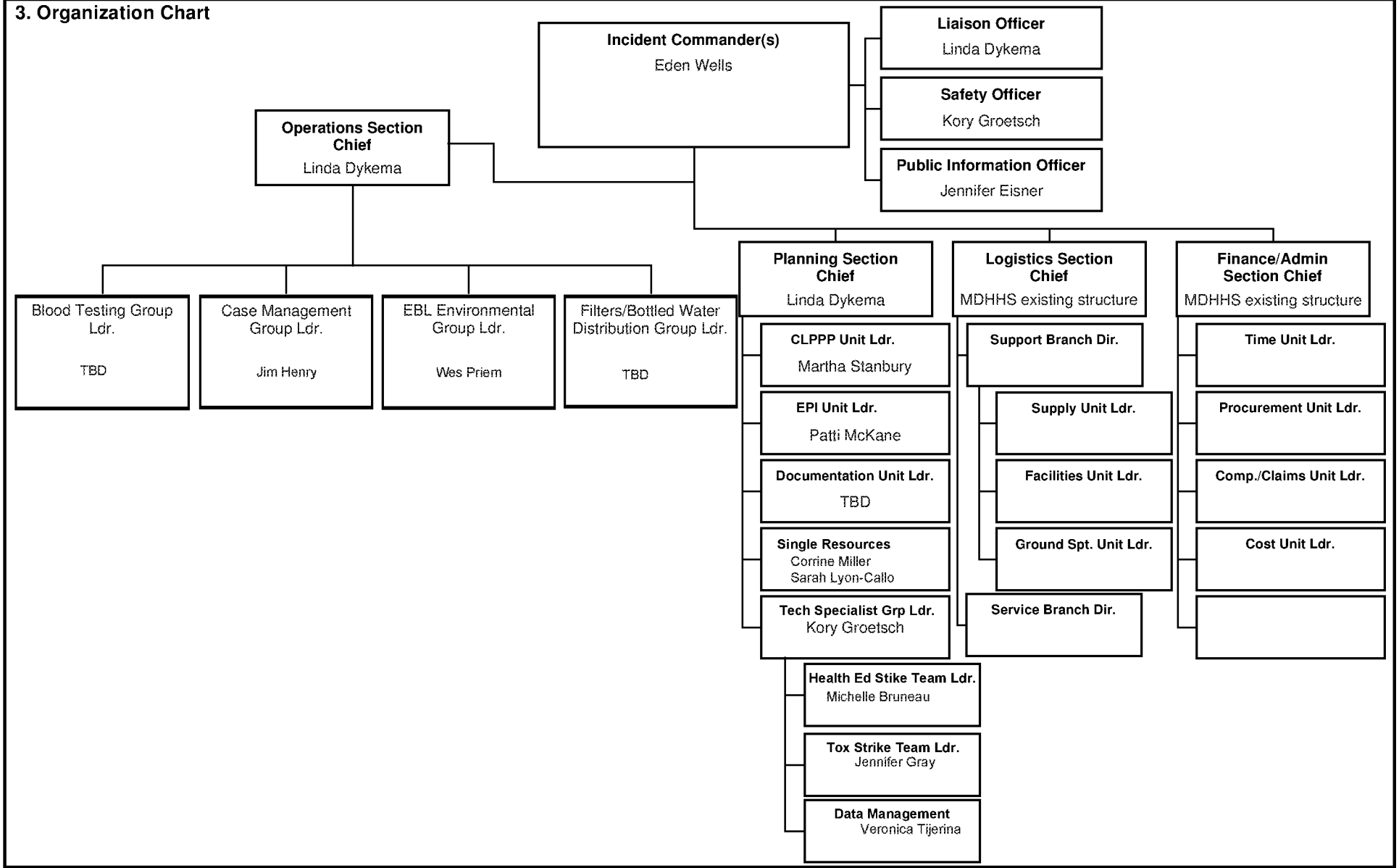
ICS 204 | **IAP Page** _____ Date/Time: _____

INCIDENT ORGANIZATION CHART (ICS 207)

1. Incident Name: Flint Drinking Water

2. Operational Period: Date From: Friday Date To: Thursday
Time From: Time To:

3. Organization Chart



ICS 207 | **IAP Page ___** | **4. Prepared by:** Name:_____ Position/Title: _____ Signature: _____ Date/Time: _____

From: Dykema, Linda D. (DHHS)
Sent: Thursday, December 03, 2015 11:04 AM
To: Moran, Susan (DHHS);Miller, Corinne (DHHS);Eden
Cc: Bouters, Janese (DHHS)
Subject: RE: 2DEc15 SitRep
Attachments: Flint Lead MDHHS Sitrep 12 2_15.docx

I believe this is good to go. Janese, please distribute.

From: Moran, Susan (DHHS)
Sent: Thursday, December 03, 2015 11:01 AM
To: Dykema, Linda D. (DHHS); Miller, Corinne (DHHS); Eden
Subject: RE: 2DEc15 SitRep

Yes.

From: Dykema, Linda D. (DHHS)
Sent: Thursday, December 03, 2015 10:56 AM
To: Moran, Susan (DHHS); Miller, Corinne (DHHS); Eden
Subject: RE: 2DEc15 SitRep

How's this?

- **CLPPP Nurse has maintained contact with GCHD nurses regarding hospitalized child with EBLL of 52 µg/dl. GCHD Nurse reports that the child's lead level has decreased to 20 µg/dl.**

From: Moran, Susan (DHHS)
Sent: Thursday, December 03, 2015 10:48 AM
To: Dykema, Linda D. (DHHS); Miller, Corinne (DHHS); Eden
Subject: RE: 2DEc15 SitRep

Typo under Epidemiology surveillance

- **. Master list will be complied on Monday and HHS staff and GCHD who will track their CM activities re these children and report back to HHS on Friday.**

Can we remove this section, I think it's still confusing to say level confirmed at 36. And we have a statement that nurse says it's 20….

- **CLPPP Nurse has maintained contact with GCHD nurses regarding hospitalized child with high EBLL, per our Nursing protocol. Second lab report received, confirming that his BLL had dropped from 52 to 36 µg/dl. GCHD Nurse reports that the child's lead level has decreased to 20 µg/dl, but the lab report has not yet been received at HHS.**

From: Dykema, Linda D. (DHHS)
Sent: Thursday, December 03, 2015 9:57 AM
To: Miller, Corinne (DHHS); Moran, Susan (DHHS); Eden
Subject: RE: 2DEc15 SitRep

Slight revision based on Sue's further comments.

From: Miller, Corinne (DHHS)
Sent: Thursday, December 03, 2015 9:54 AM
To: Dykema, Linda D. (DHHS); Moran, Susan (DHHS); Eden
Subject: RE: 2DEc15 SitRep

Looks fine to me.

From: Dykema, Linda D. (DHHS)
Sent: Thursday, December 03, 2015 9:50 AM
To: Miller, Corinne (DHHS) <MillerC39@michigan.gov>; Moran, Susan (DHHS) <MoranS@michigan.gov>; Eden <ewells@umich.edu>
Subject: RE: 2DEc15 SitRep

Ok, added that plus an item from Wes. Also condensed EBL child info into one bullet point under CM. Please distribute if ready to go.

From: Miller, Corinne (DHHS)
Sent: Thursday, December 03, 2015 9:15 AM
To: Dykema, Linda D. (DHHS); Moran, Susan (DHHS); Eden
Subject: RE: 2DEc15 SitRep

This would be a new item. Add under healthcare provider section...Sue/Eden edit if necessary.

Moran, Wells and Miller met with Medicaid health plan staff on December 2 to discuss increased promotion by health plans of EBL testing of Flint children < 6 years of age. Status update on Flint provided. Medicaid put this issue on its agenda for discussion at its December 3 meeting with Medicaid health plan CEOs. Medicaid also suggested inviting Dr. Wells to speak about Flint at a future meeting with Medicaid health plan medical directors. Medicaid identified three individuals to partner with epidemiology staff to develop a roster of Flint children enrolled in Medicaid to provide more precise estimates on the percentage of Flint children enrolled in Medicaid who receive EBL testing.

From: Dykema, Linda D. (DHHS)
Sent: Thursday, December 03, 2015 8:52 AM
To: Moran, Susan (DHHS) <MoranS@michigan.gov>; Miller, Corinne (DHHS) <MillerC39@michigan.gov>; Eden <ewells@umich.edu>
Subject: 2DEc15 SitRep

Attached for your review

Flint Water Lead Project

Michigan Department of Health and Human Services
Situation Report for December 2, 2015

****NOTE: Contains potentially Identifiable Information- REDACT AS INDICATED****
New items for the day listed first and in bold print.

Daily Briefing and Situation Report prepared by Linda Dykema

Surveillance Indicators: People Tested since 10/1/2015: 1,361;
Children less than 6 years old ≥ 5 µg/dl since 10/1/2015: 15
Children 6 to 17 years old ≥ 5 µg/dl since 10/1/2015: 6
Adults 18 years and older ≥ 5 µg/dl since 10/1/2015: 9
Severity Indicators: Hospitalized/Discharged-1/1; Deaths- 0

DAILY ACTIVITY SUMMARY

Elevated Blood Level (EBL) Environmental Investigations – ETC Contractors, Wes Priem, Courtney Wisinski

- **3 EBL investigations completed.**
- 8 investigations scheduled.
- The high EBLL home is scheduled for Friday 12/4/15.

MDHHS/Genesee County Health Department (GCHD) Case Management (CM) Services – Nancy Peeler

- **CLPPP Nurse has maintained contact with GCHD nurses regarding hospitalized child with EBLL of 52 µg/dl. GCHD Nurse reports that the child's lead level has decreased to 20 µg/dl.**
- **Received calls from Rep. Neely's office regarding an upcoming Health Fair, asking about CLPPP participation or provision of materials (may be on December 15th at a Methodist church?). Suggested that GCHD staff as their best contact: shared with GCHD as they may receive a call.**
- CM report through 11/25/15:
  - # of contacts attempted: 136
  - # offered CM: 46
  - # CM started: 5
  - # of children receiving CM who live in Flint: 5
  - # billed to Medicaid: 5
  - # Other disposition: 2 (2 children moved to Oakland County)

Epidemiology/Surveillance – Patti McKane, Martha Stanbury, Bob Scott, Jessica Cooper, Karen Lishinski

- **Established protocol for notifying HHS staff and GCHD about Flint EBL children. Master list will be compiled on Monday and HHS staff and GCHD who will track their CM activities re these children and report back to HHS on Friday.**

Filter Distribution Sheryl Thompson

- **November Distribution**
  - **778 Filters**
  - **63 Pitchers**
  - **924 Replacement Filters**
- **Total Distribution since October 1, 2015**
  - **10,951 Filters**
  - **184 Pitchers**
  - **924 Replacement Filters**

Communications/Information Sharing – Linda Dykema, Eden Wells

- **Linda Dykema received call from Dr. Mark Johnson, ATSDR R5 Senior Regional Representative and CDC main point of contact. Provided an update on HHS activities.**
- **Wes Priem attended a Michigan Community Development Directors' conference on housing where he talked with Susan Wilcox, Manager for Flint Community and Economic Development Program. She will schedule a meeting with HHS staff to discuss application of the Landlord Penalty Law in city of Flint.**
- Weekly (Tues. 8:00 am) coordination call with DEQ/LARA/HHS. Discussed need for informational materials for schools/residents regarding lead free plumbing replacements.
- Technical Advisory Committee meeting originally scheduled for December 9th- , then postponed by City of Flint, may actually take place: awaiting word from City.

Health Education Resources Updates - Michelle Bruneau, Emily Houk

- **Met with Liane Shekter-Smith (MDEQ), Steve Busch (MDEQ), Kory Groetsch (MDHHS), and Jennifer Gray (MDHHS) to discuss Phosphate Fact Sheet; changes forthcoming**
- **Coordinating meeting with GCHD and MDHHS to discuss phosphate dosing and potential health implications**
- **Sent out draft of "Bath Time" fact sheet to MDHHS and GCHD for review reiterating that it's safe for adults and children to bathe in Flint tap water; requested quote via Eden from Dr. Mona Hanna-Attisha**
- **Continuing to write and coordinate additions to the EBL Case Manager Binder, now known as the MDHHS Lead Safe Family Guide Book.**
- **Pending: Aerator/Filter Maintenance Fact Sheet; Flint Parent Letter re-do in partnership with Emily Houk.**

Toxicology - Kory Groetsch, Jennifer Gray, Lisa Quiggle

- Working with GCHD and DEQ to address questions concerning impact of phosphate treatment on drinking water filters.
- Working with Healthy Homes Section staff to revise EBL report for Flint Residents.

WIC

- Letter sent 11/24 to GCHD about Ready-to-feed formula availability from WIC program
- Talking points for WIC staff and for providers shared

Healthcare/Providers

- **Moran, Wells and Miller met with Medicaid health plan staff 2 to discuss increased promotion by health plans of EBL testing of Flint children < 6 years of age. Status update on Flint provided. Medicaid put this issue on its agenda for discussion at its December 3 meeting with Medicaid health plan CEOs and suggested inviting Dr. Wells to speak to Medicaid health plan medical directors.**
- **Medicaid identified three individuals to partner with epidemiology staff to develop methodology to measure/report progress on the percentage of Flint children enrolled in Medicaid who receive EBL testing.**
- Forum for primary care providers in Flint POSTPONED pending coordination with local providers
- WIC information to be shared by GCHD to providers

DEQ Information - Linda Dykema as Liaison

- MDEQ would like to issue school drinking water testing results in coordination with MDHHS release of the blood lead test reporting.

From: Fiedler, Jay (DHHS)
Sent: Wednesday, December 02, 2015 10:19 AM
To: Bohm, Susan (DCH)
Subject: FW: McLaren Summary Report
Attachments: McLaren Report 2015-10-16-.pdf

From: Cupal, Suzanne [mailto:scupal@gchd.us]
Sent: Friday, October 16, 2015 12:39 PM
To: Bolen, Timothy (DHHS) <BolenT1@michigan.gov>; Fiedler, Jay (DHHS) <FiedlerJ@michigan.gov>; Johnson, Shannon (DHHS) <JohnsonS61@michigan.gov>; Collins, Jim (DHHS) <CollinsJ12@michigan.gov>; Johnson, M.D., Gary <GJOHNSON@gchd.us>; Valacak, Mark <MVALACAK@gchd.us>; Henry, James <jhenry@gchd.us>; LaRocco, Toni <tlarocco@gchd.us>; Rygiel, Christine <crygiel@gchd.us>
Subject: McLaren Summary Report

Julie Borowski just forwarded their summary report. It does not address all of our questions, but it is a good starting point. Please review and let's discuss outstanding questions so we can address them with her.

Suzanne

Suzanne Cupal, M.P.H.
Public Health Supervisor
Genesee County Health Department
630 S. Saginaw Street
Suite 4
Flint, MI 48502
(810) 768-7970
scupal@gchd.us

EXECUTIVE SUMMARY

Special Pathogens Laboratory (SPL) was contacted by McLaren Flint Health Care to assist the hospital in responding to an increase in the incidence of Legionnaires' disease due to *Legionella pneumophila*, serogroup 1. The Genesee County Health Department had also been in contact with the hospital regarding cases of Legionnaires' disease in patients that had been diagnosed and treated at the hospital. This increase in cases had been observed over the past year when water quality in Flint was adversely affected when the city switched from Detroit water to the Flint River last year.

SPL was asked to provide consultation services, including an on-site risk assessment, review of the facility's current Legionella policy, and development of a Water Safety Plan for the facility.

Assessments of McLaren Flint Hospital buildings were performed from August 11 – 13, 2015. The assessment including collection of samples for *Legionella* culture from distal hot water sites, distal cold water sites, hot water heaters, a hot water return, and the cold water entries. Physicochemical measurements, including pH, temperature, and free chlorine, were also taken.

Legionella pneumophila serogroup 1 was detected across all systems, with the majority of hot water distal sites (water outlets) showing some level of positivity.

McLaren Flint Hospital Administration, Infectious Diseases, Facilities Engineering and Infection Control acted aggressively to address the potential risk for hospital-acquired Legionnaires' disease. Staff worked with SPL to expedite both short and long-term approaches to prevention. This included recommendations for rapid identification and treatment of cases as well as recommendations regarding options for installation of secondary water treatment (disinfection).

The hospital staff performed a "shock" hyperchlorination disinfection in Buildings F, A, and B/C. The hyperchlorination disinfection for Building F Upper System was completed on August 14-15, 2015 and re-sampled for *Legionella* on August 17, 2015.

The "post-disinfection" culture results showed that *Legionella* concentrations were significantly lower—indicating the hyperchlorination disinfection was a successful short-term remediation which temporarily reduced *Legionella*.

Long-term secondary disinfection with monochloramine was recommended in patient care areas because of its proven efficacy and ability to rapidly reduce *Legionella* in hospital hot water systems. A Water Safety Plan is being developed to provide on-going risk management and to comply with the new ASHRAE 188 Legionella standard.

These efforts have resulted in successfully reducing *Legionella* in the hospital water systems. No cases of healthcare-acquired Legionnaires' disease were identified following these measures.

From: Fiedler, Jay (DCH)
Sent: Monday, March 02, 2015 10:20 AM
To: Bolen, Timothy (DCH)
Subject: FW: Genesee County Legionnaires' Disease investigation update
Attachments: Epi curve.docx

From: Bohm, Susan (DCH)
Sent: Friday, February 27, 2015 9:33 AM
To: Johnson, Shannon (DCH); Tyndall Snow, Leigh (DCH); Weinberg, Meghan (DCH)
Cc: Fiedler, Jay (DCH); Collins, Jim (DCH)
Subject: Genesee County Legionnaires' Disease investigation update

Shannon and I have worked out estimated illness onset dates for the Legionnaires' disease cases and these are now displayed in graphs in the attached document. One graph shows the dates by day (keyboard effect) and the second shows the dates by month. When I was speaking with Suzanne C at ELC, she was under the impression that the peak was in September – which it is by MDSS referral date, but plotting by illness onset date shows both August and September were peak months. A lesson is the advantages of why we do epi curves!

Lily has successfully completed one interview of the very first case and says she will be doing the second today.

Susan

This Document is a Non-Responsive Attachment.

From: Fiedler, Jay (DHHS)
Sent: Wednesday, October 07, 2015 12:19 PM
To: Collins, Jim (DHHS)
Subject: Fw: FW: genesee and emergency declaration

Jay Fiedler, MS
Section Manager
Surveillance and Infectious Disease Epidemiology Section
Bureau of Disease Control, Prevention, and Epidemiology
Michigan Department of Health and Human Services
201 Townsend St - PO Box 30195 - Lansing, MI 48909
P: 517.335.9516 - E: fiedlerj@michigan.gov

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From: Eden Wells <ewells@umich.edu>
Sent: Wednesday, October 7, 2015 11:53 AM
To: Lai, Joyce (DHHS)
Cc: Schreiber, Scott (DHHS); Collins, Jim (DHHS); Fiedler, Jay (DHHS); Henderson, Tiffany (DHHS)
Subject: Re: FW: genesee and emergency declaration

I am exceedingly busy---would recommend following all press releases (go to the MDHHS site) as well as those that come out today and tomorrow AM. That was not an emergency declaration, it was an emergency advisory. This is a multi-agency response being coordinated by the Governor's office. Will forward talking points to Jim Collins---if he thinks OK to send out to you all that is OK, not sure of how far distribution should go

Also, I- do not tend to look at UM emails as frequently when doing MDHHS stuff ---you all got lucky!

Eden V. Wells, MD, MPH, FACPM
Clinical Associate Professor, Epidemiology
Director, Preventive Medicine Residency
University of Michigan School of Public Health
1415 Washington Heights,
Ann Arbor, MI 48109
Tel: 734-647-5306
Fax: 734-936-2084
ewells@umich.edu

On Wed, Oct 7, 2015 at 11:18 AM, Lai, Joyce (DHHS) <LaiJ@michigan.gov> wrote:

Hi Eden,

Care to comment on what Tim has said below? As I explained to Tim, both Scott and I participate on the GLBHI Conference calls and I am responsible for updating the group on the MI activities. Any details I should say about the Genesee and Emergency Declaration situation?

From: Bolen, Timothy (DHHS)
Sent: Wednesday, October 07, 2015 11:16 AM
To: Lai, Joyce (DHHS)
Cc: Schreiber, Scott (DHHS)
Subject: Re: genesee and emergency declaration

Hi Guys,
I don't have anything written up - been staying away from this issue (kind of outside the CD realm, eh?). Mlive has had some good articles with timelines and actions taken by city/state government and the health department.

When the Hurley Doc released her evaluation of lead data from their clinic evaluations there was an initial response from our environmental health folks that suggested that their data didn't show what Hurley's did. Unfortunately, after paring down MDHHS data to just kids who likely were exposed to Flint drinking water Eden (Wells) was quoted in one article that there indeed was an increase in kids less than 6 after the switch. (You may want to talk with Eden, Joyce - I've only been privy to what is in the news.) The Public Health Emergency was declared after that - (last Thursday).

Honestly, I wouldn't offer too much information on this issue...(That's my 2 cents)

Tim

Tim Bolen
Michigan Department of Health and Human Services; Regional Epidemiologist - Region 3
Midland County Health Department
220 W. Ellsworth Street
Midland, MI 48640-5194
Phone: (989)832-6690
Fax: (989)832-6628

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From: Lai, Joyce (DHHS)
Sent: Wednesday, October 7, 2015 11:00 AM
To: Bolen, Timothy (DHHS)
Cc: Schreiber, Scott (DHHS)
Subject: genesee and emergency declaration

Hi Tim
As you know, both Scott and I participate in the GLBHI meetings and our next one is coming up tomorrow. Since this Genesee County and Emergency Health Declaration has been very dominate in the national news, I was hoping to get some details from you that I can pass onto the group. If you have a summary or something written up, I can just extract what you want me to from it and tell to the group as well. Thanks!!

Joyce Lai, MPH
Region 2 South Epidemiologist
Surveillance and Infectious Disease Epidemiology Section
Bureau of Disease Control, Prevention, and Epidemiology
Michigan Department of Health and Human Services
Physical Address: 5454 Venoy, Wayne, MI 48184
Ph: 734-727-7204 Cell: 517-930-6958 E-mail: laij@michigan.gov

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From: Bohm, Susan (DCH)
Sent: Friday, September 25, 2015 11:39 AM
To: Fiedler, Jay (DCH);Johnson, Shannon (DCH);Bolen, Timothy (DCH)
Subject: RE: Director's Office Assignment -- Flint - need update asap

Seems like the Flint docs are pushing this idea:
http://www.detroitnews.com/story/news/local/michigan/2015/09/24/flint-plans-advisory-curbing-exposure-lead/72725736/

-Susan

From: Fiedler, Jay (DCH)
Sent: Friday, September 25, 2015 11:10 AM
To: Bohm, Susan (DCH); Johnson, Shannon (DCH); Bolen, Timothy (DCH)
Subject: Fwd: Director's Office Assignment -- Flint - need update asap

Passing along. Haven't read the whole thing.

Jay Fiedler
MDHHS SIDE Section Manager
517/335-9516

Begin forwarded message:

> **From:** "Miller, Corinne (DCH)" <MillerC39@michigan.gov>
> **Date:** September 24, 2015 at 1:16:20 PM EDT
> **To:** "Priem, Wesley F. (DCH)" <priemw@michigan.gov>, "Fiedler, Jay (DCH)" <FiedlerJ@michigan.gov>
> **Cc:** "Dykema, Linda D. (DCH)" <DykemaL@michigan.gov>
> **Subject: FW: Director's Office Assignment -- Flint - need update asap**
>
> Wes - per the EPA request to you, the attachment contains two graphics on childhood blood lead testing in Flint.
>
> Jay - this information likely will be shared with the local health department, if it hasn't been already (there is an MDHHS childhood lead poisoning health educator in the Flint-area), because the MDHHS toxicologists, MDEQ and the county health department spoke last week about the development of standard messaging related to lead in drinking water.
>
> -----Original Message-----
> From: Peeler, Nancy (DCH)
> Sent: Tuesday, July 28, 2015 2:57 PM
> To: Anderson, Paula (DCH); Miller, Corinne (DCH); Travis, Rashmi (DCH); Moran, Susan (DCH); Grijalva, Nancy (DCH); Fink, Brenda (DCH)
> Cc: Priem, Wesley F. (DCH); Dykema, Linda D. (DCH); Bouters, Janese (DCH); Barr, Jacqui (DCH)
> Subject: RE: Director's Office Assignment -- Flint - need update asap

I apologize for the delay in responding more specifically to this assignment, it took some time to review our Childhood Lead Poisoning Prevention program data to see if it might contribute to the understanding of the situation in Flint with their water supply. Here is what we found:

We looked at lead testing results for May 2014-April 2015, which is the 12 month time frame just after Flint started drawing their water from the river (water source changed in April 2014). We compared lead testing rates and lead testing results to the same time frame for the previous 3 years, to see if there were any patterns that suggested that there were increased rates of lead poisoning after the water supply was switched. Per the attached charts -

* Lead testing rates remained about the same from year to year (chart on the right).
* There was a spike in elevated blood lead tests from July-September 2014 (chart on the left, gold line).
* However that pattern was not terribly different from what we saw in the previous three years, especially in 2011-2012 (we are working with our Epidemiologist to statistically verify any significant differences).
* We commonly see a 'seasonal effect' with lead, related to people opening and closing windows more often in the summer, which disturbs old deteriorating paint on the windows, sills and sashes. Window fans frequently blow and spread the lead dust from the deteriorating paint to other parts of the room/house. We suspect that the summer data spike may be related to this effect.
* If the home water supply lines and/or river water were contributing to elevated blood lead tests, we expected that the increased rates would extend beyond the summer, but they drop quite a bit from September to October, stayed low over the winter, and are just starting to tail up again in the spring of 2015.

So upon review, we don't believe our data demonstrates an increase in lead poisoning rates that might be attributable to the change in water source for Flint. We recognize that lead exposure via the water is only a small piece of what may be happening for families in Flint, however, we hope the information is helpful.

Nancy Peeler

-----Original Message-----
From: Anderson, Paula (DCH)
Sent: Wednesday, July 22, 2015 5:31 PM
To: Miller, Corinne (DCH); Travis, Rashmi (DCH)
Cc: Priem, Wesley F. (DCH); Dykema, Linda D. (DCH); Peeler, Nancy (DCH); Bouters, Janese (DCH); Barr, Jacqui (DCH)
Subject: Director's Office Assignment -- Flint - need update asap
Importance: High

Good afternoon,
Please see the message below received from the Director's office just before 5. If at all possible, please provide an update of what you may, or may not, know ASAP, today if at all possible. Include Nancy Grijalva and Sue Moran in the response. Thank you.

-----Original Message-----
From: Miller, Mark (DCH)
Sent: Wednesday, July 22, 2015 5:28 PM

To: Anderson, Paula (DCH)
Subject: RE: Flint - need update asap

There's an article from the metro times I located:

http://www.metrotimes.com/Blogs/archives/2015/07/14/flint-family-finds-hazardous-waste-levels-of-lead-in-its-tap-water

Based on this it sounds like at least one family might have had a child with elevated lead blood levels, which might or might not have come from the water. Sounds like the issue is old lead service lines, but their seems to be some difference of opinion on appropriate testing methods.

I'd send this over to Linda Dykema, Wes Priem and Nancy Peeler for their comments.

DEQ has jurisdiction over municipal water supplies, but we do have a program to follow-up on children with elevated blood lead levels, so I think it would be appropriate for the folks above to discuss the situation and recommend any action.

Mark

-----Original Message-----
From: Anderson, Paula (DCH)
Sent: Wednesday, July 22, 2015 4:51 PM
To: Miller, Mark (DCH)
Cc: Moran, Susan (DCH)
Subject: FW: Flint - need update asap
Importance: High

Nancy requested an answer TODAY. Thanks.

-----Original Message-----
From: Grijalva, Nancy (DCH)
Sent: Wednesday, July 22, 2015 4:47 PM
To: Moran, Susan (DCH)
Cc: Anderson, Paula (DCH)
Subject: FW: Flint - need update asap

I'm frustrated by the water issue in Flint. I really don't think people are getting the benefit of the doubt. Now they are concerned and rightfully so about the lead level studies they are receiving from the DEQ samples. Can you take a moment out of your impossible schedule to personally take a look at this? These folks are scared and worried about the health impacts and they are basically getting blown off by us (as a state we're just not sympathizing with their plight).

From: Johnson, Shannon (DCH)
Sent: Friday, April 24, 2015 2:36 PM
To: Fiedler, Jay (DCH)
Subject: FW: City of Flint water testing results
Attachments: Flint-WaterQualityData-3-2015.pdf

Did you want to get this to Jim Henry?

From: Busch, Stephen (DEQ)
Sent: Friday, April 24, 2015 2:33 PM
To: Johnson, Shannon (DCH)
Cc: Prysby, Mike (DEQ)
Subject: RE: City of Flint water testing results

Shannon,

Attached is what I have through March.

Stephen Busch, P.E.
Lansing and Jackson District Supervisor
Office of Drinking Water and Municipal Assistance
MDEQ
517-643-2314

From: Johnson, Shannon (DCH)
Sent: Thursday, April 23, 2015 4:15 PM
To: Busch, Stephen (DEQ)
Subject: City of Flint water testing results

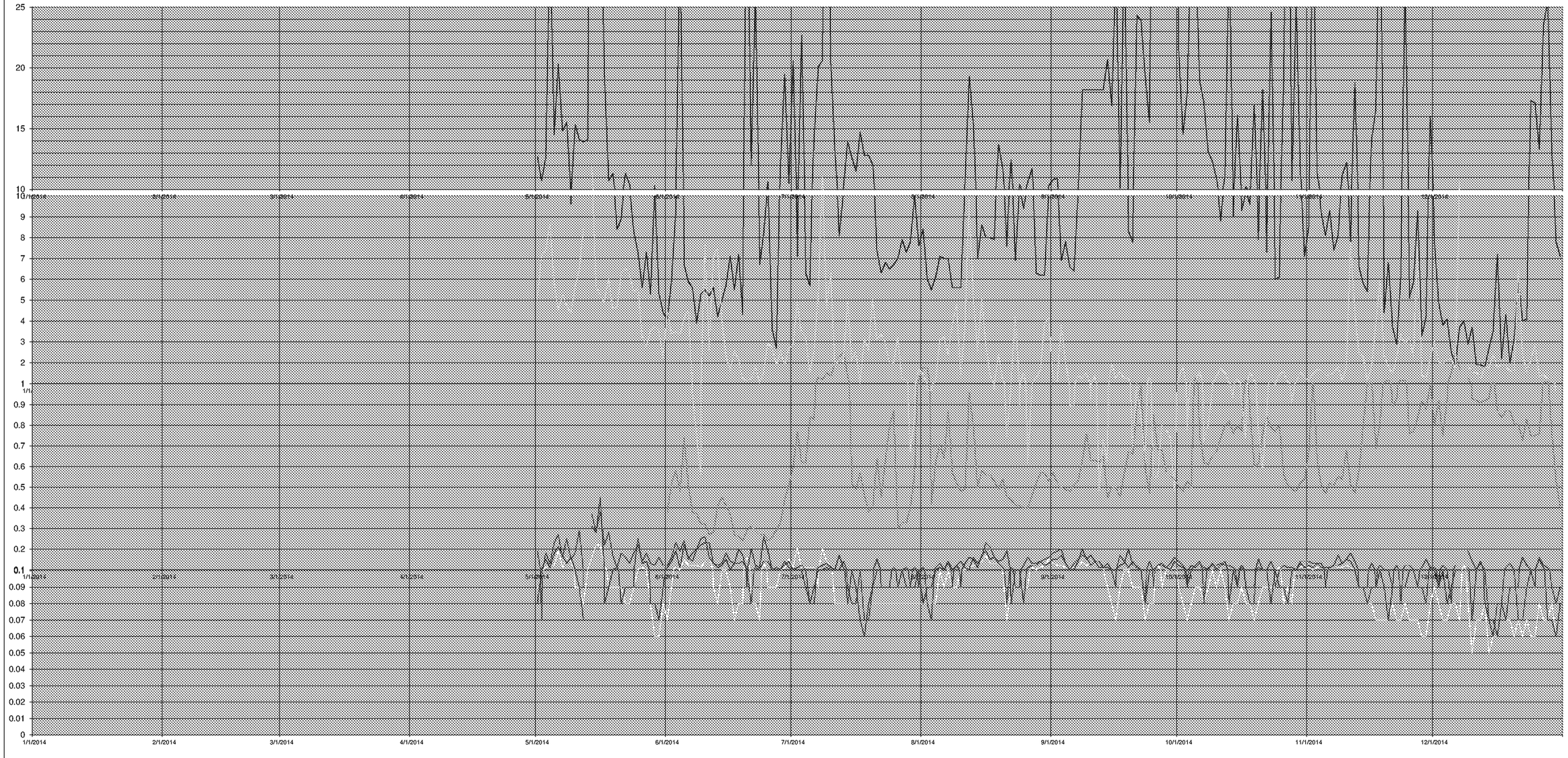
Hi Steve,

You had mentioned in our meeting the other week that you would be able to share the water testing spreadsheet. Would it be possible for us to get a copy of that so we can share it with the Genesee Health Department? I know this was part of the information they were looking for.

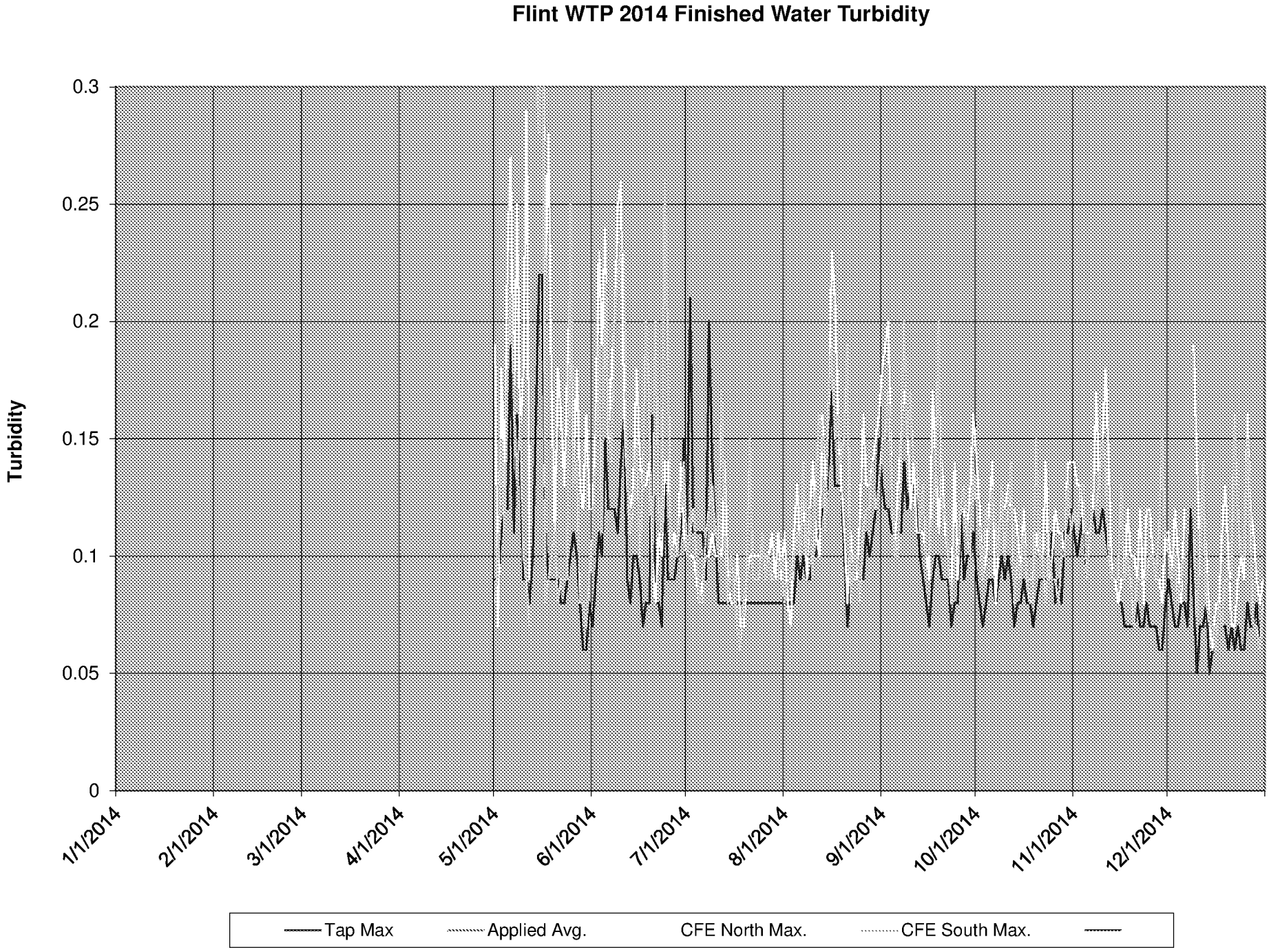
Thanks for your help.

Best,
Shannon Andrews Johnson, MPH
Infectious Disease Epidemiologist
Michigan Dept. of Health and Human Services
201 Townsend St., CVB 5th Floor
Lansing, MI 48913
Phone: 517-335-8165
Fax: 517-335-8263

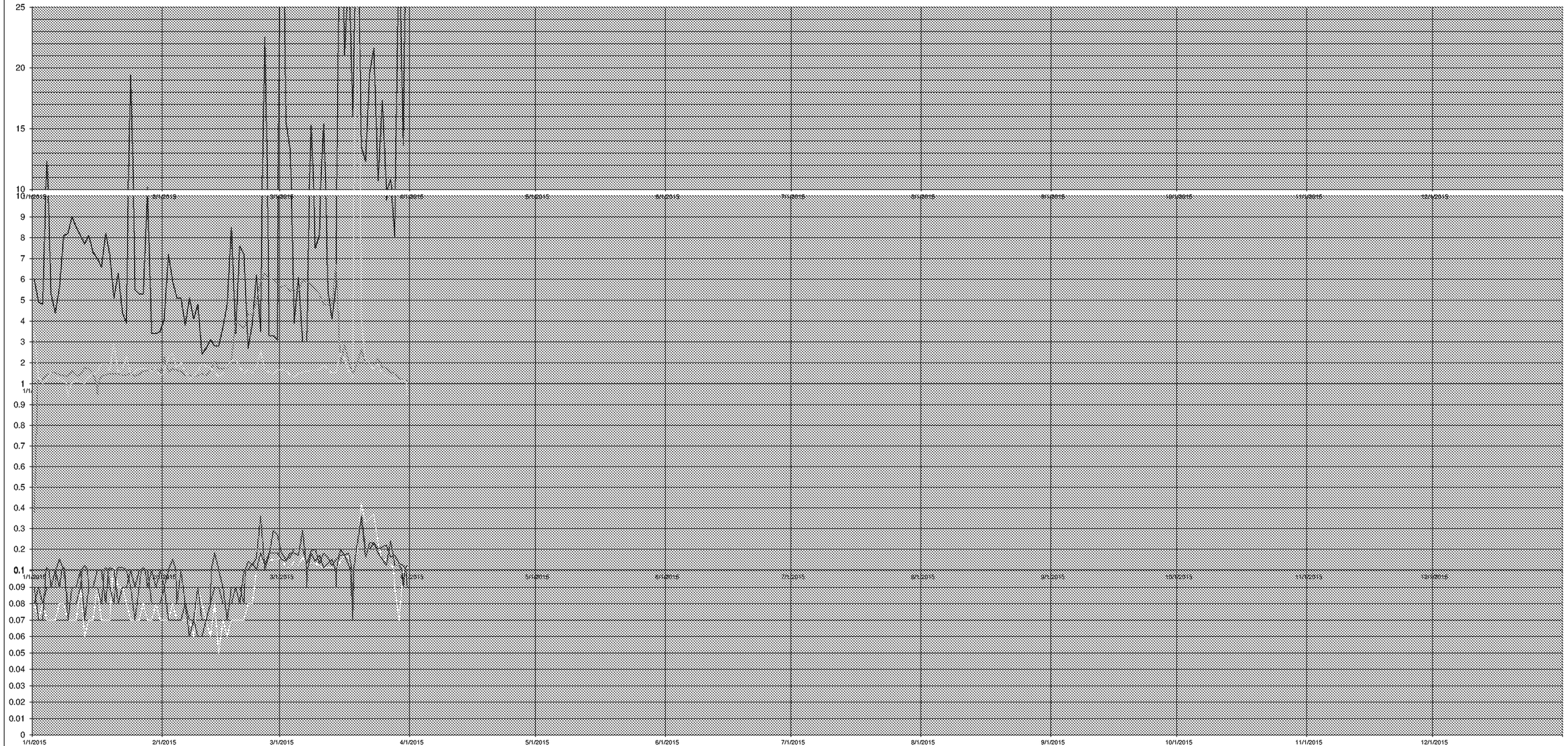
Flint WTP 2014 Turbidity Comparison



—Raw Max. ····Settled Avg. Tap Max ····Applied Avg. —CFE North Max. —CFE South Max. ····

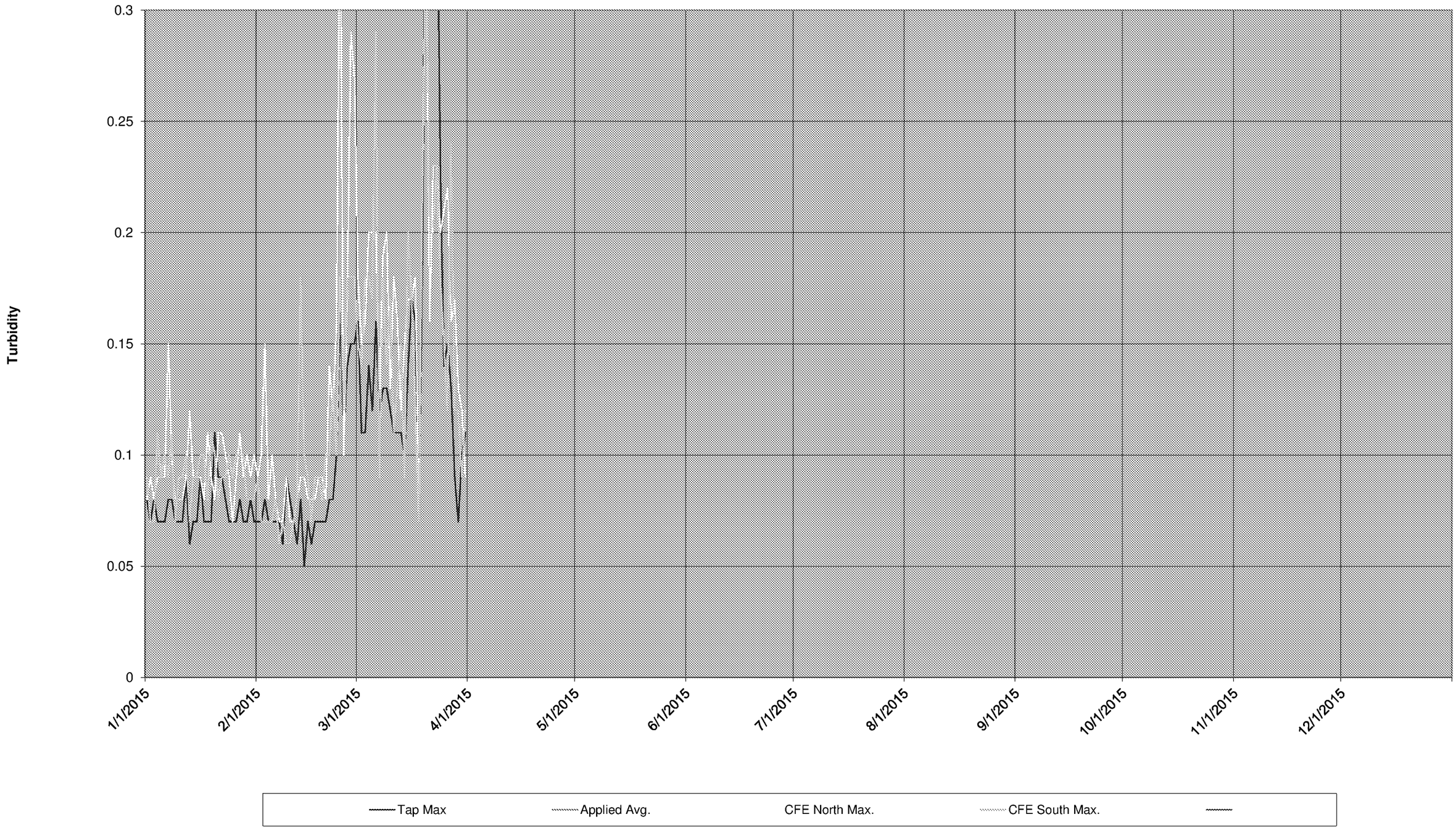

Flint WTP 2014 Finished Water Turbidity
Turbidity
0.3
0.25
0.2
0.15
0.1
0.05
0
1/1/2014
2/1/2014
3/1/2014
4/1/2014
5/1/2014
6/1/2014
7/1/2014
8/1/2014
9/1/2014
10/1/2014
11/1/2014
12/1/2014
Tap Max
Applied Avg.
CFE North Max.
CFE South Max.

Flint WTP 2015 Turbidity Comparison



—Raw Max. ---Settled Avg. Tap Max ·····Applied Avg. —CFE North Max. —CFE South Max. -----

Flint WTP 2015 Finished Water Turbidity



2014 Flint WTP Water Quality Data

Raw Water		Hardness (ppm)			Turbidity (NTU)			Color			Alkalinity (ppm)			Total Coliform (Cts/100 mL)			TOC			Nitrate (ppm)			Fluoride (ppm)			TTHM (ppb)			HAA5 (ppb)			pH			HPC		
2014	Days	Avg.	Max.	Min.	Avg.	Max.	Min.	Avg.	Max.	Min.	Avg.	Max.	Min.	Avg.	Max.	Min.	Avg.	Max.	Min.	Avg.	Max.	Min.	Avg.	Max.	Min.	Avg.	Max.	Min.	Avg.	Max.	Min.	Avg.	Max.	Min.	Avg.	Max.	Min.
January	31																																			
February	28																																			
March	31																																			
April	30																																			
May	31	254	286	232	12.3	71.7	3.5				207	216	184	2191	16328	126							0.15	0.16	0.14	NS	NS	NS	NS	NS	NS	8.27	8.44	8.05	9170	14760	16.1
June	30	268	280	252	4.55	39.4	1.9				223	232	216	3640	12262	62	9	9	9				0.16	0.18	0.14	NS	NS	NS	NS	NS	NS	8.1	8.34	7.88	4822	12460	960
July	31	249	273	227	8.41	49.5	4.9				205	226	182	9056	48329	1866	8.44	8.44	8.44				0.18	0.22	0.15	NS	NS	NS	NS	NS	NS	8.13	8.51	7.68	7255	14760	1180
August	31	235	248	221	6.23	19.3	4.7				194	200	185	5171	22398	1232	8.48	8.48	8.48				0.19	0.2	0.16	NS	NS	NS	NS	NS	NS	8.09	8.39	7.59	6831	14760	900
September	30	243	251	235	9.13	73.4	5.5				202	209	192	8097	31062	1918	7.36	7.36	7.36				0.19	0.24	0.16	NS	NS	NS	NS	NS	NS	8.13	8.41	7.78	4398	14760	1360
October	31	261	280	249	9.23	48.2	5.7				214	237	202	1979	15402	148	7.38	7.38	7.38				0.21	0.23	0.18	NS	NS	NS	NS	NS	NS	8.25	8.4	7.97	2914	14760	200
November	30	301	321	281	6.17	36.3	2.5				240	255	149	1502	19608	20	7.27	7.27	7.27				0.22	0.26	0.18	NS	NS	NS	NS	NS	NS	8.4	8.57	8.16	1467	5140	40
December	31	317	334	289	4.95	25.6	1.6				258	270	232				6.49	6.49	6.49				0.22	0.24	0.19	NS	NS	NS	NS	NS	NS	8.24	8.43	7.99	1670	14760	0
Annual		179	334	221	5.1	73.4	1.6	0.0	0	0	146	270	149	1039	1600	0	8.29	9	6.49	NS	NS	NS	0.13	0.26	0.14	NS	NS	NS	NS	NS	NS	5.50	8.57	7.59	4480.1	14760	0

Treated Water		Hardness (ppm)			Turbidity (NTU)			Color			Alkalinity (ppm)			Total Coliform (Cts/100 mL)			TOC			Nitrate (ppm)			Fluoride (ppm)			TTHM (ppb)			HAA5 (ppb)			pH			HPC		
2014		Avg.	Max.	Min.	Avg.	Max.	Min.	Avg.	Max.	Min.	Avg.	Max.	Min.	Avg.	Max.	Min.	Avg.	Max.	Min.	Avg.	Max.	Min.	Avg.	Max.	Min.	Avg.	Max.	Min.	Avg.	Max.	Min.	Avg.	Max.	Min.	Avg.	Max.	Min.
January																																				
February																																				
March																																				
April																																				
May		206	242	120	0.12	0.45	0.06				113	138	60	0	0	0							0.16	0.34	0.13	100.0	162	75	49.6	64	38	7.37	7.71	7.07	0	2	0
June		205	266	156	0.13	0.26	0.08				108	172	66	0	0	0	3.63	3.63	3.63	0.4	0.4	0.4	0.16	0.45	0.12							7.48	7.81	7	0	0	0
July		169	193	147	0.1	0.21	0.05				62	85	31	0	0	0	2.67	2.67	2.67				0.63	0.88	0.14							7.62	7.94	7.35	0	2	0
August		155	176	139	0.1	0.23	0.06				82	101	50	0	0	0	4.06	4.06	4.06				0.66	0.83	0.53	142.0	196	112	30.9	43	17	7.78	8.09	7.43	0	2	0
September		153	175	120	0.1	0.2	0.07				82	104	51	0	0	0	3.3	3.3	3.3				0.67	0.72	0.57							7.82	8.11	7.44	0	2	0
October		163	197	144	0.11	0.15	0.06				80	107	68	0	0	0	2.98	2.98	2.98	0	0	0	0.67	0.74	0.59							7.71	8.11	7.41	0	0	0
November		175	213	146	0.09	0.18	0.06				88	122	60	0	0	0	3.41	3.41	3.41				0.64	0.76	0.46	50.0	94	33	16.4	24	5	7.87	8.45	7.29	0	2	0
December		192	210	168	0.07	0.19	0.05				88	1115	60	0	0	0	2.59	2.59	2.59				0.66	0.77	0.58							8.07	8.49	7.41	1	4	0
Annual		119	266	120	0.07	0.45	0.05	0	0	0	59	1115	31	0	0	0	3.56	4.06	2.59		0.4	0	0.36	0.88	0.12	97.3	196	33	32.3	64	5	5.18	8.49	7	0.08	4	0

2015 Flint WTP Water Quality Data

Raw Water		Hardness (ppm)			Turbidity (NTU)			Color			Alkalinity (ppm)			Total Coliform (Cts/100 mL)			TOC			Nitrate (ppm)			Fluoride (ppm)			TTHM (ppb)			HAA5 (ppb)			pH			HPC		
2015	Days	Avg.	Max.	Min.	Avg.	Max.	Min.	Avg.	Max.	Min.	Avg.	Max.	Min.	Avg.	Max.	Min.	Avg.	Max.	Min.	Avg.	Max.	Min.	Avg.	Max.	Min.	Avg.	Max.	Min.	Avg.	Max.	Min.	Avg.	Max.	Min.	Avg.	Max.	Min.
January	31	324	344	311	5.17	19.4	2.7				258	272	245	820	2994	40	7.62	7.62	7.62				0.21	0.25	0.19	NS	NS	NS	NS	NS	NS	7.95	8.31	7.59	991	5980	60
February	28	352	366	339	3	22.5	2.1				280	295	228	141	365	41	5.95	5.95	5.95				0.23	0.24	0.21	NS	NS	NS	NS	NS	NS	7.95	8.11	7.75	114	183	62
March	31	290	366	211	8.7	47.2	2.4				233	297	171	8788	48392	98	7.22	7.22	7.22				0.2	0.26	0.14	NS	NS	NS	NS	NS	NS	7.98	8.27	7.55	3155	14760	43
April	30																									NS	NS	NS	NS	NS	NS						
May	31																									NS	NS	NS	NS	NS	NS						
June	30																									NS	NS	NS	NS	NS	NS						
July	31																									NS	NS	NS	NS	NS	NS						
August	31																									NS	NS	NS	NS	NS	NS						
September	30																									NS	NS	NS	NS	NS	NS						
October	31																									NS	NS	NS	NS	NS	NS						
November	30																									NS	NS	NS	NS	NS	NS						
December	31																									NS	NS	NS	NS	NS	NS						
Annual		79	366	211	1.4	47.2	2.1	0.0	0	0	63	297	171	1247	1600	0	1.72	7.62	5.95	NS	NS	NS	0.05	0.26	0.14	NS	NS	NS	NS	NS	NS	1.96	8.31	7.55	0.0	14760	43

Distribution

Treated Water		Hardness (ppm)			Turbidity (NTU)			Color			Alkalinity (ppm)			Total Coliform (Cts/100 mL)			TOC			Nitrate (ppm)			Fluoride (ppm)			TTHM (ppb)			HAA5 (ppb)			pH			HPC		
2015		Avg.	Max.	Min.	Avg.	Max.	Min.	Avg.	Max.	Min.	Avg.	Max.	Min.	Avg.	Max.	Min.	Avg.	Max.	Min.	Avg.	Max.	Min.	Avg.	Max.	Min.	Avg.	Max.	Min.	Avg.	Max.	Min.	Avg.	Max.	Min.	Avg.	Max.	Min.
January		189	218	165	0.07	0.15	0.06				73	98	44	0	0	0	3.21	3.21	3.21				0.47	0.7	0.19							7.74	8.24	7.31	2	38	0
February		197	244	168	0.08	0.36	0.05				76	127	47	0	0	0	2.07	2.07	2.07	1.3	1.3	1.3	0.57	0.64	0.48	20	29	15	8.1	9	2	7.84	8.69	7.54	0	0	0
March		208	243	151	0.13	0.42	0.07				104	135	58	0	0	0	2.97	2.97	2.97				0.57	0.66	0.48							7.89	9.9	7.3	0	0	0
April																																					
May																																					
June																																					
July																																					
August																																					
September																																					
October																																					
November																																					
December																																					
Annual		49	244	151	0.02	0.42	0.05	0	0	0	21	135	44	0	0	0	0.68	3.21	2.07	0	1.3	1.3	0.13	0.7	0.19	#DIV/0!	29	15	#DIV/0!	9	2	1.93	9.9	7.3	0.17	38	0

Chlorine Applied

	2014				2015				2016				2017				2018				2019				2020				2021				2022				2023				2024			
	Inter		Post		Inter		Post		Inter		Post		Inter		Post		Inter		Post		Pre		Inter		Pre		Inter		Pre		Inter		Pre		Inter		Pre		Inter		Pre		Inter	
	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max
Jan					1.8	2.1	3	3.5																																		
Feb					2.1	2.3	2.6	3.1																																		
March					2.4	2.9	3.1	4.9																																		
April																																								
May	5	6.9	0.4	1.4																																				
June	4.7	5.5	2.9	4																																				
July	3.9	5.3	3.8	5.2																																				
August	3.3	4.1	3.5	4.4																																				
Sept	3.1	3.9	3.9	4.8																																				
Oct	2.5	2.9	3.8	4.5																																				
Nov	2	2.5	3.4	4.2																																				
Dec	1.9	2.1	2.9	3.8																																				
AVG.	3.30		3.08		2.10		2.90		#DIV/0!		#DIV/0!		#DIV/0!		#DIV/0!		#DIV/0!		#DIV/0!		#####		#DIV/0!		#####		#DIV/0!		#####		#DIV/0!		#####		######		#####		#DIV/0!	
MAX.		6.9		5.2		2.9		4.9		0		0		0		0		0		0		0		0.00		0		0		0		0		0		0		0		0		0

OVERALL AVG.	Pre*	Inter	6/2005 - 2011 Avg.	Pre	Inter
	#DIV/0!	#DIV/0!		0	#DIV/0!

* When in use

MINIMUM RESIDUAL

	2014				2015				2016				2017				2018				2019				2020				2021				2022				2023				2024			
	Applied	Filtered	Finished	Tap Min	Applied	Filtered	Finished	Tap Min	Applied	Filtered	Finished	Tap Min	Applied	Filtered	Finished	Tap Min	Applied	Filtered	Finished	Tap Min	Applied	Filtered	Finished	Tap Min	Applied	Filtered	Finished	Tap Min	Applied	Filtered	Finished	Tap Min	Applied	Filtered	Finished	Tap Min	Applied	Filtered	Finished	Tap Min	Applied	Filtered	Finished	Tap Min
Jan						0.4	2.3	1.5																																		
Feb						0.3	1.7	1.3																																		
March						0.3	1.7	1.3																																		
April																																									
May		1.2	1.4	1.2																																				
June		0.3	1.4	1.2																																				
July		0.2	1.3	1.3																																				
August		0.2	1.9	0.8																																				
Sept		0.2	1.9	1.2																																				
Oct		0.5	2.6	1.9																																				
Nov		0.2	2.4	1.8																																				
Dec		0.4	2.2	1.7																																				
MINIMUM	0.00	0.20	1.30	0.80	0.00	0.30	1.70	1.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

CHEMICAL STORAGE (MIN. DAYS)

CHLORINE

	2014	2015	2003	2004	2005	2006	2007	2008	2009	2010	2011
Jan		18									
Feb		8									
March		19									
April											
May	20										
June	20										
July	16										
August	10										
Sept	15										
Oct	25										
Nov	15										
Dec	30										

MINIMUM	10	8	0	0	0	0	0	0	0	0	0

FERRIC CHLORIDE

	2014	2015	2003	2004	2005	2006	2007	2008	2009	2010	2011
Jan		10									
Feb		3									
March		9									
April											
May	14										
June	10										
July	23										
August	23										
Sept	27										
Oct	16										
Nov	22										
Dec	18										

MINIMUM	10	3	0	0	0	0	0	0	0	0	0

Flint 2015 Sanitary Survey Filter Data

Maximum Filtration Rate Experienced (gpm/ft^2)

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Overall Monthly Avg.
January		3.6										3.60
February		3.3										3.30
March		3.3										3.30
April												#DIV/0!
May	3.8											3.80
June	3.5											3.50
July	3.8											3.80
August	3.3											3.30
September	3.4											3.40
October	3.3											3.30
November	3.2											3.20
December	3.2											3.20
Maximum	3.8	3.60	0	0	0	0	0	0	0	0	0	

OVERALL MAX.	**3.8**
	3.80
	0.00

Average Filtration Rate (gpm/ft^2)

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Overall Monthly Avg.
January		2.1										2.10
February		2.4										2.40
March		2.3										2.30
April												#DIV/0!
May	2.6											2.60
June	2.5											2.50
July	2.3											2.30
August	2.2											2.20
September	2.1											2.10
October	1.9											1.90
November	2.1											2.10
December	2.4											2.40
Average	1.52	0.56	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

OVERALL AVG.	**0.19**
	0.42
	0.00

Average Filter Run (Hours)

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Overall Monthly Avg.
January		76										76.00
February		86										86.00
March		96										96.00
April												#DIV/0!
May	101											101.00
June	74											74.00
July	65											65.00
August	78											78.00
September	97											97.00
October	84											84.00
November	76											76.00
December	74											74.00
Maximum	101	96	0	0	0	0	0	0	0	0	0	
Minimum	65	76	0	0	0	0	0	0	0	0	0	
Average	54.44	21.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

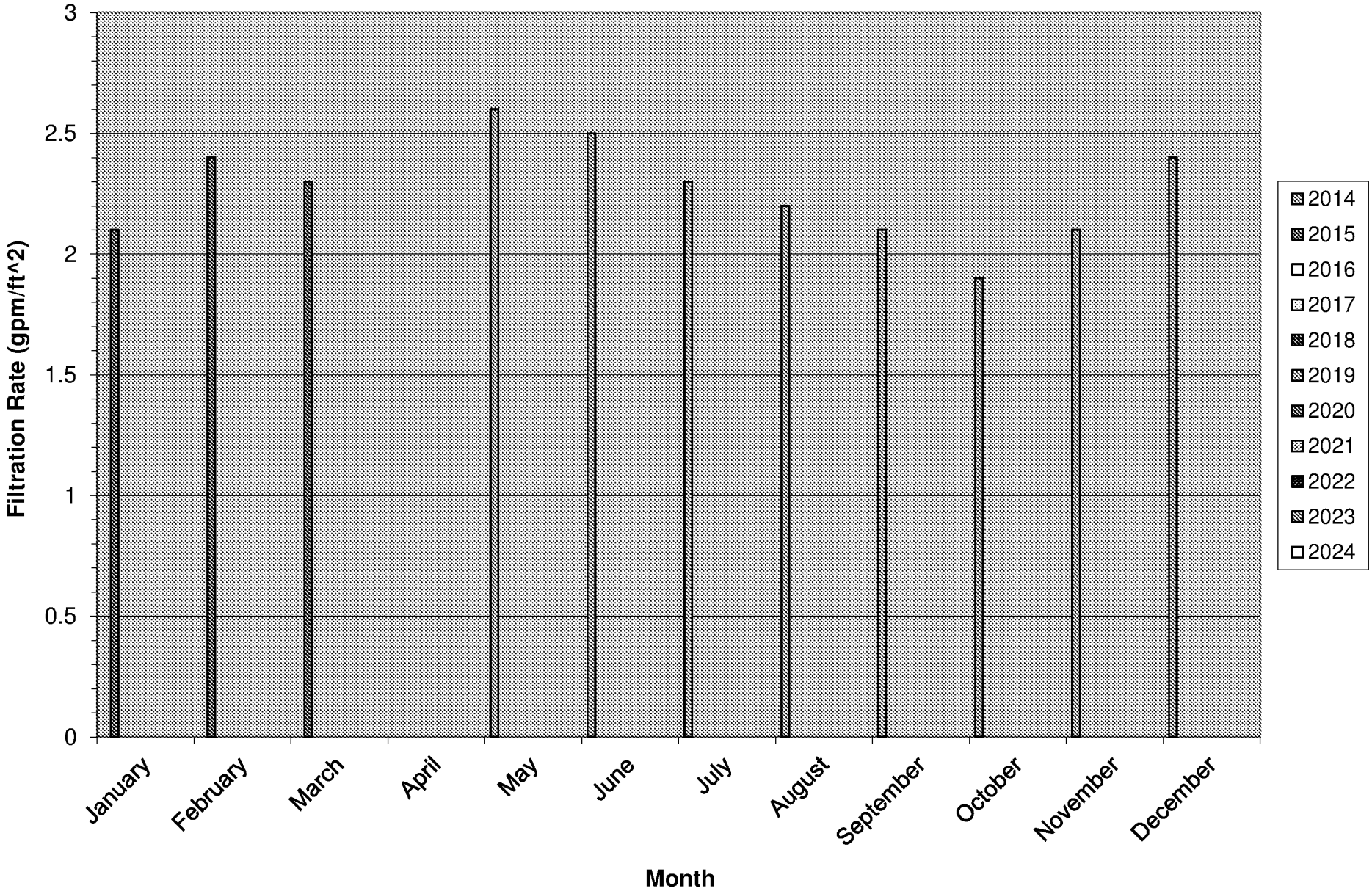
OVERALL AVG.	**6.88**	**0.00**	**15.13**
OVERALL MAX.	**101**	**0**	**101**
OVERALL MIN.	**0**	**0**	**0**

Average Percentage Wash Water Use

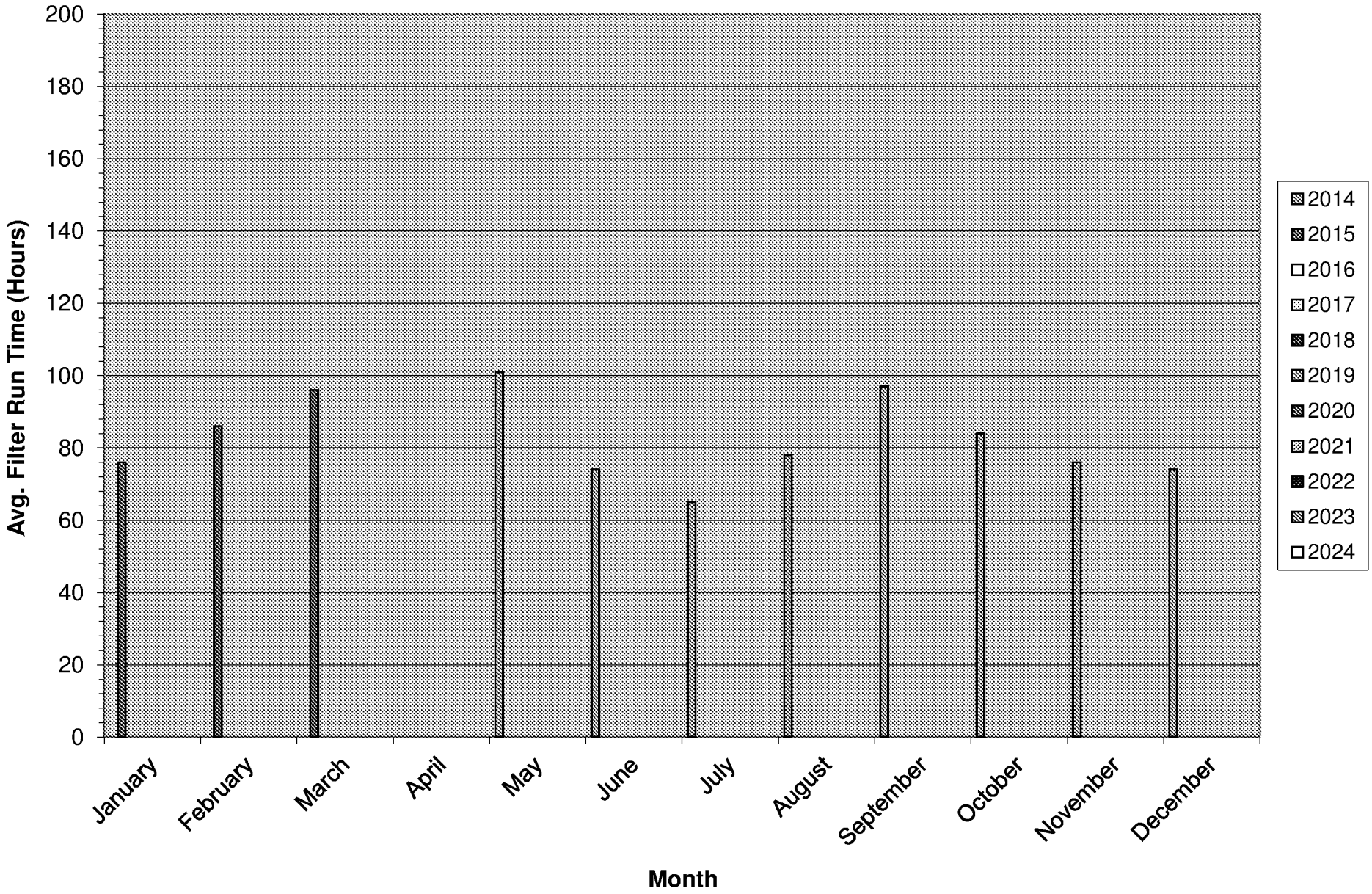
	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Overall Monthly Avg.
January		3.20%										3.20%
February		2.40%										2.40%
March		1.30%										1.30%
April												#DIV/0!
May	2.00%											2.00%
June	3.60%											3.60%
July	2.50%											2.50%
August	2.80%											2.80%
September	1.90%											1.90%
October	2.70%											2.70%
November	3.20%											3.20%
December	2.90%											2.90%
Average	1.81%	0.57%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	

OVERALL AVG.	**0.22%**
	0.48%
	0.00%

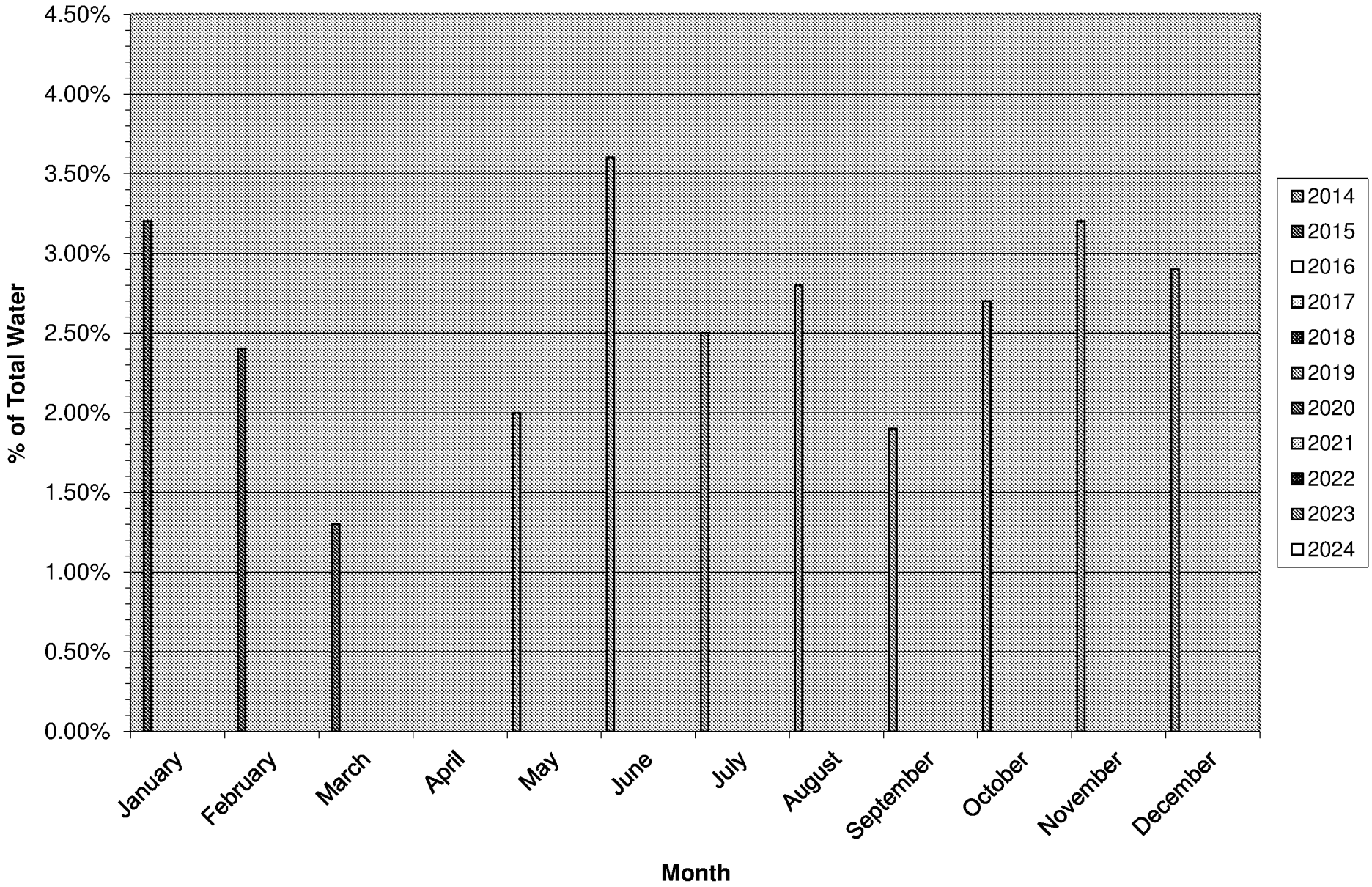
Average Filtration Rate Monthly Comparison



Average Filter Run Hours Monthly Comparison



Average Washwater Use Monthly Comparison



From: Yoder, Jonathan S. (CDC/OID/NCEZID) <jey9@cdc.gov>
Sent: Friday, May 01, 2015 11:00 AM
To: Cupal, Suzanne;Garrison, Laurel (CDC/OID/NCIRD);Bohm, Susan (DCH);Fiedler, Jay (DCH)
Cc: Johnson, Shannon (DCH);Henry, James;Hasan, Shurooq;Childs, Bonnie;Valacak, Mark;Collins, Jim (DCH);Langley, Gayle E. (CDC/OID/NCIRD);Tyndall Snow, Leigh (DCH);Weinberg, Meghan (DCH);Fialkowski, Veronica (DCH);Carpenter, Joe (CDC/OID/NCEZID);Gargano, Julia Marie W. (CDC/OID/NCEZID);Fullerton, Katie (CDC/OID/NCEZID)
Subject: water complaint resources
Attachments: CDC 2007 Vermont Chloramines investigation Epi2.pdf; Ewence 2011 Review of skin irritation and tap water quality UK Drinking Water.pdf; SF Water 2013 Chloramines and skin irritation.pdf; Weintraub 2006 Hetergeneous dermatitis complaints after change in DW treatment Env Hlth.pdf

Hi Suzanne

Thank you for the information on Legionella.

For the non-legionella water issues, here are some documents that might assist with thinking about complaints related to drinking water. The 2007 investigation in Vermont has some questions designed to assess health effects such as dermatitis that might be helpful. However that investigation was very difficult, partly because some members of the community and outside groups attempted to influence the results of the investigation. If you want to discuss that investigation further, I can contact the staff who participated for their feedback.
If you want to pursue these other complaints, it would be good to gather standard information on each complaint and categorize by syndrome, time, location, etc. You might already being doing this. We previously discussed syndromic surveillance; I am glad to discuss that further if you are interested. We don't have experience doing that type of analysis in this situation but there might be others who do.

Regards
Jonathan

From: Cupal, Suzanne [mailto:scupal@gchd.us]
Sent: Friday, May 01, 2015 8:40 AM
To: Garrison, Laurel (CDC/OID/NCIRD); Bohm, Susan (CDC michigan.gov); Fiedler, Jay (CDC michigan.gov)
Cc: Johnson, Shannon (DCH); Henry, James; Hasan, Shurooq; Childs, Bonnie; Valacak, Mark; Yoder, Jonathan S. (CDC/OID/NCEZID); Collins, Jim (CDC michigan.gov); Langley, Gayle E. (CDC/OID/NCIRD); Tyndall Snow, Leigh (DCH); Meghan Weinberg (CDC michigan.gov); Fialkowski, Veronica (DCH)
Subject: RE: Follow-up Information

Attached is additional information Shurooq prepared yesterday to supplement our conversation information. It includes the number of confirmed Legionella cases in Genesee County *by calendar year.* To clarify, the number we quoted for 2013 yesterday reflects our fiscal year which is October 2012-2013 and included confirmed and suspect cases.

Suzanne Cupal, M.P.H.
Public Health Supervisor
Genesee County Health Department
630 S. Saginaw Street
Suite 4
Flint, MI 48502
(810) 768-7970
scupal@gchd.us

From: Garrison, Laurel (CDC/OID/NCIRD) [mailto:lee5@cdc.gov]
Sent: Wednesday, April 29, 2015 9:09 PM
To: Bohm, Susan (CDC michigan.gov); Cupal, Suzanne; Fiedler, Jay (CDC michigan.gov)
Cc: Johnson, Shannon (DCH); Henry, James; Hasan, Shurooq; Childs, Bonnie; Valacak, Mark; Yoder, Jonathan S. (CDC/OID/NCEZID); Collins, Jim (CDC michigan.gov); Langley, Gayle E. (CDC/OID/NCIRD); Tyndall Snow, Leigh (DCH); Meghan Weinberg (CDC michigan.gov); Fialkowski, Veronica (DCH)
Subject: RE: CDC-GCHD Call, 9:00am Apr 30th

Thank you Susan and everyone for your work on this and for sharing your findings thus far. I will forward this to the rest of the group here, and we'll talk to you tomorrow at 9.
Laurel

From: Bohm, Susan (CDC michigan.gov)
Sent: Wednesday, April 29, 2015 5:28 PM
To: Garrison, Laurel (CDC/OID/NCIRD); Cupal, Suzanne; Fiedler, Jay (CDC michigan.gov)
Cc: Johnson, Shannon (DCH); Henry, James; Hasan, Shurooq; Childs, Bonnie; Valacak, Mark; Yoder, Jonathan S. (CDC/OID/NCEZID); Collins, Jim (CDC michigan.gov); Langley, Gayle E. (CDC/OID/NCIRD); Tyndall Snow, Leigh (DCH); Meghan Weinberg (CDC michigan.gov); Fialkowski, Veronica (DCH)
Subject: RE: CDC-GCHD Call, 9:00am Apr 30th

Hello,

Attached please find the survey data of cases interviewed by MDHHS and Genesee Co HD so far (EpiInfo analysis) and updated info on the investigation (MDHHS Prelim Stats). We've included an agenda to help guide tomorrow morning's call.

Call Agenda

Summarizing the Investigation/Epidemiology

- Preliminary Statistics — MDHHS (Shannon & Susan)
- Interview Data — MDHHS (Lily & Meghan)
  - EPI Info Analysis
- EPI Curve — GCHD
- Discussion of Current Investigation — All

Environmental Investigation

- Environmental Sampling Protocol — CDC

- Discussion All

Additional Recommendations

- Additional Recommendations CDC/All

Till tomorrow then,

Susan Bohm, MS
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From: Garrison, Laurel (CDC/OID/NCIRD) [mailto:lee5@cdc.gov]
Sent: Wednesday, April 29, 2015 1:58 PM
To: Cupal, Suzanne; Fiedler, Jay (DCH)
Cc: Bohm, Susan (DCH); Johnson, Shannon (DCH); Henry, James; Hasan, Shurooq; Childs, Bonnie; Valacak, Mark; Yoder, Jonathan S. (CDC/OID/NCEZID); Collins, Jim (DCH); Langley, Gayle E. (CDC/OID/NCIRD)
Subject: RE: CDC-GCHD Call

Thanks, Suzanne. In just looking at this quickly, I'm wondering if you can you break down the epi curve in the following ways:
--Color code the cases with exposure to McLaren during their incubation periods
--Color code by some kind of indicator of exposure to Flint water (maybe Q.3?).
You've probably already looked at this in several different ways, and I think there are other ways to look at it as well, but perhaps that might help us. Thanks!

From: Cupal, Suzanne [mailto:scupal@gchd.us]
Sent: Wednesday, April 29, 2015 1:29 PM
To: Garrison, Laurel (CDC/OID/NCIRD); Fiedler, Jay (CDC michigan.gov)
Cc: Bohm, Susan (CDC michigan.gov); Johnson, Shannon (DCH); Henry, James; Hasan, Shurooq; Childs, Bonnie; Valacak, Mark; Yoder, Jonathan S. (CDC/OID/NCEZID); Collins, Jim (CDC michigan.gov); Langley, Gayle E. (CDC/OID/NCIRD)
Subject: RE: CDC-GCHD Call

I just forwarded information. Please let us know if there is anything else we can share.

Suzanne Cupal, M.P.H.
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Flint, MI 48502
(810) 768-7970
scupal@gchd.us

From: Garrison, Laurel (CDC/OID/NCIRD) [mailto:lee5@cdc.gov]
Sent: Wednesday, April 29, 2015 1:18 PM
To: Fiedler, Jay (CDC michigan.gov); Cupal, Suzanne
Cc: Bohm, Susan (CDC michigan.gov); Johnson, Shannon (DCH); Henry, James; Hasan, Shurooq; Childs, Bonnie; Valacak, Mark; Yoder, Jonathan S. (CDC/OID/NCEZID); Collins, Jim (CDC michigan.gov); Langley, Gayle E. (CDC/OID/NCIRD)
Subject: RE: CDC-GCHD Call

Hi all,
Just checking in to see whether you expect to send any epi data to help guide the discussion tomorrow. If we could review it prior to the call I think that would help facilitate the call and ensure we make the most of our time.
Thanks!
Laurel

From: Garrison, Laurel (CDC/OID/NCIRD)
Sent: Tuesday, April 28, 2015 12:18 PM
To: Fiedler, Jay (CDC michigan.gov); 'Cupal, Suzanne'
Cc: Bohm, Susan (CDC michigan.gov); Johnson, Shannon (DCH); Henry, James; Hasan, Shurooq; Childs, Bonnie; Valacak, Mark; Yoder, Jonathan S. (CDC/OID/NCEZID); Collins, Jim (CDC michigan.gov); Langley, Gayle E. (CDC/OID/NCIRD)
Subject: RE: CDC-GCHD Call

OK let's go ahead and plan for a call 9:00 AM on Thursday. I'm attaching our new document CDC Sampling Procedure and Potential Sampling Sites (it's not available on the website yet). Please review prior to the call and we will answer any questions then.
We can use our conference line:
Tel: PPI
Code: PPI

From: Fiedler, Jay (CDC michigan.gov)
Sent: Tuesday, April 28, 2015 11:50 AM
To: Garrison, Laurel (CDC/OID/NCIRD); 'Cupal, Suzanne'
Cc: Bohm, Susan (CDC michigan.gov); Johnson, Shannon (DCH); Henry, James; Hasan, Shurooq; Childs, Bonnie; Valacak, Mark; Yoder, Jonathan S. (CDC/OID/NCEZID); Collins, Jim (CDC michigan.gov)
Subject: RE: CDC-GCHD Call

Hello,

Yes, 9:00 or 9:30 on Thursday works for us. Let us know the final details when they're decided.

Of the topics mentioned below, at this point in time it would be best to focus on:

- the current investigation,
- CDC walk-through of the environmental sampling protocol,
- and a discussion of any additional recommendations.

It's very likely that these topics will fill our allotted time. There's no need to discuss the clinical specimen collection and guidance that has already been provided to GCHD and sent to local providers. The syndromic surveillance data project

would be better handled at the local/state level and should not take away from the ongoing epi investigation that we're currently assisting GCHD with.

Thanks, and we look forward to hearing from you. --Jay

Jay Fiedler, MS
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From: Garrison, Laurel (CDC/OID/NCIRD) [mailto:lee5@cdc.gov]
Sent: Tuesday, April 28, 2015 8:00 AM
To: 'Cupal, Suzanne'; Fiedler, Jay (DCH)
Cc: Bohm, Susan (DCH); Johnson, Shannon (DCH); Henry, James; Hasan, Shurooq; Childs, Bonnie; Valacak, Mark; Yoder, Jonathan S. (CDC/OID/NCEZID)
Subject: RE: CDC-GCHD Call

Great! I think we have a better chance in getting good participation if we schedule early, say 9 or 9:30? We'd like to have the state on the call as well, so let us know if that works.

From: Cupal, Suzanne [mailto:scupal@gchd.us]
Sent: Tuesday, April 28, 2015 7:54 AM
To: Garrison, Laurel (CDC/OID/NCIRD); Fiedler, Jay (CDC michigan.gov)
Cc: Bohm, Susan (CDC michigan.gov); Johnson, Shannon (DCH); Henry, James; Hasan, Shurooq; Childs, Bonnie; Valacak, Mark; Yoder, Jonathan S. (CDC/OID/NCEZID)
Subject: RE: CDC-GCHD Call

Thursday morning works for us.

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(810) 768-7970
scupal@gchd.us

From: Garrison, Laurel (CDC/OID/NCIRD) [mailto:lee5@cdc.gov]
Sent: Tuesday, April 28, 2015 7:29 AM
To: Cupal, Suzanne; Fiedler, Jay (CDC michigan.gov)
Cc: Bohm, Susan (CDC michigan.gov); Johnson, Shannon (DCH); Henry, James; Hasan, Shurooq; Childs, Bonnie; Valacak, Mark; Yoder, Jonathan S. (CDC/OID/NCEZID)
Subject: RE: CDC-GCHD Call

Hi Suzanne,
Yes, let's try to schedule something for this week. Would Thursday morning work for everyone?
Yes, it would be helpful to be able to review your epi curve, questionnaire results, etc. prior to the call.
Thanks,
Laurel

From: Cupal, Suzanne [mailto:scupal@gchd.us]
Sent: Monday, April 27, 2015 3:54 PM
To: Garrison, Laurel (CDC/OID/NCIRD); Fiedler, Jay (CDC michigan.gov)
Cc: Bohm, Susan (CDC michigan.gov); Johnson, Shannon (DCH); Henry, James; Hasan, Shurooq; Childs, Bonnie; Valacak, Mark; Yoder, Jonathan S. (CDC/OID/NCEZID)
Subject: RE: CDC-GCHD Call

We were trying to coordinate schedules for Thursday (4/30) or Friday (5/1) of this week. Please let us know if we could schedule a meeting either of those days.

We have two major events next week: Our Public Health Conference 5/5/15 and the Speak To Your Health! Community Survey Data Roll-Out 5/7/15.

Jay had asked what the agenda would look like. Our suggestion would be:
A Review of the current investigation (Statistics, Questionnaire Responses, Issues Addressed, Current Concerns)
Discussion of clinical sample protocols
Discussion of environmental sampling protocols
Submission of the samples to CDC
Syndromic Surveillance Project
Suggestions for Additional Assistance .

Thank you.

Suzanne

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From: Garrison, Laurel (CDC/OID/NCIRD) [mailto:lee5@cdc.gov]
Sent: Monday, April 27, 2015 3:38 PM
To: Fiedler, Jay (CDC michigan.gov); Cupal, Suzanne
Cc: Bohm, Susan (CDC michigan.gov); Johnson, Shannon (DCH); Henry, James; Hasan, Shurooq; Childs, Bonnie; Valacak, Mark; Yoder, Jonathan S. (CDC/OID/NCEZID)
Subject: RE: CDC-GCHD Call

Hi Suzanne,

I met with colleagues and leadership at CDC, and we are very concerned about this Legionnaires' disease outbreak. It's very large, one of the largest we know of in the past decade, and community-wide, and in our opinion and experience it needs a comprehensive investigation. I know you all have been working on this for quite a while, but we are unclear

about which steps have been taken and what is currently known, and we feel a sense of urgency. Is it possible to meet before May 8th? It's difficult to give advice when we don't have all the information, but we are eager to help. You may have already taken several of these steps, but we recommend a full investigation including the following steps:

--Generate an epi curve, map the cases, interview all cases with a hypothesis-generating questionnaire, analyze results from questionnaire (I believe this has been done, and, if so, it would be helpful to review these results with you.)
--Based on these results, determine whether we can either rule out any sources or start investigating any sources. (I believe you have started this…for example you mentioned that some cases were possibly healthcare-associated.)
--Full environmental investigation of any potential sources (We can provide information on how to collect samples, etc. if needed.)
--If the source(s) is found, provide remediation recommendations to stop the outbreak.

I know you've run into issues getting information you've requested from the city water authority and the MI Dept of Environmental Quality. Again, not knowing the full extent of your investigation it's difficult to make recommendations, and it may be difficult for us to provide the kind of detailed input needed for such an extensive outbreak from afar. If you and others at the state feel you would benefit from more intensive assistance with continuing the investigation for any reason, please let us know and we can discuss providing field assistance in the form of an Epi-Aid.

Best regards,
Laurel

Laurel Garrison, MPH
Legionellosis Surveillance & Outbreak Response
NCIRD/DBD/Respiratory Diseases Branch
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From: Fiedler, Jay (CDC michigan.gov)
Sent: Monday, April 27, 2015 2:00 PM
To: Cupal, Suzanne; Garrison, Laurel (CDC/OID/NCIRD)
Cc: Kutty, Preeta (CDC/OID/NCIRD); Bohm, Susan (CDC michigan.gov); Johnson, Shannon (DCH); Henry, James; Hasan, Shurooq; Childs, Bonnie; Valacak, Mark; Bohm, Susan (CDC michigan.gov)
Subject: RE: CDC-GCHD Call

Hello Suzanne,

Looking at our schedules, we have limited availability of our core staff here at DHHS on Friday May 8th. In order to help prioritize or to determine if we should look for an alternate meeting time, can we get an idea of what the agenda will be for this call?

Thanks. -Jay

Jay Fiedler, MS
Section Manager

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From: Cupal, Suzanne [mailto:scupal@gchd.us]
Sent: Monday, April 27, 2015 11:50 AM
To: Garrison, Laurel (CDC/OID/NCIRD)
Cc: Kutty, Preeta (CDC/OID/NCIRD); Bohm, Susan (DCH); Johnson, Shannon (DCH); Henry, James; Hasan, Shurooq; Childs, Bonnie; Valacak, Mark
Subject: RE: CDC-GCHD Call

Our team is available on Friday, May 8th at 11am if that would work for you and our state colleagues.

Thank you for your assistance.

Suzanne

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From: Garrison, Laurel (CDC/OID/NCIRD) [mailto:lee5@cdc.gov]
Sent: Thursday, April 23, 2015 3:03 PM
To: Cupal, Suzanne
Cc: Kutty, Preeta (CDC/OID/NCIRD); Bohm, Susan (CDC michigan.gov); Johnson, Shannon (DCH); Henry, James; Hasan, Shurooq; Childs, Bonnie; Valacak, Mark
Subject: Re: CDC-GCHD Call

Hi Suzanne et al.,
If you are interested in discussing the Legionella action items in more detail, please let me know your availability for a conference call involving the county, state, and RDB.
Best regards,
Laurel

Laurel Garrison, MPH
Legionellosis Surveillance & Outbreak Response
NCIRD/DBD/Respiratory Diseases Branch
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Atlanta, GA 30333
404.639.3424
Lee5@cdc.gov

From: Yoder, Jonathan S. (CDC/OID/NCEZID)
Sent: Thursday, April 23, 2015 1:48 PM
To: Cupal, Suzanne; Garrison, Laurel (CDC/OID/NCIRD)
Cc: Gargano, Julia Marie W. (CDC/OID/NCEZID); Fullerton, Katie (CDC/OID/NCEZID); Kutty, Preeta (CDC/OID/NCIRD); Carpenter, Joe (CDC/OID/NCEZID); Roberts, Virginia (CDC/OID/NCEZID); Bohm, Susan (CDC michigan.gov); Johnson, Shannon (DCH); Henry, James; Hasan, Shurooq; Childs, Bonnie; Valacak, Mark
Subject: Re: CDC-GCHD Call

Hi Suzanne
It was good to speak to you yesterday. I am copying Laurel on this email as the contact for the legionella program. She will coordinate with the state to make sure you have the protocols.
We are glad to assist.

Jonathan

Sent from my iPhone

On Apr 23, 2015, at 10:03 AM, "Cupal, Suzanne" <scupal@gchd.us> wrote:

> Jonathan-
>
> Thank you and your team for the opportunity to speak yesterday. We appreciate your comments about a measured response. We recognize we do not have the data we need for further action. We were grateful for the opportunity to share with you and our state colleagues our concerns based on the information we do have. We are doing everything we can to mitigate risk to our residents.
>
> We look forward to receiving the sampling protocols and advice related to syndromic surveillance. Our concerns have now been communicated which opens the door to further communication as events unfold.
>
> We are dealing with complex and confounding information. We appreciate your assistance in gathering the facts. We want to be prepared to protect the health and safety of our residents and provide appropriate information.
>
> Thank you again.
>
> Your Genesee County Colleagues

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DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service
Centers for Disease Control
and Prevention (CDC)

Date: January 16, 2008

From: Leslie Hausman, RN, MPH, EIS Officer, Health Studies Branch (HSB)
Division of Environmental Hazards and Health Effects (EHHE)
National Center for Environmental Health (NCEH)
Lorraine Backer, PhD, Team Lead, HSB, EHHE, NCEH

Subject: Epi-Aid Trip Report: An assessment of health concerns in a community exposed to chloramine treated tap water in Vermont, 2006–2007 (Epi-2007-054).

To: Douglas H. Hamilton, MD, PhD, Director, Epidemic Intelligence Service,
Division of Applied Public Health Training, EPO (D18)

Through: Michael A. McGeehin, PhD, MSPH, Director, EHHE, NCEH
James Lando, MD, MPH, Chief, HSB, EHHE, NCEH
Amy Wolkin, MSPH, Epidemiologist, HSB, EHHE, NCEH

INTRODUCTION

The U.S. Environmental Protection Agency (EPA) requires all public water supplies (PWSs) using surface water to disinfect the water provided to their customers. In addition, all PWSs are required to maintain a residual disinfectant throughout the water distribution system to control bacterial re-growth. PWSs have several options for methods to disinfect drinking water, including filtration or chemical disinfection with chlorine or chloramine. Because chloramine produces fewer of the drinking water disinfection by-products that are currently regulated by the EPA, using chloramine as a secondary disinfectant is becoming more common. Chloramine is produced by combining chlorine and ammonia in water and, under the usual conditions of water and wastewater chlorination, monochloramine is the principal end product and disinfectant. Chloramine has been approved for use by the EPA; however, data gaps remain about the potential health effects of using chloramine for large scale water disinfection.

Chloramine has been used since before World War II for drinking water treatment. Its most frequent current use is as a residual disinfectant; its use allows systems to maintain the required detectable residual throughout the distribution system while simultaneously controlling regulated disinfection byproducts (total trihalomethanes (TTHM) and five haloacetic acids (HAA5)). There is also evidence that chloramine may control biofilm in the distribution system more effectively than other residual disinfectants (see EPA's website for information about chloramine disinfection of drinking water: http://www.epa.gov/safewater/disinfection/chloramine/index.html).

BACKGROUND

On April 10, 2006, Vermont's Champlain Water District (CWD) changed its drinking water treatment process to use chloramine rather than chlorine as the secondary disinfectant. CWD's use of chloramine is consistent with use in systems across the

country. This change affected Chittenden County (12 municipal systems that serve approximately 68,000 people). Between April 2006 and May 2007, the Vermont Department of Health Agency of Human Services and the Champlain Water District received approximately 74 calls from community members reporting a wide range of health symptoms, including upper respiratory symptoms, complaints of watery eyes and nose, scratchy throat, gastrointestinal ailments, skin rashes, and "itchy skin." The Division of Environmental Hazards and Health Effects (EHHE) of the National Center for Environmental Health (NCEH) was asked to investigate community concerns regarding exposure to chloramine treated tap water.

METHODS

On September 25, 2007 a seven person team from CDC and the EPA arrived in Burlington, Vermont. The team from CDC consisted of two Epidemic Intelligence Service Officers, a Senior Epidemiologist, and a Medical Student. The team from the EPA consisted of the Associate Director of Drinking Water from EPA's Region 1 in Boston, MA; and a Water Engineer, and an Environmental Science and Policy Specialist from the Office of Water/Ground Water and Drinking Water Standards and Risk Management Division in Washington, DC. The objective of the trip was to gather information to better understand community concerns about symptoms believed to be associated with exposure to tap water disinfected with chloramine.

Tuesday afternoon, 9/25, the CDC team met with the Vermont Department of Health and reviewed a questionnaire prepared by CDC to characterize symptoms which people reported to be associated with chloramine exposure.

On Wednesday 9/26, there was a full day of meetings that allowed an organized venue for various groups to express their concerns about chloramine exposure. Our meetings started with the Commissioner of Health, Commissioner of Environmental Conservation, and Health Department staff. We then met with the Champlain Water District senior staff and engineers, and then the State's Senator and local Representatives. In the afternoon on Wednesday, we met with advocacy groups: People Concerned about Chloramine (PCAC) and Vermonters for a Clean Environment. On Thursday morning 9/27, we toured the water treatment plant to view their drinking water treatment process. Home visits and telephone interviews were conducted from Wednesday afternoon through Friday afternoon. We returned to Atlanta on Friday evening, 9/28.

The media requested permission to attend all of the meetings scheduled for Wednesday. They were provided the opportunity to interview representatives from each group involved in the meetings and to record the meeting with the advocacy groups.

Group	Stated Objective for Participation in Meeting
People Concerned about Chloramine	To have chloramine removed from drinking water
Vermonters for a Clean Environment	To have chloramine removed from drinking water
State Legislators	Wanted to understand all issues
Champlain Water District	Explain their water treatment process, changes in the process, and their concerns

HOME VISITS AND TELEPHONE INTERVIEWS

Participant inclusion criteria

Eligible participants included all individuals residing in Chittenden County, Vermont, who had contacted the Champlain Water District or were identified in local media since April 10, 2006 and reported health effects they believed were associated with exposure to tap water.

Questionnaire

A questionnaire was prepared which focused on respondents' health, health of their families, and tap water usage (Appendix A). We interviewed 50 individuals either by telephone or during a home visit. A water engineer was part of each team visiting homes, and they examined point-of-entry and/or point-of-use water filtration systems in the residences.

Statistical Analysis

We entered and analyzed data in EPI Info 3.3.2. Descriptive statistics are presented.

Quality Control of data collection

Self-reported symptoms

This investigation was subject to biases as discussed below and any data analyses should be interpreted with caution. The respondents to this questionnaire were a convenience sample and were not examined by a medical care provider to verify the symptoms they reported.

Local influence

It was reported to field investigators, that the local chapter of People Concerned about Chloramine (PCAC) had implemented a mass media campaign prior to our arrival. This campaign distributed approximately 10,000 flyers by going door to door and approaching individuals "on the street" and in grocery stores. One report stated an individual with visible skin problems was approached by a member of PCAC in the grocery store and was told the source of their skin problem was the chloramine in the tap water. PCAC has also utilized the local press and public radio spots to mobilize an anti-chloramine campaign. This campaign started prior to April 2006 and continues today. PCAC's flyers and internet website have identified symptoms they claim are associated with the change in water disinfection, including furry tongues, gastrointestinal upset, dermatitis, and respiratory ailments.

Field investigators observed PCAC members coaching survey respondents (many of whom are PCAC members) prior to the meeting on Wednesday. In one case, a PCAC

member was present during the home visit and prompted the respondent to provide specific answers to our questions.

Based on these influences and biases these results can not be interpreted as representing the rates of symptoms, health conditions, or complaints of the overall community.

RESULTS

All interviews were conducted between September 26 and October 10, 2007. At first 74 individuals were contacted by the health department and asked if they would participate in the questionnaire and or home visit. Of those 74 individuals 49 were interviewed. At the request of PCAC the deadline for interviews was extended. This extension allowed PCAC time to contact their membership, requesting their participation in the questionnaire and provided the Vermont Department of Health the opportunity to continue interviewing individuals who wanted to participate in the questionnaire. One person contacted the health department following the extension of the deadline. Of the 50 individuals interviewed, 46 met the inclusion criteria described above. Of the four excluded: three stated their symptoms were not caused by the water and one individual had no symptoms but called because they were concerned. The 46 individuals interviewed represented 36 households. The median age of participants was 55 years (range: 2-88 years) and 29 (63%) were female. Our questionnaire inquired about 11 symptoms and participants were asked to identify if they had experienced any of these symptoms (Table 1). In addition we asked participants what activities, if any, triggered their symptoms (Table 2).

Twenty-five (54%) of the participants stated they had preexisting chronic health conditions. Of these, 6 reported more than one preexisting chronic health condition. The chronic health conditions and the number of participants reporting each condition were as follows: allergies (9), dermatologic problems (6), arthritis (5), asthma (4), diabetes (3), auto immune disorders (3), cardiac history (3), respiratory (2), cancer (2) and other (6). Thirty two (70%) of the participants sought medical attention for their symptoms and 8 (17%) of these individuals received a diagnosis. The diagnoses reported and the numbers of participants with each diagnosis were as follows: psoriasis/eczema (5), fluid in the lungs (1), "writer's rash" (1), and surface eye irritation (1).

We also asked study participants if they had changed their source of drinking water or changed how they used their water. Of the 46 participants: 34 (74%) reported they have changed their tap water habits. These changes included showering outside the home (outside water district's domain); using bottled water for drinking, bathing and or both; lowering temperature of water, or shortening duration of exposure. Twenty three (50%) reported they filter or purify their household water. There were 4 (17%) who reported they use a point of entry filtration system and 16 (70%) who use a point of use filter in their home (such as a carbon filter) and 3 (13%) did not answer the question.

Of the 34 participants who reported they have changed their tap water use habits, 23 (67.6%) reported their symptoms improved or had gone away after they changed their water use. Four (11.8%) reported no change, 3 (8.8%) reported they did not know, and 4 (11.8%) did not answer the question.

Table 1. Symptoms reported by 46 residents of Chittenden County, VT which they believed were associated with exposure to chloramine treated tap water, September and October 2007.

Symptoms	Number of people reporting symptom	%
Dry, flaky, or itchy skin	36	78.3
Rash	28	60.9
Eye irritation	23	50
Cough	20	43.5
Joint aches	14	30.4
Breathing troubles	14	30.4
Skin pain, numbness or tingling	10	21.7
Diarrhea	10	21.7
Headache	9	19.6
Anything else	8	17.8
Fever	2	4.3

Table 2. Activities reported to be associated with symptoms for the 46 residents of Chittenden County, VT who reported symptoms, September and October 2007.

Symptoms	Shower		Bath		Drank		Washed Dishes	
	N	%	N	%	N	%	N	%
Dry flaky itchy skin (N=36)	25	69.4	5	13.9	3	8.3	4	11.1
Rash (N=28)	20	71.4	4	14.3	4	14.3	2	7.1
Eye irritation (N=23)	17	73.9	3	13	1	4.3	0	0
Cough (N=20)	8	40	1	5	5	25	0	0

ENVIRONMENTAL PROTECTION AGENCY OBSERVATIONS

CWD treatment and operational practices

Based on information provided by CWD staff, CWD operations are consistent with good operational practices for drinking water treatment. Chloramine dosage, chlorine:ammonia ratio, and pH are near the median for national use. CWD's chloramine concentration of 1.8-2.3 mg/L at its distribution system entry point is well below the maximum residual disinfectant level (MRDL) of 4.0 mg/L (with compliance determined as an annual average); actual exposure for consumers from water delivered by the distribution system will be less. It is important to note that the MRDL for chloramine was set at the MRDL goal (MRDLG); MRDLG was set at a level at which no known or anticipated human health effects occur, with an adequate margin of safety, as is required under the Safe Drinking Water Act amendments.

CWD has conducted additional monitoring beyond that required for compliance determination in order to better understand and control their treatment and distribution processes. CWD has measured no increase in lead levels; this is probably due to their careful switch from chlorine to chloramine as the residual disinfectant. This is part of the system's proactive compliance strategy (preventing violations) rather than a reactive compliance strategy (responding only after violations).

Observations made during visits to individual households

An EPA staff member was included in each CDC team that visited individual households, to evaluate any treatment that homeowners may have installed. Teams found a mixture of no

treatment, treatment to reduce chloramine level, and treatment that addressed issues other than chloramines. There was a mixture of point-of-entry (whole house) and point-of-use (faucet or showerhead) treatment units. Based on these visits, there do not appear to be any supportable engineering conclusions that can be made concerning a link between treatment and exposure/symptoms.

RECOMMENDATIONS

1. Not having baseline data, the post hoc analysis is difficult especially since there are strong biases with this data. Information provided by this questionnaire should be utilized to explore the design of future prospective studies eliminating biases and allowing for a baseline understanding of the symptoms that pre-exist in the community.
2. CDC and EPA should work with State and local agencies to develop the next steps in addressing the issue of community concerns about chloramine-treated tap water.

OMB CLEARANCE

This was not a research study.

Leslie Hausman, RN, MPH
EIS Officer
Health Studies Branch
Division of Environmental Hazards and Health Effects
National Center for Environmental Health

Appendix A: Questionnaire

Self-reported Symptoms and Exposure to Chloramine-Treated Tap Water, Vermont Questionnaire

INTRODUCTION SCRIPT

VT State Health Department Staff

Hello, may I speak with _____? My name is _____, and I am calling from the VT State Health Department. We are working with the Centers for Disease Control and Prevention looking into reported symptoms related to exposure to chloramine treated tap water. We received your name from the Champlain Water District because you have reported symptoms. We would like to ask you some questions about your health, the health of your family, and your tap water usage. Your answers will help us understand what symptoms have been reported since the Champlain Water District switched over to disinfecting their water with chloramine. The questions will take about 20 minutes. May we go ahead now with the questionnaire?

If no, is there a convenient time when I can call you back?

Day: _____ Time: _____ AM / PM

Telephone: _____

CDC Staff

Hello, may I speak with _____? My name is _____, and I am calling from the Centers for Disease Control and Prevention. We are working with the VT Department of Health looking into reported symptoms related to exposure to chloramine treated tap water. We received your name from the Champlain Water District because you have reported symptoms. We would like to ask you some questions about your health, the health of your family, and your tap water usage. Your answers will help us understand what symptoms have been reported since the Champlain Water District switched over to disinfecting their water with chloramine. The questions will take about 20 minutes. May we go ahead now with the questionnaire?

If no, is there a convenient time when I can call you back?

Day: _____ Time: _____ AM / PM

Telephone: _____

CASE No: _____

Self-reported Symptoms and Exposure to Chloramine-Treated Tap Water, Vermont
Questionnaire

Date: _____ Time interview began: _ _: _ _ AM / PM
Interviewers Initials: _____

1.0 First, I would like to confirm that you contacted someone to report that you or someone you know had symptoms. Did you contact any person or organization to report these symptoms?

☐ No
☐ Yes
☐ Don't know
☐ Refused

IF NO. OK, we are interested in talking with the people who contacted someone to report symptoms. I am sorry to bother you. Thank you for your time.

IF YES:

1.0a Can you please tell me who you contacted? (check all that apply)

☐ Champlain Water District
☐ Vermont Department of Health
☐ People Concerned about chloramine
☐ Health care professional
☐ Emergency room
☐ Newspaper
☐ Radio or TV
☐ Political representative
☐ Don't know
☐ Refused
☐ Other, explain _____

Now I would like you to think back to when you contacted <CONTACT> to report these symptoms. Then, I would like to ask you a couple of questions about that call. Are you ready?

1.0b What prompted you to contact <CONTACT>?

_____

_____

1.0c Were you calling for yourself or for someone else?

☐ Self
☐ Someone else

1.0d If you were calling for someone else, what is their name and relationship to you?

1.0d1 Name: _____
1.0d2 Relationship: _____

1.0e Could I please interview that person / May we continue with the interview?
(If child, ask parent if you can continue on with interview)

☐ Yes, interviewed other person
☐ No, refused
☐ No, other person not available
☐ Yes, interviewed other person
☐ Yes, interviewed parent or individual on phone who made contact for other person

2.0 If you were experiencing symptoms or health problems when you made your contact, can you tell me what they were? Also, I would like to know when each symptom started, when it stopped,

whether or not you have the symptom now and what activities trigger these symptoms. Is that clear?

OK, can you tell me your symptoms?

2.0a Symptom	2.0b Start Date	2.0c End Date	2.0d Have it now?	2.0e Do any of the following activities trigger these symptoms?
			☐ No ☐ Yes ☐ Don't know ☐ Refused	☐ Washing dishes ☐ Doing laundry ☐ Using dishwasher ☐ Showering ☐ Taking a bath ☐ Using hot tub ☐ Other Explain _____
			☐ No ☐ Yes ☐ Don't know ☐ Refused	☐ Washing dishes ☐ Doing laundry ☐ Using dishwasher ☐ Showering ☐ Taking a bath ☐ Using hot tub ☐ Other Explain _____
			☐ No ☐ Yes ☐ Don't know ☐ Refused	☐ Washing dishes ☐ Doing laundry ☐ Using dishwasher ☐ Showering ☐ Taking a bath ☐ Using hot tub ☐ Other Explain _____
			☐ No ☐ Yes ☐ Don't know ☐ Refused	☐ Washing dishes ☐ Doing laundry ☐ Using dishwasher ☐ Showering ☐ Taking a bath ☐ Using hot tub ☐ Other Explain _____
			☐ No ☐ Yes ☐ Don't know ☐ Refused	☐ Washing dishes ☐ Doing laundry ☐ Using dishwasher ☐ Showering ☐ Taking a bath ☐ Using hot tub ☐ Other Explain _____

3.0 In addition to the symptoms you told me about, I am now going to read you a list of symptoms.

Did you have the following symptom?	Did it get worse when you: _____?	Before April 2006 when you _____ (*activity*) did you have this symptom?
3.0a Cough ☐ No ☐ Yes ☐ Don't know ☐ Refused	☐ Washed dishes ☐ Did laundry ☐ Used dishwasher ☐ Showered ☐ Took a bath ☐ Used hot tub ☐ Drank ☐ Cooked ☐ Other Explain_____	☐ No ☐ Yes ☐ Don't know ☐ Refused
3.0b Fever? ☐ No ☐ Yes ☐ Don't know ☐ Refused **3.0b1 How High___**	☐ Washed dishes ☐ Did laundry ☐ Used dishwasher ☐ Showered ☐ Took a bath ☐ Used hot tub ☐ Drank ☐ Cooked ☐ Other Explain_____	☐ No ☐ Yes ☐ Don't know ☐ Refused
3.0c Headache? ☐ No ☐ Yes ☐ Don't know ☐ Refused	☐ Washed dishes ☐ Did laundry ☐ Used dishwasher ☐ Showered ☐ Took a bath ☐ Used hot tub ☐ Drank ☐ Cooked ☐ Other Explain_____	☐ No ☐ Yes ☐ Don't know ☐ Refused
3.0d Joint aches? ☐ No ☐ Yes ☐ Don't know ☐ Refused	☐ Washed dishes ☐ Did laundry ☐ Used dishwasher ☐ Showered ☐ Took a bath ☐ Used hot tub ☐ Drank ☐ Cooked ☐ Other Explain_____	☐ No ☐ Yes ☐ Don't know ☐ Refused
3.0e Breathing troubles? ☐ No ☐ Yes ☐ Don't know ☐ Refused	☐ Washed dishes ☐ Did laundry ☐ Used dishwasher ☐ Showered ☐ Took a bath ☐ Used hot tub ☐ Drank ☐ Cooked ☐ Other Explain_____	☐ No ☐ Yes ☐ Don't know ☐ Refused
3.0f Rash? ☐ No ☐ Yes ☐ Don't know ☐ Refused	☐ Washed dishes ☐ Did laundry ☐ Used dishwasher ☐ Showered ☐ Took a bath ☐ Used hot tub ☐ Drank ☐ Cooked ☐ Other Explain_____	☐ No ☐ Yes ☐ Don't know ☐ Refused

Did you have the following symptom?	Did it get worse when you: _____?	Before April 2006 when you _____ (*activity*) did you have this symptom?
3.0g Dry, flakey, or itchy skin? ☐ No ☐ Yes ☐ Don't know ☐ Refused	☐ Washed dishes ☐ Did laundry ☐ Used dishwasher ☐ Showered ☐ Took a bath ☐ Used hot tub ☐ Drank ☐ Cooked ☐ Other Explain_____	☐ No ☐ Yes ☐ Don't know ☐ Refused
3.0h Skin pain, numbness or tingling? ☐ No ☐ Yes ☐ Don't know ☐ Refused	☐ Washed dishes ☐ Did laundry ☐ Used dishwasher ☐ Showered ☐ Took a bath ☐ Used hot tub ☐ Drank ☐ Cooked ☐ Other Explain_____	☐ No ☐ Yes ☐ Don't know ☐ Refused
3.0i Diarrhea? ☐ No ☐ Yes ☐ Don't know ☐ Refused	☐ Washed dishes ☐ Did laundry ☐ Used dishwasher ☐ Showered ☐ Took a bath ☐ Used hot tub ☐ Drank ☐ Cooked ☐ Other Explain_____	☐ No ☐ Yes ☐ Don't know ☐ Refused
3.0j Eye irritation? ☐ No ☐ Yes ☐ Don't know ☐ Refused	☐ Washed dishes ☐ Did laundry ☐ Used dishwasher ☐ Showered ☐ Took a bath ☐ Used hot tub ☐ Drank ☐ Cooked ☐ Other Explain_____	☐ No ☐ Yes ☐ Don't know ☐ Refused
3.0k Anything else? ☐ No ☐ Yes ☐ Don't know ☐ Refused	☐ Washed dishes ☐ Did laundry ☐ Used dishwasher ☐ Showered ☐ Took a bath ☐ Used hot tub ☐ Drank ☐ Cooked ☐ Other Explain_____	☐ No ☐ Yes ☐ Don't know ☐ Refused

4.0 Did you seek medical attention for any of the symptoms we just talked about?

☐ No
☐ Yes
☐ Refused
☐ Don't know
Comments: _____

IF NO go to 5.0

IF YES:

4.0a Where did you go? (check all that apply)

- ☐ Primary Care Provider
- ☐ Emergency Department
- ☐ Urgent care
- ☐ Alternative health care provider
- ☐ Other

Explain_____

4.0b Were you hospitalized for this condition?

- ☐ Yes
- ☐ No
- ☐ Refused
- ☐ Don't know

4.0b1 If yes, when? _____

4.0c Did you receive a diagnosis?

- ☐ No
- ☐ Yes
- ☐ Refused
- ☐ Don't know

4.0c1 If yes, what was the diagnosis? _____

5.0 We have heard that people have stopped using their tap water for certain activities, like showering. Have you changed your tap water use habits?

- ☐ No
- ☐ Yes
- ☐ Refused
- ☐ Don't know

5.0a If yes, can you please explain? _____

6.0 Do you filter or purify your household water?

- ☐ No
- ☐ Yes
- ☐ Refused
- ☐ Don't know

6.0a If yes, do you have a point-of-entry filter, that is one that serves your whole house or a point-of-use filter, that is, a filter just for your drinking water?

- ☐ Point-of-entry filter
- ☐ Point-of-use filter

6.0a1 IF POINT-OF-ENTRY (serves your whole house)
Can you tell me what kind of point-of-entry system you use?

- ☐ Carbon filter
- ☐ Water softener
- ☐ Ultraviolet treatment
- ☐ Reverse osmosis
- ☐ Other
  - ☐ Describe _____
- ☐ Refused
- ☐ Don't know

6.0a2 IF POINT-OF-USE (just for your drinking water)
Can you tell me what kind of point-of-use treatment system you use?

☐ Carafe filter
☐ Faucet-mounted filter
☐ Counter-top filter
☐ Under-sink filter
☐ Refrigerator filter
☐ Other
☐ Describe _____
☐ Refused
☐ Don't know

6.0a2a What type of treatment is the point-of-use system?

☐ Carbon filter
☐ Ultraviolet treatment
☐ Reverse osmosis
☐ Distiller
☐ Other
☐ Describe _____
☐ Refused
☐ Don't know

6.0a3 What is the name of your filter and name of the company that manufactured your filter?

☐ Access business Group LLV – makers of eSpring products
☐ Culligan International Co.
☐ Cuno Inc - makers of Aqua-Pure
☐ Everpure LLC
☐ Japin International Inc.
☐ Multi-Pure
☐ Paragon Water Systems, Inc.
☐ Rainsoft Division of Aquin – makers of Hydrefiner
☐ Selecto Scientific, Inc
☐ Shurflo Pump Manufacturing Co.
☐ Sta-Rite Industries
☐ Other
☐ Describe _____

7.0 Are you on municipal tap water, that is, do you get your water from the Champlain Water District?

☐ No
☐ Yes
☐ Refused
☐ Don't know

IF NO:
Can you tell me the source of your tap water? _____

7.0a Have your symptoms improved or gone away since you changed your water use?

☐ No
☐ Yes
☐ Refused
☐ Don't know

Now I am going to ask you a few questions about your general health.

8.0 Do you have any chronic health conditions, such as diabetes, skin conditions, asthma, allergies or anything else?

- ☐ No
- ☐ Yes
- ☐ Refused
- ☐ Don't know

8.0a If yes, what are they? _____

_____

8.0b When were you diagnosed with this / these conditions? **Date:** _____

_____

Now I have a few questions about you.

9.0 How old are you? _____

10.0 What is your sex?

- ☐ Male
- ☐ Female

11.0 Is there anything else related to your chloramine concern that you think I should know about?

_____

_____

_____

_____

_____

_____

That was the last question. Thank you for taking the time to answer our questions.

If you are interested in the results of this questionnaire and additional information on water disinfection, please refer to the Vermont Department of Health website at
http://healthvermont.gov/enviro/water/chloramine.aspx

From: Bolen, Timothy (DHHS)
Sent: Wednesday, October 14, 2015 7:41 PM
To: Fiedler, Jay (DHHS)
Subject: Fwd: genesee and emergency declaration

Here's my exchange with Joyce.

Sent from my iPhone

Begin forwarded message:

> **From:** "Bolen, Timothy (DHHS)" <BolenT1@michigan.gov>
> **Date:** October 7, 2015 at 11:16:06 AM EDT
> **To:** "Lai, Joyce (DHHS)" <LaiJ@michigan.gov>
> **Cc:** "Schreiber, Scott (DHHS)" <SchreiberS@michigan.gov>
> **Subject: Re: genesee and emergency declaration**
>
> Hi Guys,
>
> I don't have anything written up - been staying away from this issue (kind of outside the CD realm, eh?). Mlive has had some good articles with timelines and actions taken by city/state government and the health department.
>
> When the Hurley Doc released her evaluation of lead data from their clinic evaluations there was an initial response from our environmental health folks that suggested that their data didn't show what Hurley's did. Unfortunately, after paring down MDHHS data to just kids who likely were exposed to Flint drinking water Eden (Wells) was quoted in one article that there indeed was an increase in kids less than 6 after the switch. (You may want to talk with Eden, Joyce - I've only been privy to what is in the news.) The Public Health Emergency was declared after that - (last Thursday).
>
> Honestly, I wouldn't offer too much information on this issue...(That's my 2 cents)
>
> Tim
>
> Tim Bolen
> Michigan Department of Health and Human Services; Regional Epidemiologist - Region 3
> Midland County Health Department

220 W. Ellsworth Street
Midland, MI 48640-5194
Phone: (989)832-6690
Fax: (989)832-6628

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From: Lai, Joyce (DHHS)
Sent: Wednesday, October 7, 2015 11:00 AM
To: Bolen, Timothy (DHHS)
Cc: Schreiber, Scott (DHHS)
Subject: genesee and emergency declaration

Hi Tim
As you know, both Scott and I participate in the GLBHI meetings and our next one is coming up tomorrow. Since this Genesee County and Emergency Health Declaration has been very dominate in the national news, I was hoping to get some details from you that I can pass onto the group. If you have a summary or something written up, I can just extract what you want me to from it and tell to the group as well. Thanks!!

Joyce Lai, MPH
Region 2 South Epidemiologist
Surveillance and Infectious Disease Epidemiology Section
Bureau of Disease Control, Prevention, and Epidemiology
Michigan Department of Health and Human Services
Physical Address: 5454 Venoy, Wayne, MI 48184
Ph: 734-727-7204 Cell: 517-930-6958 E-mail: laij@michigan.gov

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From: Fiedler, Jay (DCH)
Sent: Friday, September 25, 2015 11:10 AM
To: Bohm, Susan (DCH);Johnson, Shannon (DCH);Bolen, Timothy (DCH)
Subject: Fwd: Director's Office Assignment -- Flint - need update asap
Attachments: Flint Testing and EBLLs_2.xlsx; ATT00001.htm

Passing along. Haven't read the whole thing.

Jay Fiedler
MDHHS SIDE Section Manager
517/335-9516

Begin forwarded message:

> **From:** "Miller, Corinne (DCH)" <MillerC39@michigan.gov>
> **Date:** September 24, 2015 at 1:16:20 PM EDT
> **To:** "Priem, Wesley F. (DCH)" <priemw@michigan.gov>, "Fiedler, Jay (DCH)" <FiedlerJ@michigan.gov>
> **Cc:** "Dykema, Linda D. (DCH)" <DykemaL@michigan.gov>
> **Subject: FW: Director's Office Assignment -- Flint - need update asap**
>
> Wes - per the EPA request to you, the attachment contains two graphics on childhood blood lead testing in Flint.
>
> Jay - this information likely will be shared with the local health department, if it hasn't been already (there is an MDHHS childhood lead poisoning health educator in the Flint-area), because the MDHHS toxicologists, MDEQ and the county health department spoke last week about the development of standard messaging related to lead in drinking water.
>
> -----Original Message-----
> From: Peeler, Nancy (DCH)
> Sent: Tuesday, July 28, 2015 2:57 PM
> To: Anderson, Paula (DCH); Miller, Corinne (DCH); Travis, Rashmi (DCH); Moran, Susan (DCH); Grijalva, Nancy (DCH); Fink, Brenda (DCH)
> Cc: Priem, Wesley F. (DCH); Dykema, Linda D. (DCH); Bouters, Janese (DCH); Barr, Jacqui (DCH)
> Subject: RE: Director's Office Assignment -- Flint - need update asap
>
> I apologize for the delay in responding more specifically to this assignment, it took some time to review our Childhood Lead Poisoning Prevention program data to see if it might contribute to the understanding of the situation in Flint with their water supply. Here is what we found:
>
> We looked at lead testing results for May 2014-April 2015, which is the 12 month time frame just after Flint started drawing their water from the river (water source changed in April 2014). We compared lead testing rates and lead testing results to the same time frame for the previous 3 years, to see if there were any patterns that suggested that there were increased rates of lead poisoning after the water supply was switched. Per the attached charts -
> * Lead testing rates remained about the same from year to year (chart on the right).
> * There was a spike in elevated blood lead tests from July-September 2014 (chart on the left,

gold line).
* However that pattern was not terribly different from what we saw in the previous three years, especially in 2011-2012 (we are working with our Epidemiologist to statistically verify any significant differences).
* We commonly see a 'seasonal effect' with lead, related to people opening and closing windows more often in the summer, which disturbs old deteriorating paint on the windows, sills and sashes. Window fans frequently blow and spread the lead dust from the deteriorating paint to other parts of the room/house. We suspect that the summer data spike may be related to this effect.
* If the home water supply lines and/or river water were contributing to elevated blood lead tests, we expected that the increased rates would extend beyond the summer, but they drop quite a bit from September to October, stayed low over the winter, and are just starting to tail up again in the spring of 2015.

So upon review, we don't believe our data demonstrates an increase in lead poisoning rates that might be attributable to the change in water source for Flint. We recognize that lead exposure via the water is only a small piece of what may be happening for families in Flint, however, we hope the information is helpful.

Nancy Peeler

-----Original Message-----
From: Anderson, Paula (DCH)
Sent: Wednesday, July 22, 2015 5:31 PM
To: Miller, Corinne (DCH); Travis, Rashmi (DCH)
Cc: Priem, Wesley F. (DCH); Dykema, Linda D. (DCH); Peeler, Nancy (DCH); Bouters, Janese (DCH); Barr, Jacqui (DCH)
Subject: Director's Office Assignment -- Flint - need update asap
Importance: High

Good afternoon,
Please see the message below received from the Director's office just before 5. If at all possible, please provide an update of what you may, or may not, know ASAP, today if at all possible. Include Nancy Grijalva and Sue Moran in the response. Thank you.

-----Original Message-----
From: Miller, Mark (DCH)
Sent: Wednesday, July 22, 2015 5:28 PM
To: Anderson, Paula (DCH)
Subject: RE: Flint - need update asap

There's an article from the metro times I located:

http://www.metrotimes.com/Blogs/archives/2015/07/14/flint-family-finds-hazardous-waste-levels-of-lead-in-its-tap-water

Based on this it sounds like at least one family might have had a child with elevated lead blood levels, which might or might not have come from the water. Sounds like the issue is old lead service lines, but their seems to be some difference of opinion on appropriate testing methods.

I'd send this over to Linda Dykema, Wes Priem and Nancy Peeler for their comments.

DEQ has jurisdiction over municipal water supplies, but we do have a program to follow-up on children with elevated blood lead levels, so I think it would be appropriate for the folks above to discuss the situation and recommend any action.

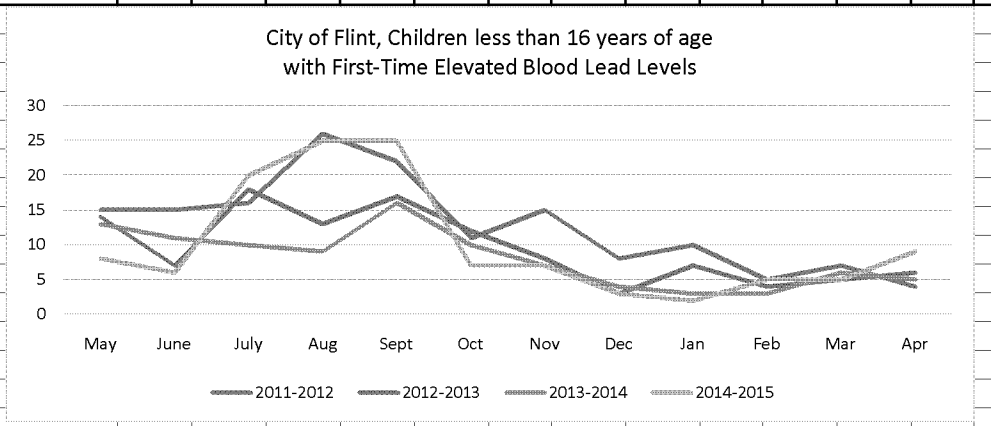
Mark

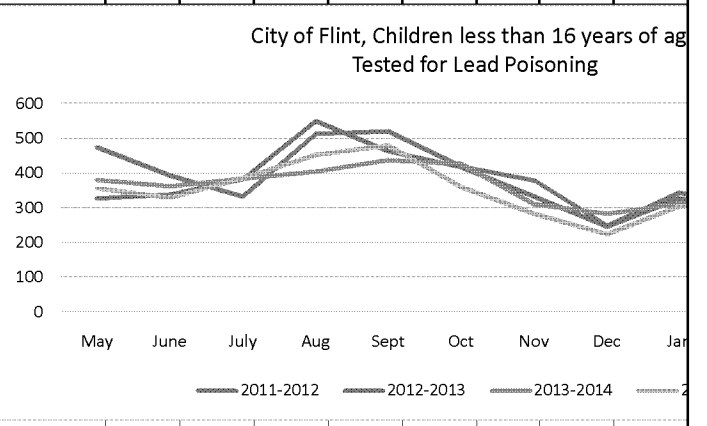
-----Original Message-----
From: Anderson, Paula (DCH)
Sent: Wednesday, July 22, 2015 4:51 PM
To: Miller, Mark (DCH)
Cc: Moran, Susan (DCH)
Subject: FW: Flint - need update asap
Importance: High

Nancy requested an answer TODAY. Thanks.

-----Original Message-----
From: Grijalva, Nancy (DCH)
Sent: Wednesday, July 22, 2015 4:47 PM
To: Moran, Susan (DCH)
Cc: Anderson, Paula (DCH)
Subject: FW: Flint - need update asap

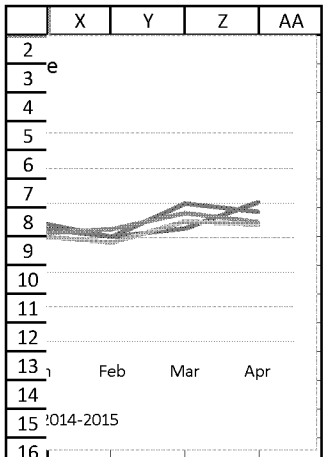
I'm frustrated by the water issue in Flint. I really don't think people are getting the benefit of the doubt. Now they are concerned and rightfully so about the lead level studies they are receiving from the DEQ samples. Can you take a moment out of your impossible schedule to personally take a look at this? These folks are scared and worried about the health impacts and they are basically getting blown off by us (as a state we're just not sympathizing with their plight).





		May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr
2011-2012		15	15	16	26	22	11	15	8	10	5	7	4
2012-2013		14	7	18	13	17	12	8	3	7	4	5	6
2013-2014		13	11	10	9	16	10	7	4	3	3	6	5
2014-2015		8	6	20	25	25	7	7	3	2	5	5	9

		May	June	July	Aug	Sept	Oct	Nov	Dec
2011-2012		474	393	332	513	520	420	379	249
2012-2013		328	338	383	550	464	417	332	246
2013-2014		380	363	385	404	438	427	310	283
2014-2015		356	329	386	452	480	361	283	224



	X	Y	Z	AA
16				
17				
18	Jan	Feb	Mar	Apr
19	343	303	399	375
20	328	303	328	402
21	313	325	371	346
22	305	287	348	339

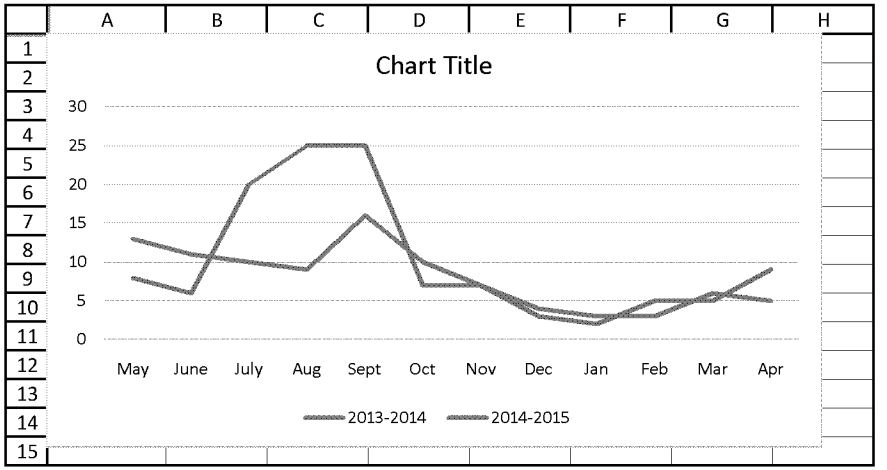


Chart Title
30
25
20
15
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5
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May
June
July
Aug
Sept
Oct
Nov
Dec
Jan
Feb
Mar
Apr
2013-2014
2014-2015

This Document is a Non-Responsive Attachment.

From: Lyon, Nick (DHHS)
Sent: Tuesday, December 15, 2015 2:34 PM
To: Eisner, Jennifer (DHHS)
Subject: FW: Emailing: Lead Presciption

-----Original Message-----
From: Mona Hanna-Attisha [mailto:MHanna1@hurleymc.com]
Sent: Friday, October 16, 2015 8:47 AM
To: Lyon, Nick (DHHS) <LyonN2@michigan.gov>; Wells, Eden (DHHS) <WellsE3@michigan.gov>
Subject: FW: Emailing: Lead Presciption

And as I mentioned on the phone yesterday, Aug 27 is the first time I brought up the potential issue with the county health dept....

-----Original Message-----
From: Mona Hanna-Attisha
Sent: Thursday, August 27, 2015 1:31 PM
To: 'Johnson, M.D., Gary'; Schacher, Andrew (aschacher@gchd.us); 'Valacak, Mark'
Cc: Hallwood, Dawn; Henry, James
Subject: RE: Emailing: Lead Presciption

It was a pleasure meeting with Andrew today regarding the lead prescription program. As a follow-up:

1) We will work with Andrew and our lab and social worker to create an automatic electronic referral system for all kids with elevated lead levels. The referral will go to Andrew so that he can enroll them in his program.

2) Please use Hurley and MSU as a resource for lead programming, lead research, lead grant-writing, lead education, lead advocacy, lead whatever. Through Hurley, we have the providers, the patient population and the interest to work on pediatric public health issues. We clearly recognize the devastating and life-long impact of this entirely PREVENTABLE condition. Through MSU, we have the additional research capacity and the collaboration with the MSU Public Health Program (potential PH students and/or research hires interested in lead). We are eager to collaborate on this shared goal. Personally, I have a background in environmental health and this topic ideally merges the disciplines of pediatrics and public health.

3) Lastly, this may not be under the health department's jurisdiction; however, I don't' understand why it wouldn't be - I am concerned about the potential for an increase in childhood lead poisoning secondary to the Flint drinking water situation. Flint had Safe Drinking Water Act violations for trihalomethanes after switching water sources. They dramatically increased their chlorine after switching sources. That changes the oxidation reduction potential and allows the metal of the pipe to go into solution. This is strikingly similar to what happened in Washington DC that resulted in significant childhood lead poisonings. It took about 2 years of lead leaching and exposure to result in elevated blood lead levels measured in 2003 as reported by CDC (http://www.cdc.gov/nceh/lead/blood_levels.htm). I have an EPA colleague who worked on the DC issue and is aware/interested in the Flint issue.

Article about Flint's lead levels in water:
http://www.deadlinedetroit.com/articles/12697/scary_leaded_water_and_one_flint_family_s_toxic_nightmare#.Vd8yWVKVP9d

I know this has been a controversial issue, but it would be great if we can collaborate to prevent some of the same issues that happened in DC. Our children already significant pre-existing challenges (toxic stress/adverse childhood events), avoidable lead exposure should not be an additional burden. I would be more than happy to meet to discuss/brainstorm additional solutions.

Thanks again and looking forward to additional collaborations! Mona

Mona Hanna-Attisha MD MPH FAAP
Program Director Pediatric Residency
Hurley Children's Hospital at Hurley Medical Center Michigan State University College of Human Medicine Department of Pediatrics and Human Development Mhanna1@hurleymc.com

-----Original Message-----
From: Johnson, M.D., Gary [mailto:GJOHNSON@gchd.us]
Sent: Friday, August 21, 2015 4:40 PM
To: Mona Hanna-Attisha
Cc: Hallwood, Dawn; Henry, James
Subject: RE: Emailing: Lead Presciption

Thanks Mona!!

-----Original Message-----
From: Mona Hanna-Attisha [mailto:MHanna1@hurleymc.com]
Sent: Friday, August 21, 2015 4:17 PM
To: Johnson, M.D., Gary
Cc: Hallwood, Dawn; Henry, James
Subject: RE: Emailing: Lead Presciption

Thanks Dr Johnson. I will share with all the residents and get some copies printed for the clinic.

Thanks!

-----Original Message-----
From: Johnson, M.D., Gary [mailto:GJOHNSON@gchd.us]
Sent: Friday, August 21, 2015 2:04 PM
To: Mona Hanna-Attisha
Cc: Hallwood, Dawn; Henry, James
Subject: FW: Emailing: Lead Presciption

<<Lead Presciption.pdf>> Mona--
Please read over the attached letter with the prescription. We sent you a similar letter on May 5th, hoping the pediatric residents would participate in the community outreach portion of this grant funded Childhood Lead Poisoning program.

Please re-consider having the pediatric residents participate in this community prescription program for children whose venous lead levels are between 5-14 as stated in the letter.

Please contact Dawn Hallwood via e-mail or phone letter as stated in the letter.

We would greatly appreciate your participation and the resident's participation.

Thank you very much.

Gary Johnson

-----Original Message-----
From: Henry, James
Sent: Friday, August 21, 2015 1:40 PM
To: 'GJOHNSON@gchd.us'
Cc: Hallwood, Dawn
Subject: Emailing: Lead Presciption

Dr. J

This is from Dawn, her email stopped working

Jim

Your message is ready to be sent with the following file or link
attachments:

Lead Presciption

Note: To protect against computer viruses, e-mail programs may prevent sending or receiving certain types of file attachments. Check your e-mail security settings to determine how attachments are handled.

From: Lyon, Nick (DHHS)
Sent: Tuesday, December 15, 2015 2:34 PM
To: Eisner, Jennifer (DHHS)
Subject: FW: Childhood lead poisoning- grand rounds talk

From: Mona Hanna-Attisha [mailto:MHanna1@hurleymc.com]
Sent: Friday, October 16, 2015 8:24 AM
To: Wells, Eden (DHHS) <WellsE3@michigan.gov>; Lyon, Nick (DHHS) <LyonN2@michigan.gov>
Subject: FW: Childhood lead poisoning- grand rounds talk

Nick, thank you for your phone call yesterday. These past couple months have been a blur, and I wanted to go back and see exactly when I first communicated with the state.

My first contact with MDDHS was with Karen Lishinski on Sept 8 (she had come to Hurley a year prior to give a grand rounds on lead). I called her and asked her about the lead concerns and she said that the state had looked at the blood lead data and that there was a possible increase, I asked her for the data over the phone, she said ok, but then I never heard back from her. I sent her the below email the day after.

And then my first communication with Bob Scott was on Sept 16 asking for the data again.

From: Mona Hanna-Attisha
Sent: Wednesday, September 09, 2015 9:37 AM
To: 'Lishinski, Karen (DCH)'
Subject: RE: Childhood lead poisoning- grand rounds talk

Hi Karen, Hope you are well. Thanks for speaking with me yesterday. Since we spoke, we have been able to run a report on all the blood lead levels in our peds clinic since before and after the water switch . Our research team is still analyzing the data, but it appears that there is an increase. I will share more once the analysis is complete.

Can you please share the MCIR data that you mentioned. That would be most helpful since the sample size is much greater. If there is someone else I should contact regarding the MCIR data request, please let me know.

Thanks! Mona

Mona Hanna-Attisha MD MPH FAAP
Program Director Pediatric Residency
Hurley Children's Hospital at Hurley Medical Center
Michigan State University College of Human Medicine
Department of Pediatrics and Human Development
Mhanna1@hurleymc.com

HURLEY CHILDREN'S HOSPITAL

From: Lishinski, Karen (DCH) [mailto:LishinskiK@michigan.gov]
Sent: Monday, July 14, 2014 2:00 PM
To: Mona Hanna-Attisha
Subject: Childhood lead poisoning- grand rounds talk

Hi Dr. Hanna-Attisha,

Dr. Reynolds told me that you were interested in having a speaker at a grand rounds talk. Could you give me a call and let me know when and what you would need in the way of specific information to be presented?

Looking forward to speaking with you!

Karen Lishinski RN MA AE-C
Nurse Consultant
Michigan Department of Community Health
Division of Family and Community Health
Childhood Lead Poisoning Prevention Program
109 Michigan Ave
PO Box 30195
4th Floor
Lansing, MI 48909
lishinskik@michigan.gov
Phone: 517-241-3599
Fax: 517-335-8509

From: Grijalva, Nancy (DHHS)
Sent: Monday, December 21, 2015 2:32 PM
To: Lyon, Nick (DHHS);Eisner, Jennifer (DHHS)
Subject: RE: Edwards Report Response

Qualify how??? Instead of saying they did not indicate anything other than

Should we say instead: Seasonal fluctuation was indicated..

From: Lyon, Nick (DHHS)
Sent: Monday, December 21, 2015 2:28 PM
To: Eisner, Jennifer (DHHS) <EisnerJ@michigan.gov>
Cc: Becker, Timothy (DHHS) <beckert1@michigan.gov>; Lasher, Geralyn (DHHS) <lasherg@michigan.gov>; Wells, Eden (DHHS) <WellsE3@michigan.gov>; Minicuci, Angela (DHHS) <MinicuciA@michigan.gov>; Grijalva, Nancy (DHHS) <GrijalvaN@michigan.gov>
Subject: Re: Edwards Report Response

I have an issue with one sentence. I think the "they did not indicate@ could be qualified.

On Dec 21, 2015, at 2:14 PM, Eisner, Jennifer (DHHS) <EisnerJ@michigan.gov> wrote:

> **For your review asap.. the reporter has a 3 p.m. deadline..**
>
> The Michigan Department of Health and Human Services has been, and continues to be, committed to full disclosure of information regarding the city of Flint and blood lead levels. To suggest otherwise is not consistent with how we have responded.
>
> When initially looking at the citywide and county elevated blood lead level numbers, they did not indicate anything other than seasonal fluctuation. It wasn't until the Hurley report came out that our epidemiologists took a more in-depth look at the data by zip code, controlling for seasonal variation, and confirmed an increase outside of normal trends. As a result of this process, we have determined that the way we analyze data collected needs to be thoroughly reviewed. Our after action report will help determine how we conduct this process in the future.
>
> Our department is focused on ensuring that appropriate case management and follow up is occurring in Flint. Summary reports outlining blood lead level testing are posted online on a bi-weekly basis, and we are working closely with local partners to fulfill data requests as we receive them.
>
> Regarding the FOIA, Mr. Edwards received all of the requested documents, with personal information redacted, on Friday, December 18.

Message

From: Eisner, Jennifer (DHHS) [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=E58A0110D9914D1395311D742E28B4C9-SMITH JENNI]
Sent: 10/8/2015 3:27:10 PM
To: Tanner, Kristi [ktanner@freepress.com]; Scott, Robert L. (DHHS) [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=1aefbcaada9a48ad8d643aa95e441df1-Scott Robert L.]
Subject: RE: data aggregated by year

Hi Kristi:

I've talked with our epis and we cannot provide the aggregate by year starting with q2 annually due to the DNS cells then being compromised and privacy concerns with identifiable information.

If you would still like to pursue the IRB route, please let us know and Bob and assist you through that process.

Best,

Jennifer (Smith) Eisner

Public Information Officer

Michigan Department of Health and Human Services

517-241-2112

From: Tanner, Kristi [mailto:ktanner@freepress.com]
Sent: Wednesday, October 07, 2015 4:18 PM
To: Eisner, Jennifer (DHHS) <EisnerJ@michigan.gov>; Scott, Robert L. (DHHS) <ScottR9@michigan.gov>
Subject: data aggregated by year

Bob,

Thank you for the count data by quarter.

Is it possible for you to aggregate it by year starting with q2 annually? So the data are comparable?

Thanks!

Kristi

From: Eisner, Jennifer (DHHS) [mailto:EisnerJ@michigan.gov]
Sent: Wednesday, October 07, 2015 2:48 PM
To: Tanner, Kristi
Subject: RE: Regarding data request

Kristi:

The attached documents include the requested data, as well as the Poisson regression model output.

Thank you,

Jennifer (Smith) Eisner

Public Information Officer

Michigan Department of Health and Human Services

517-241-2112

From: Eisner, Jennifer (DHHS)
Sent: Wednesday, October 07, 2015 2:41 PM
To: 'Tanner, Kristi' <ktanner@freepress.com>
Subject: RE: Regarding data request

Here's a contact for the Technical Advisory Committee:

Jason Lorenz

Public Information Officer

City of Flint

(810) 237-2039 (Office)

PPI Cell)

jlorenz@cityofflint.com

Jennifer (Smith) Eisner

Public Information Officer

Michigan Department of Health and Human Services

517-241-2112

From: Eisner, Jennifer (DHHS)
Sent: Wednesday, October 07, 2015 2:20 PM
To: 'Tanner, Kristi' <ktanner@freepress.com>
Subject: RE: Regarding data request

I'd be happy to set up a time for you to speak with Linda Dykema and Sarah Lyon Callo regarding our prediction modelling. Might not be today, but I'll see what we can do.

We're working on the other questions as well, but it's a lot to get through – will send updates as we have them.

For the list of taskforce members and the schedule of meetings, I'd recommend reaching out to DEQ.

Jennifer (Smith) Eisner

Public Information Officer

Michigan Department of Health and Human Services

517-241-2112

From: Tanner, Kristi [mailto:ktanner@freepress.com]
Sent: Wednesday, October 07, 2015 12:40 PM
To: Eisner, Jennifer (DHHS) <EisnerJ@michigan.gov>
Subject: RE: Regarding data request

I am interested in the name/title and contact information for all of the Taskforce members. I am interested in the meeting schedule for the group and what the next steps are in general.

It was mentioned on the call that the state has a team of toxicologists that will be doing some prediction modeling in Flint. I am interested in when/where tests are occurring and what the sampling frame looks like. So maybe a call would be a good first start.

Thanks!

Kristi

From: Eisner, Jennifer (DHHS) [mailto:EisnerJ@michigan.gov]
Sent: Wednesday, October 07, 2015 12:21 PM
To: Tanner, Kristi
Subject: RE: Regarding data request

For the task force contact – the contact would depend on the question. Can you tell me what you're looking for so I can be sure to get you in touch with the right person?

And for our toxicologist, are you looking to set up a call?

Jennifer (Smith) Eisner

Public Information Officer

Michigan Department of Health and Human Services

517-241-2112

From: Tanner, Kristi [mailto:ktanner@freepress.com]
Sent: Wednesday, October 07, 2015 12:19 PM
To: Eisner, Jennifer (DHHS) <EisnerJ@michigan.gov>; Scott, Robert L. (DHHS) <ScottR9@michigan.gov>
Cc: Peeler, Nancy (DHHS) <PeelerN@michigan.gov>
Subject: RE: Regarding data request

Yes,

I am looking for the quarterly numbers behind the percentages on the chart Jennifer shared. I was told I need to sign a release – does this come from you Jen? To get the quarterly counts, in the meantime if you can aggregate the counts annually beginning with q2 that will help.

Summary numbers are fine for the second request, just looking to see what the investigation and remediation/clearance participation rates look like for those children identified with lead poisoning for communities receiving funding.

If that makes sense, if it doesn't maybe we need to chat over the phone.

Thanks

Kristi

P.S. Jen can you forward me the contact info for the lead on toxicology team and special task force for Flint?

From: Eisner, Jennifer (DHHS) [mailto:EisnerJ@michigan.gov]
Sent: Wednesday, October 07, 2015 12:04 PM
To: Scott, Robert L. (DHHS); Tanner, Kristi
Cc: Peeler, Nancy (DHHS)
Subject: RE: Regarding data request

Hi Bob:

Attached is the info we provided to Kristi on Monday. She would like the raw data behind the percentages listed. She would also like the annual data aggregated if that's a simpler, quicker request to fulfill.

Kristi – please jump in if you want to clarify further.

Thank you,

Jennifer (Smith) Eisner

Public Information Officer

Michigan Department of Health and Human Services

517-241-2112

From: Scott, Robert L. (DHHS)
Sent: Wednesday, October 07, 2015 11:18 AM
To: ktanner@freepress.com
Cc: Peeler, Nancy (DHHS) <PeelerN@michigan.gov>; Eisner, Jennifer (DHHS) <EisnerJ@michigan.gov>
Subject: Regarding data request

Ms. Tanner,

I'm requesting clarification on a couple of points regarding your request below:

- Regarding "Actual numbers behind the updated analysis/chart and percentages," more than one set of charts & data were produced over the last couple of weeks. Can you be more specific on what you're referring to—maybe title and date?
- Regarding data on "investigation, risk assessment, abatement and/or clearance," I assume you're not asking for any individual or identifiable data, is that correct? Summary numbers only?

Thanks,

Bob Scott

Robert L. Scott

Childhood Lead Poisoning Prevention Program

Michigan Department of Health & Human Services

(517) 335-8178

fax (517) 335-8509

From: Tanner, Kristi [mailto:ktanner@freepress.com]
Sent: Monday, October 05, 2015 4:20 PM
To: Eisner, Jennifer (DHHS) <EisnerJ@michigan.gov>
Subject: RE: Info attached

Thanks for the follow-up Jennifer.

Per our discussion, I am interested in obtaining the following information

Specific to Flint:

- The logistic regression model discussed in the conference call
- Actual numbers behind the updated analysis/chart and percentages
- Contact information for the lead toxicologists working on the prediction modeling in Flint.

- Contact information for the lead contact for the Special Workgroup EPA/DEQ/MDHHS to address lead in Flint.

Communities that receive funding for lead poisoning prevention (Flint,Detroit, Grand Rapids, Hamtramck, Highland Park, Jackson, Lansing, Muskegon/Muskegon Heights and Saginaw):

- Any data that the state collects on investigation, risk assessment, abatement and/or clearance.

Thank you!

Kristi Tanner

cell

Message

From: Eisner, Jennifer (DHHS) [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=E58A0110D9914D1395311D742E28B4C9-SMITH JENNI]
Sent: 12/21/2015 8:46:05 PM
To: Lyon, Nick (DHHS) [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=cc8bf601f48844a2b44c7e1bda929e38-Lyon Nick]
Subject: RE: Edwards Report Response

With edits from the gov's team in bold..

The Michigan Department of Health and Human Services **has consistently provided information regarding blood lead levels in the city of Flint.**

When initially looking at the citywide and county elevated blood lead level numbers, the increase appeared to be consistent with the routine seasonal fluctuation seen in the summer months. It wasn't until the Hurley report came out that our epidemiologists took a more in-depth look at the data by ZIP code, controlling for seasonal variation, and confirmed an increase outside of normal trends. As a result of this process, we have determined that the way we analyze data needs to be thoroughly reviewed. **Additionally, Gov. Rick Snyder has created a Flint Water Task Force to review all city, state and federal responses and actions and is expected to make recommendations moving forward.**

Our department is focused on ensuring that appropriate case management and follow up is occurring in Flint. Summary reports outlining blood lead level testing are posted online on a bi-weekly basis, and we are working closely with local partners to fulfill data requests as we receive them.

Regarding the FOIA, Mr. Edwards received all of the requested documents, with personal information redacted, on Friday, December 18.

Jennifer Eisner

Public Information Officer

Michigan Department of Health and Human Services

Office: 517-241-2112 or EisnerJ@michigan.gov

Cell: PPI

From: Lyon, Nick (DHHS)
Sent: Monday, December 21, 2015 3:45 PM
To: Eisner, Jennifer (DHHS) <EisnerJ@michigan.gov>
Subject: Re: Edwards Report Response

Final?

On Dec 21, 2015, at 2:36 PM, Eisner, Jennifer (DHHS) <EisnerJ@michigan.gov> wrote:

Thank you -- here's what we have:

The Michigan Department of Health and Human Services has been, and continues to be, committed to full disclosure of information regarding the city of Flint and blood lead levels. To suggest otherwise is not consistent with how we have responded.

When initially looking at the citywide and county elevated blood lead level numbers, the increase appeared to be consistent with the routine seasonal fluctuation seen in the summer months. It wasn't until the Hurley report came out that our epidemiologists took a more in-depth look at the data by zip code, controlling for seasonal variation, and confirmed an increase outside of normal trends. As a result of this process, we have determined that the way we analyze data collected needs to be thoroughly reviewed. Our after action report will help determine how we conduct this process in the future.

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Jennifer Eisner

Public Information Officer

Michigan Department of Health and Human Services

Office: 517-241-2112 or EisnerJ@michigan.gov

Cell: PPI

From: Becker, Timothy (DHHS)
Sent: Monday, December 21, 2015 2:34 PM
To: Lasher, Geralyn (DHHS) <lasherg@michigan.gov>; Lyon, Nick (DHHS) <LyonN2@michigan.gov>; Eisner, Jennifer (DHHS) <EisnerJ@michigan.gov>
Cc: Wells, Eden (DHHS) <WellsE3@michigan.gov>; Minicuci, Angela (DHHS) <MinicuciA@michigan.gov>; Grijalva, Nancy (DHHS) <GrijalvaN@michigan.gov>
Subject: RE: Edwards Report Response

That works. I was also typing something similar as G's response came in. I had this: "When initially looking at the citywide and county elevated blood lead level numbers, the aggregate data suggested a seasonal fluctuation consistent with trends noted prior to the switch in the water source."

From: Lasher, Geralyn (DHHS)
Sent: Monday, December 21, 2015 2:32 PM
To: Lyon, Nick (DHHS) <LyonN2@michigan.gov>; Eisner, Jennifer (DHHS) <EisnerJ@michigan.gov>
Cc: Becker, Timothy (DHHS) <beckert1@michigan.gov>; Wells, Eden (DHHS) <WellsE3@michigan.gov>; Minicuci, Angela (DHHS) <MinicuciA@michigan.gov>; Grijalva, Nancy (DHHS) <GrijalvaN@michigan.gov>
Subject: RE: Edwards Report Response

When initially looking at the citywide and county elevated blood lead level numbers, the increase appeared to be consistent with the routine seasonal fluctuation seen in the summer months.

From: Lyon, Nick (DHHS)
Sent: Monday, December 21, 2015 2:28 PM
To: Eisner, Jennifer (DHHS) <EisnerJ@michigan.gov>
Cc: Becker, Timothy (DHHS) <beckert1@michigan.gov>; Lasher, Geralyn (DHHS) <lasherg@michigan.gov>; Wells, Eden (DHHS) <WellsE3@michigan.gov>; Minicuci, Angela (DHHS) <MinicuciA@michigan.gov>; Grijalva, Nancy (DHHS) <GrijalvaN@michigan.gov>
Subject: Re: Edwards Report Response

I have an issue with one sentence. I think the "they did not indicate@ could be qualified.

On Dec 21, 2015, at 2:14 PM, Eisner, Jennifer (DHHS) <EisnerJ@michigan.gov> wrote:

For your review asap.. the reporter has a 3 p.m. deadline..

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Regarding the FOIA, Mr. Edwards received all of the requested documents, with personal information redacted, on Friday, December 18.

Message

From: Eisner, Jennifer (DHHS) [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=E58A0110D9914D1395311D742E28B4C9-SMITH JENNI]
Sent: 12/21/2015 8:55:36 PM
To: Lyon, Nick (DHHS) [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=cc8bf601f48844a2b44c7e1bda929e38-Lyon Nick]
Subject: FW: Look for a statement

FYI, there was a follow up asking about the emails and I responded with:

There were seasonal increases during the third quarters of 2014 and 2015, but the extent of these increases were not apparent until zip code levels were analyzed. As a result of this process, we are thoroughly reviewing the way we analyze data. Our after action report will help determine how we conduct this process in the future.

-----Original Message-----
From: Eisner, Jennifer (DHHS)
Sent: Monday, December 21, 2015 3:55 PM
To: 'Dupnack, Jessica' <jessica.dupnack@abc12.com>
Subject: RE: Look for a statement

Hi Jessica:

There were seasonal increases during the third quarters of 2014 and 2015, but the extent of these increases were not apparent until zip code levels were analyzed. As a result of this process, we are thoroughly reviewing the way we analyze data. Our after action report will help determine how we conduct this process in the future.

Thank you,

Jennifer Eisner
Public Information Officer
Michigan Department of Health and Human Services
Office: 517-241-2112 or EisnerJ@michigan.gov
Cell: PPI

-----Original Message-----
From: Dupnack, Jessica [mailto:jessica.dupnack@abc12.com]
Sent: Monday, December 21, 2015 3:29 PM
To: Eisner, Jennifer (DHHS) <EisnerJ@michigan.gov>
Subject: RE: Look for a statement

I appreciate the reply.
I have one further question.

In this statement - "the increase appeared to be consistent with the routine seasonal fluctuation seen in the summer months."

BUT according to the data collected and notes provided by Cristin Larder on July 28, 2015 it specifically says:

"Based on the results depicted in Figure 3 positives tests for EBLL were higher than usual for children under age 16 in the City of Flint during the months of July, August and September, 2014."

While I understand a sample size in July can't reflect a direct correlation to the water switch - comparing summer 2014 to previous years AND accounting for seasonal variance - Larder wrote "there does appear to be a high proportion of EBLL last summer than usual"

I guess I am just confused how this report in July is consistent with what the department is saying now?

-----Original Message-----
From: Eisner, Jennifer (DHHS) [mailto:EisnerJ@michigan.gov]
Sent: Monday, December 21, 2015 3:18 PM
To: Dupnack, Jessica
Subject: RE: Look for a statement

Thanks for your patience on this.

The Michigan Department of Health and Human Services has consistently provided information regarding the city of Flint and blood lead levels.

When initially looking at the citywide and county elevated blood lead level numbers, the increase appeared to be consistent with the routine seasonal fluctuation seen in the summer months. It wasn't until the Hurley report came out that our epidemiologists took a more in-depth look at the data by zip code, controlling for seasonal variation, and confirmed an increase outside of normal trends. As a result of this process, we have determined that the way we analyze data collected needs to be thoroughly reviewed. Additionally, Gov. Rick Snyder has created a Flint Water Task Force to review all city, state and federal responses and actions and is expected to make recommendations moving forward.

The Michigan Department of Health and Human Services is focused on ensuring appropriate case management and follow up in Flint. Summary reports outlining blood lead level testing are posted online on a bi-weekly basis, and we work closely with local partners to fulfill data requests as we receive them.

Regarding the FOIA, Mr. Edwards received all of the requested documents, with personal information redacted, on Friday, December 18.

Jennifer Eisner
Public Information Officer
Michigan Department of Health and Human Services
Office: 517-241-2112 or EisnerJ@michigan.gov
Cell: PPI

-----Original Message-----
From: Dupnack, Jessica [mailto:jessica.dupnack@abc12.com]
Sent: Monday, December 21, 2015 3:15 PM
To: Eisner, Jennifer (DHHS) <EisnerJ@michigan.gov>
Subject: RE: Look for a statement

We are shooting to do the story at 5/6 this evening. Just wanted to give you a heads up.
Thanks.

-----Original Message-----
From: Eisner, Jennifer (DHHS) [mailto:EisnerJ@michigan.gov]
Sent: Monday, December 21, 2015 1:42 PM
To: Dupnack, Jessica
Subject: Re: Look for a statement

Thanks Jessica I'll get back to you soon

Sent from my iPhone

> On Dec 21, 2015, at 1:09 PM, "Dupnack, Jessica" <jessica.dupnack@abc12.com> wrote:
>
> Here is a link to the article posted by Edwards.
>
> http://flintwaterstudy.org/
>
> Let me know if/when MDHHS will have a statement. Thank you.
>
> -----Original Message-----
> From: Eisner, Jennifer (DHHS) [mailto:EisnerJ@michigan.gov]
> Sent: Monday, December 21, 2015 10:31 AM
> To: Dupnack, Jessica
> Subject: RE: Look for a statement
>
> Thanks Jessica. We will review the report, when it's available, and get back to you.
>
> Be in touch soon,
>
> Jennifer Eisner
> Public Information Officer
> Michigan Department of Health and Human Services
> Office: 517-241-2112 or EisnerJ@michigan.gov
> Cell: PPI
>
> -----Original Message-----
> From: Dupnack, Jessica [mailto:jessica.dupnack@abc12.com]
> Sent: Monday, December 21, 2015 10:00 AM
> To: Eisner, Jennifer (DHHS) <EisnerJ@michigan.gov>

> Subject: RE: Look for a statement
>
> I'm sorry! I was in a meeting.
>
> Michigan Health Department Hid Evidence of Health Harm Due to Lead Contaminated Water
>
> This is the title of their preliminary report about the documents that were FOIA'd from MDHHS
>
> -----Original Message-----
> From: Eisner, Jennifer (DHHS) [mailto:EisnerJ@michigan.gov]
> Sent: Monday, December 21, 2015 9:56 AM
> To: Dupnack, Jessica
> Subject: RE: Look for a statement
>
> I think there was a typo in your email below re: the headline of the report.. can you tell me again what the headline is?
>
> Jennifer Eisner
> Public Information Officer
> Michigan Department of Health and Human Services
> Office: 517-241-2112 or EisnerJ@michigan.gov
> Cell: [redacted]
>
> -----Original Message-----
> From: Dupnack, Jessica [mailto:jessica.dupnack@abc12.com]
> Sent: Monday, December 21, 2015 9:40 AM
> To: Eisner, Jennifer (DHHS) <EisnerJ@michigan.gov>
> Subject: Look for a statement
>
> Hello! I received some information from Marc Edwards this morning regarding some FOIA information that he received. I'm wondering if you are aware of the documentation he's received? And if the department has any comment.
>
> The "headline" of their report is "Michigan Health department his evidence of health had due to lead contaminated water"...so clearly some strong statements with the FOIA documents as source citing. Let me know if you have any comment! Thanks again.
>
> Thanks!
> Jessica Dupnack

From: Scott, Robert L. (DCH)
Sent: Friday, September 11, 2015 1:49 PM
To: Cooper, Jessica (DCH)
Subject: flint water
Attachments: Rapid Proposal Final.pdf

Robert L. Scott
Childhood Lead Poisoning Prevention Program
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Overview: Flint, MI, is currently suffering from a "perfect storm" attributable to out-of-control corrosion of its potable water distribution system. The corrosion is undermining water affordability for residents, financial viability of city government, water aesthetics, and hygiene/sanitation as revealed in local and national news reporting. We ***hypothesize*** that these circumstances will also create severe chemical/biological health risks for Flint residents, including elevated levels of lead and opportunistic premise plumbing pathogens (OPPPs) in drinking water. Preliminary data collected from a home of a lead poisoned child in Flint has revealed extraordinarily high levels of lead, with average concentrations over 20 minutes of water use exceeding 2,000 ppb (> 200 times the World Health Organization allowable levels for lead in potable water).

The main ***objectives*** of this research are to: 1) compare levels of chlorine, iron, fecal indicator bacteria, OPPPs, and corrosion-inducing bacteria present in water mains of a distribution system with uncontrolled corrosion (Flint) versus surrounding cities/counties still using non-corrosive water, 2) profile OPPPs occurrence in hot and cold potable water systems at these same locations, and 3) determine if there is evidence of elevated lead in Flint homes, and, if so, forensically determine the links to iron corrosion. Our team is uniquely qualified to do this work given our just published peer reviewed research on this subject and our extensive collaborations with key stakeholders in Flint.

Intellectual Merit: The four elements of the "perfect storm" currently undermining water quality (and possibly public health) in Flint include: a) chronic underinvestment in water infrastructure, b) under-appreciation of the role of corrosion control in sustaining urban potable water systems, c) increased corrosion due to higher chloride in Flint's new source water, and d) failure to appropriately monitor for lead and OPPPs. The latter two factors are amongst the most important health problems arising in modern potable water systems. The high rates of corrosion occurring in Flint are releasing high levels of iron to water and consuming chlorine disinfectant, which our most recent laboratory testing has indicated will increase lead release to water and growth of OPPPs in cold and hot water plumbing systems. The unfortunate but unique opportunity offered by Flint's current situation, provides an ideal opportunity to field test our recent discoveries regarding potentially adverse consequences of iron corrosion on chemical/microbiological water quality at field rather than laboratory scale.

Broader Impacts: This RAPID grant will directly assist residents of Flint in assessing the current safety of their potable water supply. If the results support recently issued public assurances regarding safety of water, the current problems in Flint can be considered mainly of aesthetics and perception due to very distasteful or discolored water. However, if sampling reveals widespread problems, the public will learn of the potential health threat. Since elements of the "perfect storm" afflicting Flint are occurring at some level in many other financially stressed U.S. urban centers with decaying drinking water infrastructure, this Rapid Response Research (RAPID) grant also provides an unprecedented opportunity to advance fundamental scientific and practical understanding at this emerging nexus of infrastructure-environmental engineering-public health. The general results and approach used herein can inform residents and managers of other U.S. cities, who will soon be dealing with similar problems associated with failing potable water infrastructure exacerbated by increased chloride in water due to excessive use of road salt and rising sea levels. The research also provides a compelling case study in *Citizen Science*, since the experiences of Flint parents in monitoring their children's health and environmental exposures was a trigger for our preliminary testing, and Flint consumers will be scientifically empowered by participating in fundamental research relying on collection of samples from their homes and residences. There is also a social justice implication of the research, in that these results can help inform the current policy debate regarding strategies for dealing with cites that have gone bankrupt, as well as the discussion of access to safe and affordable drinking water as a basic human right.

RAPID: Synergistic Impacts of Corrosive Water and Interrupted Corrosion Control on Chemical/Microbiological Water Quality: Flint, MI

1. Problem Statement and Objectives

Flint, MI, is currently suffering from a "perfect storm" due to out-of-control corrosion of its potable water distribution system, undermining the well-being of the community including water affordability for residents, financial viability of city government, water aesthetics, and hygiene/sanitation.[1-13] Flint's problems began in April 2014, when emergency managers hired to deal with the city's fiscal crisis determined they could save money by switching to a local river water source as opposed to purchasing water from Detroit (Table 1). As a result of the change in source water, the Larson Iron Corrosion Index was raised from 0.54 (low corrosion) to 2.3 (very high corrosion) and the chloride to sulfate mass ratio (CSMR) index for lead corrosion increased from 0.45 (low corrosion) to 1.6 (very high corrosion). Concurrently, the managers and state primacy agency attempted to save even more money by not feeding an orthophosphate corrosion inhibitor to the water supply (Table 1).

Table 1. Water quality parameters for drinking water supplied in Flint, MI before and after the April 2014 switch

Parameter	Before[1]	After[2]
pH	7.38	7.61
Hardness (mg/L as $CaCO_3$)	101	183
Alkalinity (mg/L as $CaCO_3$)	78	77
Chloride (mg/L)	11.4	32
Sulfate (mg/L)	25.2	41
CSMR[3]	0.45	1.6
Inhibitor (mg/L as P)	0.35	NONE
Larson Ratio[4]	0.5	2.3

[1]Source: City of Flint Monthly Operation Report, June 2015. Available from www.cityofflint.com
[2]Source: DWSD 2014 Water Quality Report. Available from www.dwsd.org
[3]A measure of corrosivity to lead; a value > 0.5 is a critical trigger [10]
[4]A measure of corrosivity to mild steel and iron; corrosion rate increases linearly with Larson Ratio [8]

Not surprisingly, the combined effect of more corrosive water and removal of the corrosion inhibitor unleashed unprecedented corrosion in the water main distribution system with cascading personal, economic, and public health consequences to Flint as tracked by news reports and mandatory chemical/biological monitoring of water in the distribution system mains.[1-14] ***Our recent research also predicts that these circumstances will potentially create severe chemical/biological health risks for residents, due to impacts on water within building (premise) plumbing systems that include elevated levels of lead and opportunistic premise plumbing pathogens (OPPPs).***[15-18] Because the factors impacting Flint are also occurring at some level in many other financially-stressed U.S. urban centers with decaying drinking water infrastructure, this ***Rapid Response Research (RAPID) grant provides an unprecedented opportunity to advance fundamental scientific and practical understanding at this emerging nexus of infrastructure-environmental engineering-public health.*** We view August-September 2015 as the ideal time to first sample in Flint, as more than 16 months of uncontrolled corrosion have occurred and the water remains near its seasonal peak temperature, maximizing the likelihood of serious problems with lead and OPPPs if they exist.

Our key hypothesis is that the rapid corrosion of iron water mains will dramatically increase lead release to water and growth of OPPPs as measured in consumers' homes. Mechanistically, higher iron corrosion produces both higher iron in water and lower levels of free chlorine, both of which dramatically increased lead release and OPPPs regrowth in our just published laboratory research utilizing simulated distribution systems.[15-19] The ***main objectives of this research*** are to: *1) compare levels of chlorine, iron, fecal indicator bacteria, OPPPs, and corrosion-inducing bacteria present in water mains of a distribution system with uncontrolled corrosion (Flint) versus controlled corrosion in surrounding cities/counties still using non-corrosive Detroit water, 2) profile hot and cold potable water systems at the same sampling locations in #1 for OPPPs, and 3) determine if there is evidence of elevated lead in Flint homes, and, if so, forensically determine the links to iron corrosion.*[15,17-20] The unfortunate but unique opportunity offered by Flint's current situation provides an ideal opportunity to field test our recent discoveries regarding adverse consequences of iron corrosion on OPPPs and lead concentration at the tap.

2. Review of Local Events and Intellectual Merit

Local Impacts. After the switch of water sources, residents of Flint were immediately subject to an outbreak of corrosion-related drinking water problems including flooding from large water main breaks and reported health ailments.[1-6] General Motors, a prime customer of the water system, reported that the new water was severely corroding auto parts on its assembly line and had to begin importing water, costing the city $400,000 in lost revenue.[9] The PI was also alerted by an Environmental Protection Agency volunteer to a case of childhood lead poisoning in a Flint home that was certified as "lead free."[4] Samples collected from the home exhibited classic "red water" that is occurring throughout the city (Figure 1), along with the highest sustained levels of lead in drinking water that we have encountered in over 25 years of research on the subject. Specifically, in 30 samples collected over a period of 25 minutes flushing at the kitchen faucet, lead concentrations averaged over 2,000 ppb and were as high as 13,000 ppb. For perspective, these levels are more than 200-1,300 times higher than World Health Organization standards (10 ppb) and several even exceeded the EPA criterion for "hazardous waste" of 5,000 ppb Pb. The city has also reported unspecified economic losses due to water main breaks and water losses through leaks.[3,7,11-12]

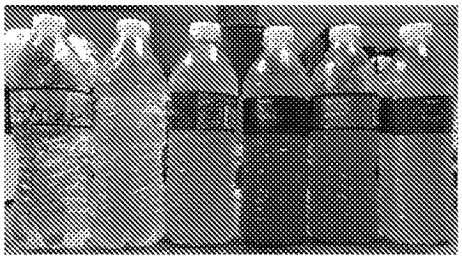

Figure 1. Drinking water samples collected from home of a child who was lead poisoned by Flint water.

The corrosion problems have also had cascading impacts on health parameters monitored under federal regulations. Because the corrosion is rapidly consuming chlorine disinfectant in the water, the city violated EPA limits for *E. coli*.[5-6] The detaching iron rust also has the potential to expose consumers to other contaminants that pose a serious public health risk, including arsenic[14] and lead that have accumulated in pipes or sorbed to iron surfaces.[15-16] Health effects reported by residents since the switch include skin rashes, hair loss, vomiting, copper poisoning, and the one confirmed case of lead poisoning.[2-4,7,13] However, the relatively small number of cases reported to date almost certainly underestimates the full extent of the problem. In response to the sampling showing high lead, the authorities who made the decision to switch water sources and stop adding corrosion inhibitor publicly stated that "anyone who is concerned about lead in the drinking water in Flint can relax" and that the water is safe,[44] but refuse to sample consumers' water without pre-flushing the plumbing for at least 5 minutes the night before sampling. The latter practice is known to miss lead in water problems.

We are also concerned about possible health effects that have not yet been investigated. For example, in March 2015 Region 5 EPA was provided reports of higher incidence of Legionnaires' disease associated with bacteria growth in premise plumbing in the Flint area.[21] Legionnaires' disease has recently been acknowledged to be the primary source of waterborne disease outbreaks (and associated deaths) in the U.S.[22] Despite that acknowledged risk, there is currently no required monitoring for this important pathogen in consumers' homes, where it proliferates and can lead to human exposure and infection in showers.[22]

Intellectual Merit. The four elements of the "perfect storm" currently undermining water quality (and possibly public health) in Flint include: a) chronic underinvestment in water infrastructure, b) under-appreciation of the role of corrosion control in sustaining urban potable water systems, c) increased corrosivity of water sources nationally due to rising chloride levels from anthropogenic pollution and/or rising sea levels, and d) failure to appropriately monitor for lead and OPPPs, which are two of the most important modern-day public health problems arising in building plumbing systems.

a) Chronic Underinvestment in Water Infrastructure. A large fraction of the nation's potable water infrastructure is on the verge of failure, and this problem has been repeatedly voted by

members of the American Society of Civil Engineers (ASCE) as the most urgent societal infrastructure challenge with an overall condition grade of "D".[23,24] Many water main distribution systems are reaching the end of their design lifetime (60-95 years), with water main breaks currently at a rate of 240,000 per year nationally and rising.[25,26] Aside from obvious public health implications associated with compromised delivery of uncontaminated drinking water to the tap, failure events can cause property damage and water loss through leaks.[27] Like many post-industrial manufacturing centers, Flint has a very large potable distribution system constructed to sustain a large consumer and industrial base that no longer exists. The projected cost to upgrade the distribution system is $1.5 billion dollars,[28] which would translate to an unbearable cost of $50,000 per existing customer in Flint.[28]

b) **Under-appreciation of the role of corrosion control in sustaining potable water systems.** Estimates by ASCE, the American Water Works Association (AWWA), the Environmental Protection Agency (EPA), the Water Infrastructure Network (WIN), and the National Academy of Corrosion Engineers (NACE) suggest that direct costs of water pipeline corrosion range between $8 billion - $36 billion annually and indirect costs are much higher.[27] Leaks result in 7 billion gallons of lost water each day with associated revenue losses of ≈ $3 billion per year for U.S. utilities.[29] Problems with leaking potable water plumbing systems in buildings (i.e. premise plumbing) also cost consumers billions of dollars each year.[30,31] Water utilities can reduce costs of potable water system corrosion and extend the lifetime of these invaluable assets by adding corrosion inhibitors, such as orthophosphate, to the water. Prior research using a relatively low corrosivity source water determined that each dollar invested in corrosion control produced more than $5 dollars in financial savings due to reduced corrosion damage and extended lifetime of pipeline infrastructure.[32] In Flint, the short-sighted decision to reduce chemical costs by removing the corrosion inhibitor and introducing corrosive water to the system may have produced tens if not hundreds of millions of dollars in corrosion damages to its existing potable water distribution system. We are also aware of many other utilities that are cutting back on their corrosion inhibitor doses due to cost-cutting pressures.

c) ***Increased corrosivity of water sources nationally due to rising chloride levels from anthropogenic pollution and/or rising sea levels.*** Chloride levels in drinking water are rising nationally in surface water due to use of road salt and seawater intrusion in coastal regions. Road salt use in winter has risen to 137 lbs per year for every American, with a doubling of salt application from 1990 to 2014 (10 vs. 22 million tons) associated with a doubling of chloride levels in northern U.S. waters as monitored by the USGS.[33,34] There is documented concern about the damage of salt application to infrastructure such as roads and bridges,[35] but rising salt levels in the Potomac (due to road salt) in 2015 also have triggered a spike in consumer complaints of red or brown water from their main distribution system.[36,37] and we are currently working with a utility in Brick, NJ that is reporting high lead in consumers' water due to higher chloride from rising sea levels near their intake as well as road salt use.[38-40] The higher corrosivity of water in Flint due to higher chloride (Table 1), therefore provides an interesting "acute" case study of higher chloride impacts that can shed light on these important national trends.

d) ***Failure of utilities and regulatory agencies to take responsibility for the two most important modern day public health problems arising in building plumbing systems (i.e., lead and OPPPs).*** For ten years EPA has acknowledged that utilities are collecting samples in a manner that "misses" worst case lead in water,[41-43] and to date they have not required utilities to change monitoring practices to better reveal problems. The EPA LCR sampling protocols have been under review since 2008 and the EPA is expected to issue new requirements sometime in 2016. Hence, sampling in Flint without "pre-flushing" to reduce lead, as revealed by the EPA

volunteer,[4] could inform modifications to the EPA LCR. Likewise, EPA's current regulations on Legionella consider only levels that might be present in water leaving the treatment plant, where it is least likely to be present, and do not yet require monitoring at the point of entry into homes or within buildings where Legionella is most likely to be present and cause disease.[21] Our proposed sampling for Legionella at these locations can therefore inform future regulation and distribution system management policies for dealing with this emerging public health risk.[19,22]

In summary, this proposed RAPID grant characterizing the occurrence of chemical/biological problems in Flint, MI homes explores a newly emerging nexus between degrading infrastructure-environmental engineering-public health that can provide insight into problems facing many cities all over the United States.

3. Approach

The ***RAPID grant objectives*** will be achieved through three phases of sampling, using analytical methods in routine use by the project team, as follows:

Phase 1. Compare levels of chlorine, iron, fecal indicator bacteria, OPPPs, and corrosion-inducing bacteria present in water mains of a distribution system with uncontrolled corrosion (Flint) versus controlled corrosion in surrounding cities/counties still using non-corrosive Detroit water. A team including the PI and at least 3 graduate students will travel to Flint and stay 3-7 days in mid-August 2015, to collect 8 distribution system samples from surrounding cities still using Detroit water, and to also sample Flint's 8 distribution system monitoring locations (Figure 1). We will stay in two hotel rooms, one located in Flint and one in a surrounding location on Detroit water, to conveniently collect samples for free chlorine at 2 hour intervals expected to correspond to lowest and highest daily demand. All of these analyses will be conducted using standard methods with the exception of testing for corrosion-inducing bacteria which will be conducted with Biological Activity Reaction Test (BART) kits. BARTs are standardized colorimetric culture kits that are semi-quantitative and include testing for Sulfate-Reducing Bacteria (SRB), Heterotrophic Aerobic Bacteria, Heterotrophic Anaerobic Bacteria, Denitrifiers, Slime Forming Bacteria, and Acid Producing Bacteria (APB). It is hypothesized that the Flint waters will have much lower levels of free chlorine, higher levels of iron, corrosion-inducing bacteria, and fecal indicator bacteria than samples collected from locations still on Detroit water.

Phase 2. Profile building hot and cold water plumbing systems for OPPPs at the same sampling locations used in Phase 1. Protocols used previously to sample for a suite of OPPPs and two host protozoa[18,20] in hot and cold water from taps and biofilms of buildings using quantitative Polymerase Chain Reaction (q-PCR) analysis, will be used to profile the hot and cold water systems for human pathogens at the same locations tested in Phase 1. Specifically, target microbes including *Legionella pneumophila, M. avium, P. aeruginosa, Acanthamoeba and Vermamoeba vermiformis* will be quantified by qPCR, and hot water samples will be cultured for *Legionella* and

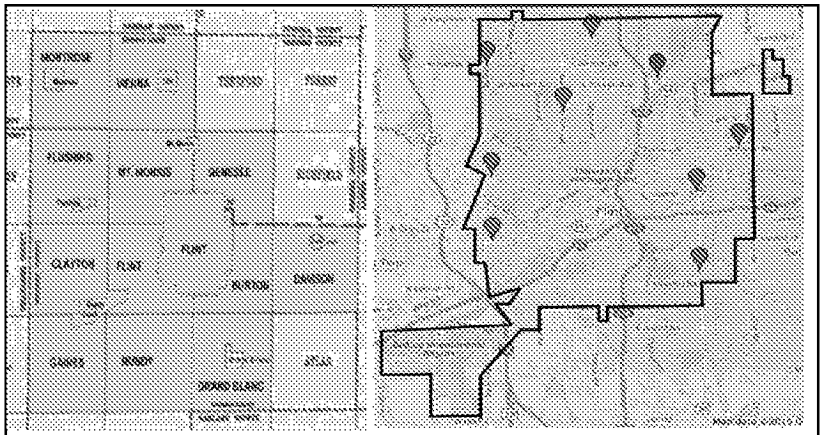

Figure 2. Blue areas indicate areas served by Detroit water before the city of Flint switched (left) and distribution of Flint monitoring stations (right).

Mycobacteria from each location. Samples collected for microbial analysis and fecal indicator bacteria (Phase 1) will be overnight shipped from Michigan via cold-pack using protocols developed by the project team on NSF Project CBET-1438328. In Flint, for comparison, at least three additional privately owned homes will be sampled for OPPPs using the same protocols as for the public buildings.

Phase 3. Determine if there is evidence of elevated lead in Flint homes. We will coordinate with several local citizen groups including the American Civil Liberties Union (ACLU), **Concerned Pastors for Social Action**, and others to sample homes in Flint for lead in water. We will prepare 300 sampling kits with instructions, to collect water samples according to standard EPA LCR protocols for shipment to community groups. Each kit will contain three bottles to sample water after standard water stagnation (> 6 hours) at typical-use flow rates, including 1) first draw standard LCR (1 liter), 2) 45 second flushing 0.5 liter sample (targeting the lead service line, if present), and 3) 5 minutes of flushing 0.25 liter sample. Each kit will have a sample form to fill out information including 1) name of person collecting sample, 2) age of home (if known), 3) mailing address of home sampled, and 4) date of sample collection. A phone number will be provided of a member of the Virginia Tech team, who can answer questions that residents have about the instructions (if any). Residents will be instructed to return the sampling kits to a centralized location according to procedures that best suit each citizen group. The sample kits will then be put into boxes provided by the project team, and shipped back to Virginia Tech with the postage paid by the RAPID grant. Assuming a response rate of 33%, 300 samples (= 0.33 X 300 X 3 bottles per kit) will be analyzed for lead, iron, copper and other constituents using the PI's Inductively Coupled Plasma Mass Spectrometer (ICP-MS). All returned kits will be analyzed, and results will be summarized in a letter to each consumer to be sent out within 1 month of receiving the samples. We will provide a phone number of a senior research scientist (Dr. Jeff Parks) that the residents can call to ask questions about their results if they have them and compile the results in a summary form for research publications and public outreach.

4. Project Management and Prior NSF Support

The senior project team (Edwards, Pruden, Falkinham) has collaborated together extensively and has a strong record of success. They will be assisted in leading the project by Dr. Brandi Clark (former NSF graduate fellow) who is a recent graduate of Virginia Tech (2015). Edwards and Clark will coordinate the Flint site visit and the lead survey. Another NSF graduate fellow (Emily Garner, formerly Emily Lipscomb) who is currently co-advised by Pruden/Edwards will assist the Flint site visit team and coordinate biological sample analysis and shipments. Pruden and Falkinham will assist in the data analysis, interpretation and write-up of the results.

5. Broader Impacts

In addition to improving practical and scientific understanding related to two of the most important problems associated with potable water and health in consumer homes (i.e., lead and OPPPs), this RAPID grant will directly assist residents of Flint in assessing the safety of their potable water supply. The results and approach used herein can inform residents and managers of other U.S. cities who will soon be dealing with similar problems associated with failing potable water infrastructure and increased corrosivity of potable water. Phase 3 of this research also provides an interesting case study in *Citizen Science* as a tool to advance scientific understanding, policy, and public health, because consumers are actively collecting samples from their homes and will be participating in National Science Foundation research. The work also has social justice implications, as the plight of Flint residents has already received national attention, and results can inform the current debate regarding access to safe, affordable water as a "right" for Americans in U.S. cities.

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From: Peeler, Nancy (DHHS)
Sent: Thursday, October 01, 2015 5:59 PM
To: Scott, Robert L. (DHHS);Lishinski, Karen (DHHS);Cooper, Jessica (DHHS);Emily Houk R2P (emily@r2pconsultants.com);Lounds, Elizabeth (DHHS)
Subject: documents plus THANKS
Attachments: Blood Lead Level (BLL) Quick Reference for Primary Care Providers.pdf; Lead Screening & Testing for Safe, Healthy Michigan Kids.pdf; Parent Handout Is Your Child Safe From Lead Poisoning.pdf; Pregnant and Nursing Mothers and Lead.pdf

OK, FYI, attached are the final documents that were posted on our website today by Jeff Ellsworth. I believe they will be referenced in the press conference tomorrow. Yes, Gov is holding a big press conference tomorrow, watch your email, stay tuned, (online TV?). I think it is in Flint, but don't quote me on that.

Angela talked in a meeting today about our toolkit and plans to introduce it later this month since this pesky lead problem existed before and continues to exist both in Flint and statewide, great that there will be continued attention. These attached documents will be kind of a preview.

Some thank you's -

Emily, many thanks for the last minute speedy work on the breastfeeding document, and just plain making the rest of the materials look great, and set all of us (CLPPP and MDHHS) for a big push later this month!

Karen, thank you for finding that research that made the breastfeeding document easy to create, and for tracking what is happening in Flint and keeping the day to day work going for all of the other kids.

Jess, you are a rock of stability with your headphones on, plugging away at all that data which has become so incredibly important in the Epi analysis, and in helping people to get a picture of what is happening in Flint and statewide.

Bob, you've pushed so much through in a short period of time, responding with such grace and kindness with each request, even the ornery ones. Thank you for your positive attitude and great work, the Department TRULY couldn't do it without you!!!

And Beth – you just keep laughing at me as I flit around, which is good, the humor is needed!

Thank you, everyone!

Nancy

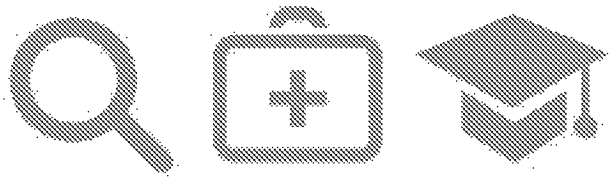
This Document is a Non-Responsive Attachment.

Lead Screening & Testing For Safe, Healthy Michigan Kids

A program with PREVENTION at its core!

Lead poisoning remains a health hazard for children in communities across Michigan. With proven links to biological and neurologic damage, lead exposure is a major factor in lifelong learning, aggression, and behavior problems. These challenges have downstream impacts on the state's budget through higher special education and incarceration costs, as well as diminished productivity and lost tax revenue.

Effective screening and testing programs offer a clear, low-cost way of identifying and promptly addressing cases of lead exposure.



Michigan's Childhood Lead Poisoning Prevention Program (CLPPP) concentrates on SURVEILLANCE, NURSING ASSISTANCE and EDUCATION to ensure that parents, medical professionals and policy makers have the information they need to identify, assess and care for Michigan's children.

Surveillance

CLPPP provides a statewide lead monitoring system that requires elevated blood lead results to be shared among state and local agencies, and for aggregated data to be reported to the Legislature annually.

155,919

Blood Lead Level (BLL) results processed in 2014 through Michigan's surveillance system

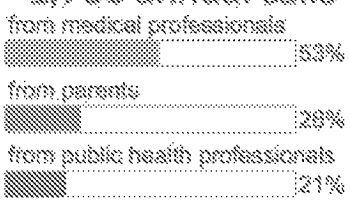
45

Different reports prepared for stakeholders like health departments, lead abatement programs and Legislature each year

Nursing Assistance

Technical assistance that ensures health care providers are supported in managing and coordinating services to children with elevated blood lead levels.

1,900 annual calls



20%

of children less than six years old were tested for lead poisoning in 2014

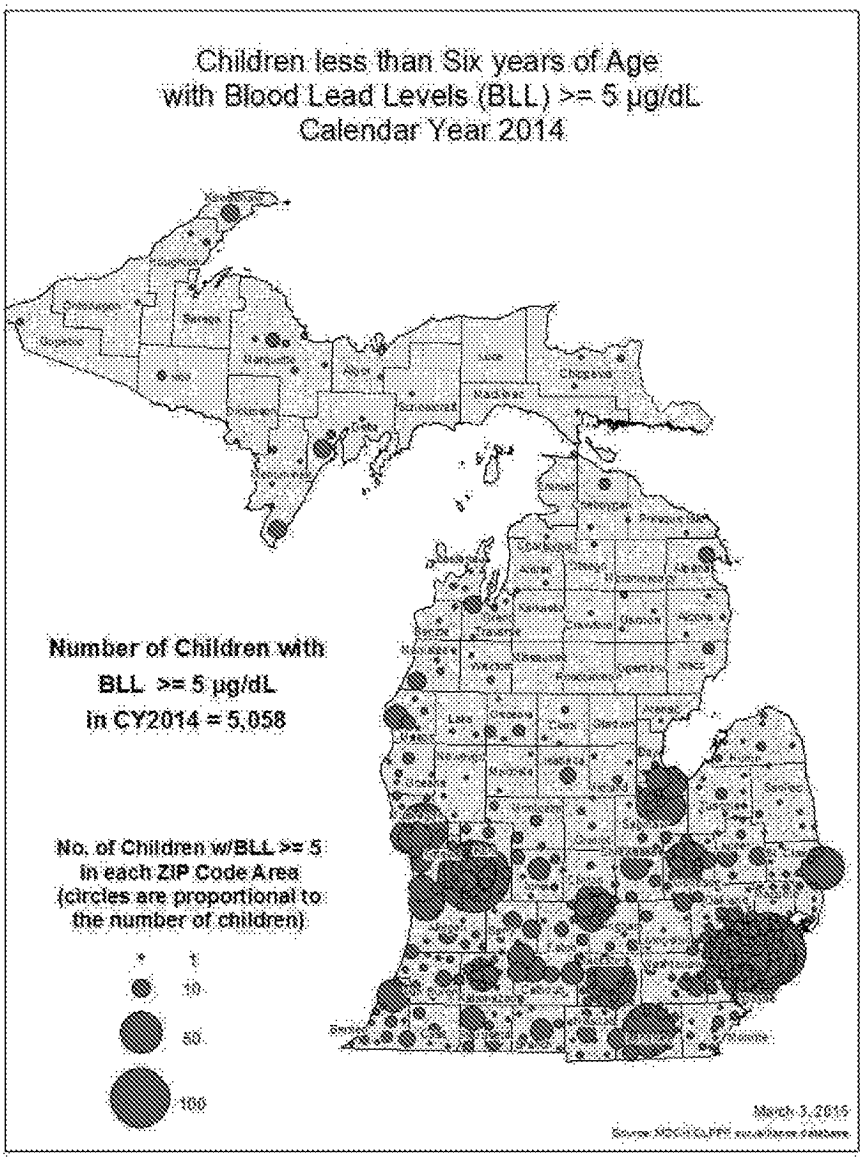
5,058

children tested who were identified with blood lead levels >= 5 ug/dL (3.5%)

Education

Statewide community outreach to parents, health care providers, child care providers, public schools, and homeowners/tenants.

- prevention focused
- aimed at awareness
- designed for in-home support for families



Childhood lead poisoning is preventable.

In 2015, boosting PREVENTION education and TARGETED IN-HOME INTERVENTIONS like safe cleaning techniques and temporary fixes is our #1 goal.

Visit our website to learn more:
www.michigan.gov/lead

MDHHS
Michigan Department of Health & Human Services
RICK SNYDER, GOVERNOR | NICK LYON, DIRECTOR

Childhood
LEAD POISONING
prevention program

From: Scott, Robert L. (DCH)
Sent: Friday, February 14, 2014 3:51 PM
To: Speidel, Carin (DCH);Amy Zaagman;Carol Austerberry;Chris Lerchen;Clay Powell;Dohn Hoyle;Donnavan O'Neal;Ed Wenz;Edward Wenz;Jessica Yorko;Jill Keast;John Hellmuth;Mary Morrow;Mary Sue Schottenfels;Pam Smith (pamela@urbanregenerationllc.com);Paul Diegelman;Paul Haan;Rashard Montgomery;Rebecca Meuninck;Rod McNeill;Vern Johnson;Priem, Wesley F. (DCH);hugh@environmentalcouncil.org;Finis Adams (southfieldfinis@aol.com);Matthew Baird (mbaird@saginawcounty.com);Cindy Baker (baker6@chartermi.net);Angelo Bateast (angelobateast@yahoo.com);John Bower (Johnnysgirl2x3@yahoo.com);Rick Bremer (RickB@ci.royal-oak.mi.us);Barry Brown (blbrown1@sbcglobal.net);Dale Brown (dbrown4913 @aol.com);glennbrown@hotmail.com;Thomes Carpenter (thomes.carpenter@perform-env.com);Copeland, James (DCH);Davis, Matthew (DCH);Jean Doss;Harry Dryer (harry.etc@gmail.com);Elizabeth@environmentalcouncil.org;Mat Gervais (mcgervais27 @gmail.com);Robert Grutza (bghomeimprovement@gmail.com);Donnez Hemphill (donnezhemphill@ymail.com);Ken Holton (kholton@grcity.us);Stephanie Horn (horns@aktpeerless.com);Levil Iroha (liroha@waynecounty.com);Viv Jaunais (VJaunais@yahoo.com);Bruce Jones (JISLConstruction@gmail.com);Kimmel, Barb (Barb.Kimmel@lansingmi.gov);Kyle King/Ernest King (topnotchlead@gmail.com);John Hank Klein (hammer77x@aol.com);Krista (kb@clearcorpsdetroit.org);Steven Leggat (steve.leggat@aol.com);Lishinski, Karen (DCH);Robbie McFarlin (robbiemcfarlin84 @gmail.com);Mehrotra, Anupama (DCH);amanda@dandeliondetroit.com;Mueller, Ann (MSHDA);Debbie Murray (Debbie.matyka@yahoo.com);Jane Nickert (jnickert@ipophealth.org);Daniel Pauzos (DAPAUZUS@gmail.com);Peeler, Nancy (DCH);courtcpen@hotmail.com;Jennifer Pendley (mirockgirl@yahoo.com);Ebert, Debbie (DHS);Ken Priest (kpriest@bchdmi.org);Nicole Rodden-Bowen (nrodden-bowen@cityofbentonharbormi.gov);rustemki@gmail.com;Siwatu Salama-Ra (siwatu@emeac.org);Alexander Samul (Alex.samul@gtjonline.com);waylon Sanford (wavon15@gmail.com);Angie Sarbo (angela.sarbo@wayne.edu);janice_schnorberger@monroemi.org;Deborah Skalecki (dskalecki@bchdmi.org);Ian Smith (ian.orland@gmail.com);Smith, Paulette (MSHDA);Smith, Steve M. (DCH);Lyke Thompson;Kevin Ushery (kevinushery@yahoo.com);Jerry Watson (watsonjerry1@att.net);Dawn Winther (dawnwinther@att.net);Alanna M. Woolley;Darnell Jackson (amproconstruction@sbcglobal.net);Scott Brown (buildit1971@gmail.com);Bob Cannon (rdcio@sbcglobal.net);David Farmer (dlfarmer@ci.battle-creek.mi.us);Randy Herbert (rherbert@saginaw-mi.com);Kenneth Drew Gulliver (drew0412 @hotmail.com);Alan Martin (amartin@falcon-usa.com);Joseph Burley (fets@att.net);Jason McMillin/John Soisson (gtlo@live.com);David Solis (sansolis08 @comcast.net);Irene Smith (greentree@grntree.net);Steve Cousineau;Hayward, Nancy (NHayward@ingham.org);Celia Henderson (celiaehenderson@hotmail.com);Randy Jarzembowski (rjarz@mac.com);Jeff Suty (jsuty@jettenvironmental.com);Linnie Petersen (linnieshomerepairservice@gmail.com);Garcia, Deborah (DCH);Jaquette, Leslie (DCH);Tina Reynolds;Michael Barclay (michiganleadpaintinginspectors@gmail.com);Deborah Socier (dsocier@co.midland.mi.us);Joe Fehler (joefehler@aol.com);Nicole Perry

To:	(nicolemiperry@aol.com);David Baxter (PetroDataRes@comcast.net);Ben Calo (ben@probeenv.com);Jim Leale (alresconce@aol.com);Dawn Hallwood;soniccityllc@yahoo.com;Thomas F. Kendriorski (tfk@thearcoakland.org);Don McKnabb (don.mcnabb@triterra.us);Ashley Ciaffone (WCPOlead@gmail.com);jxp2039 @yahoo.com
Cc:	peelern@michgan.gov;Cooper, Jessica (DCH);Howard, Javier (DCH)
Subject:	For MIALSH members - 2013 CLPPP Data Report
Attachments:	2013 CLPPP Data Report PRELIM.pdf

Hello all,

Please see attached PRELIMINARY report. For the final report, the numbers will change slightly but the percentages probably won't.

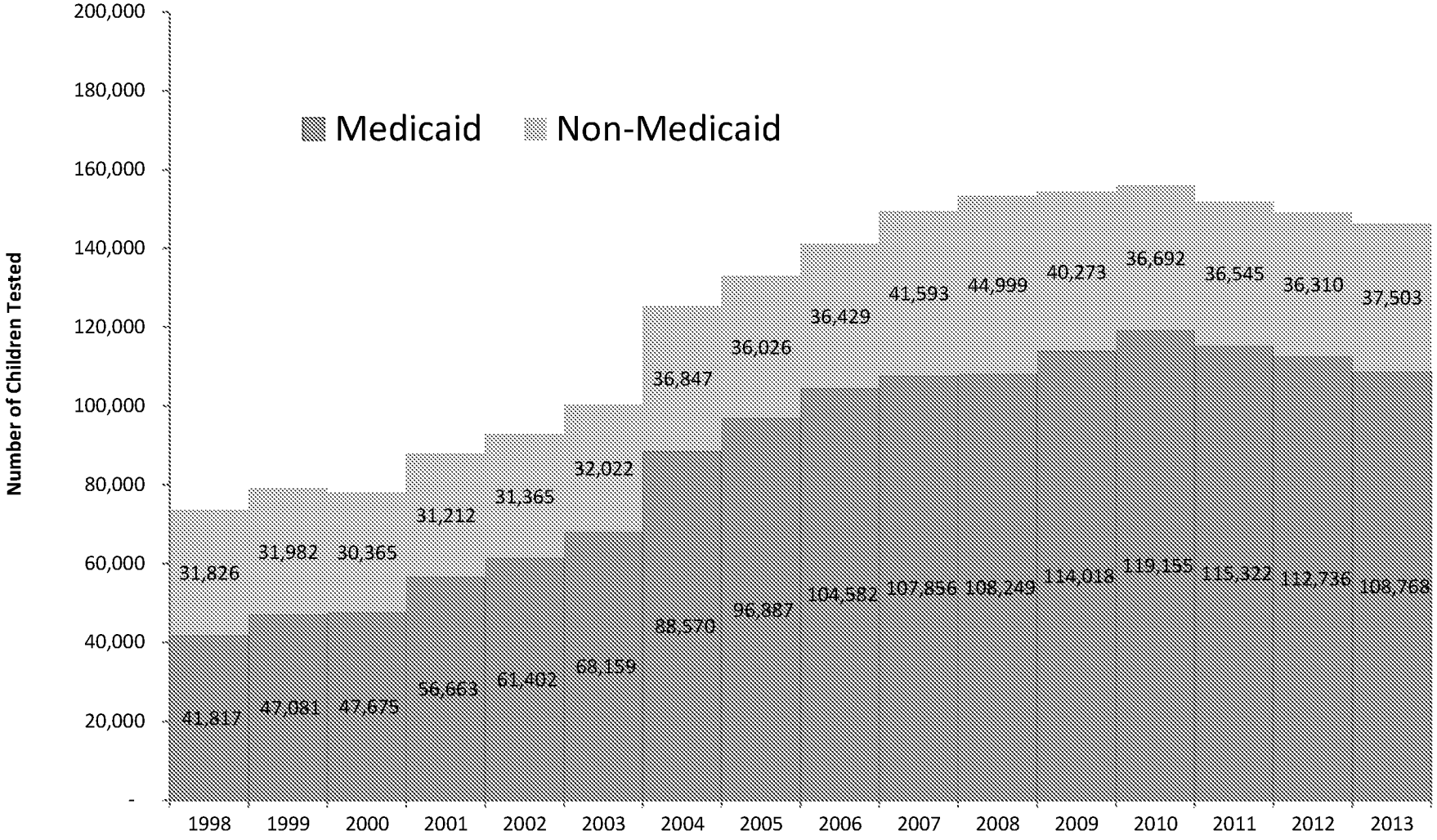
Blood lead testing is down slightly from last year (which has been a recent trend). Elevated blood lead levels are down by number and percentage, as they have been almost every year since we started tracking them.

Let me know if you have questions.

Bob

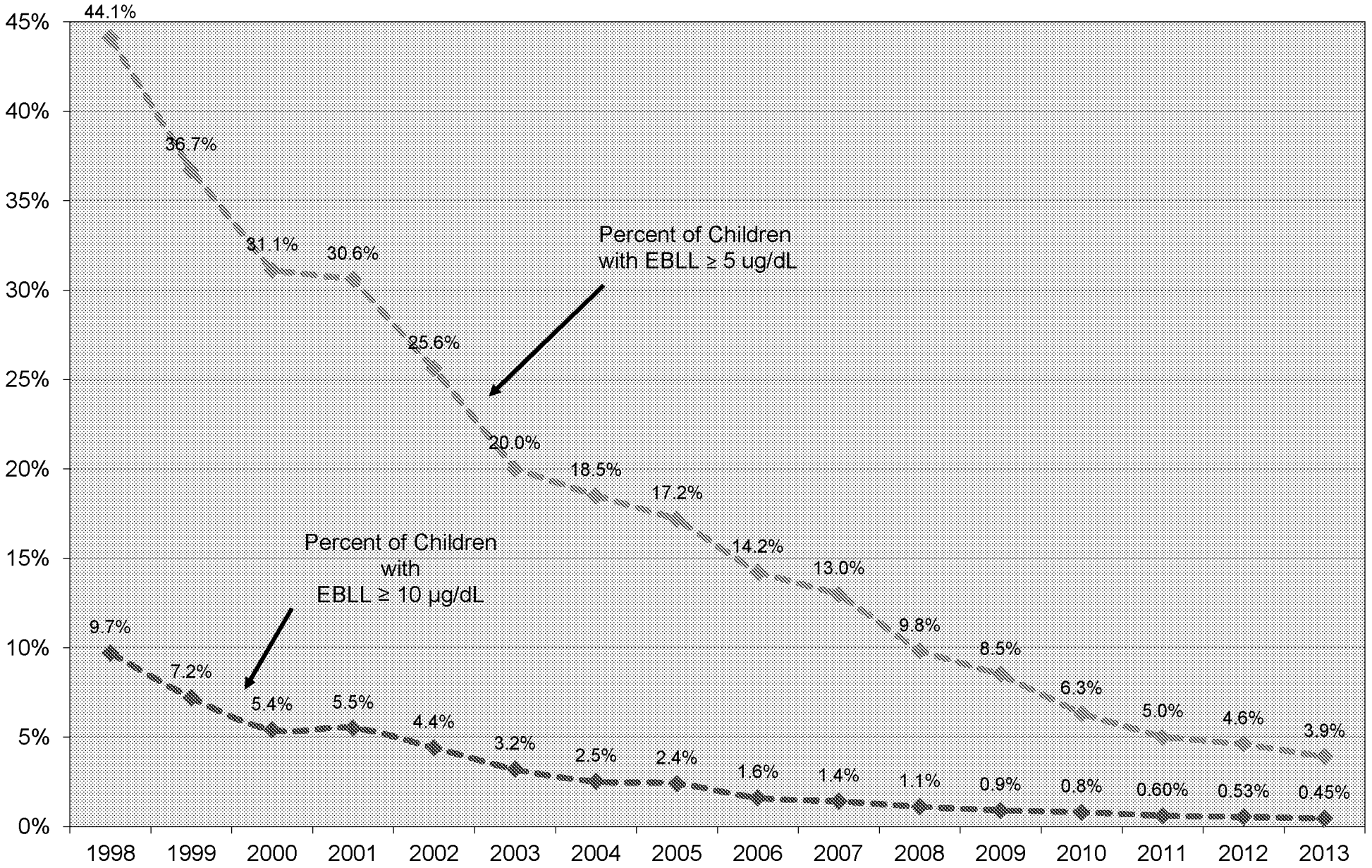
Robert L. Scott
Childhood Lead Poisoning Prevention Program
Michigan Department of Community Health
(517) 335-8178

Number of Children Tested for Lead, 1998 - 2013
Michigan Children less than Six Years of Age



February 14, 2014 Source: MDCH Data Warehouse

Elevated Blood Lead Levels (EBLL) in Michigan 1998 - 2013
Children less than Six Years of Age



February 14, 2014
Source: MDCH Data Warehouse

Childhood Lead Poisoning Data Facts (PRELIMINARY)
All Counties in Michigan - Children less than Six Years of Age
Calendar Year 2013

				Children < Age 6, Tested for Lead		Children Tested, by Highest Blood Lead Level									
County	%Pre-1950 Housing	%Pre-1978 Housing	Children Under Age 6	Number of Children Tested	% Tested	<5 ug/dL (capillary or venous)	5 to 9 ug/dL (capillary or venous)	Capillary >= 10 ug/dL, not confirmed by venous	Confirmed 10-19 ug/dL (venous only)	Confirmed 20-44 ug/dL (venous only)	Confirmed ≥45 ug/dL (venous only)	Total ≥ 5 µg/dL	Total Confirmed >=10 ug/dL	% with BLL >= 5 ug/dL	% Confirmed >= 10 ug/dL
Alcona	12.4	61.5	397	51	**12.8**	50	1	0	0	0	0	**1**	**0**	**2.0**	**0.0**
Alger	29.5	64.1	464	76	**16.4**	75	1	0	0	0	0	**1**	**0**	**1.3**	**0.0**
Allegan	23.2	51.1	9,073	1,159	**12.8**	1,124	31	2	2	0	0	**35**	**2**	**3.0**	**0.2**
Alpena	25.3	71.6	1,816	299	**16.5**	292	6	1	0	0	0	**7**	**0**	**2.3**	**0.0**
Antrim	18.8	52.6	1,447	257	**17.8**	251	5	1	0	0	0	**6**	**0**	**2.3**	**0.0**
Arenac	19.8	58.2	919	163	**17.7**	161	2	0	0	0	0	**2**	**0**	**1.2**	**0.0**
Baraga	34.0	71.7	533	128	**24.0**	127	1	0	0	0	0	**1**	**0**	**0.8**	**0.0**
Barry	27.1	57.3	4,282	465	**10.9**	453	10	2	0	0	0	**12**	**0**	**2.6**	**0.0**
Bay	33.9	75.6	7,516	1,422	**18.9**	1,351	63	0	7	1	0	**71**	**8**	**5.0**	**0.6**
Benzie	18.6	46.3	1,104	231	**20.9**	225	6	0	0	0	0	**6**	**0**	**2.6**	**0.0**
Berrien	28.6	72.2	11,542	1,726	**15.0**	1,662	52	0	10	2	0	**64**	**12**	**3.7**	**0.7**
Branch	30.9	65.3	3,540	765	**21.6**	726	35	3	0	1	0	**39**	**1**	**5.1**	**0.1**
Calhoun	36.1	75.3	10,545	1,971	**18.7**	1,903	54	3	7	4	0	**68**	**11**	**3.5**	**0.6**
Cass	22.4	59.9	3,616	458	**12.7**	438	16	3	1	0	0	**20**	**1**	**4.4**	**0.2**
Charlevoix	25.3	54.4	1,632	296	**18.1**	294	2	0	0	0	0	**2**	**0**	**0.7**	**0.0**
Cheboygan	20.9	53.5	1,517	264	**17.4**	262	0	2	0	0	0	**2**	**0**	**0.8**	**0.0**
Chippewa	25.1	58.6	2,384	434	**18.2**	429	5	0	0	0	0	**5**	**0**	**1.2**	**0.0**
Clare	14.5	58.8	2,099	411	**19.6**	408	3	0	0	0	0	**3**	**0**	**0.7**	**0.0**
Clinton	22.5	52.8	5,467	564	**10.3**	552	12	0	0	0	0	**12**	**0**	**2.1**	**0.0**
Crawford	13.7	55.6	814	87	**10.7**	81	6	0	0	0	0	**6**	**0**	**6.9**	**0.0**
Delta	33.3	68.0	2,411	453	**18.8**	435	15	2	1	0	0	**18**	**1**	**4.0**	**0.2**
Dickinson	38.9	71.7	1,595	303	**19.0**	296	4	2	1	0	0	**7**	**1**	**2.3**	**0.3**
Eaton	20.4	56.4	7,352	1,131	**15.4**	1,116	13	2	0	0	0	**15**	**0**	**1.3**	**0.0**
Emmet	23.0	48.3	2,026	322	**15.9**	320	2	0	0	0	0	**2**	**0**	**0.6**	**0.0**
Genesee	19.9	68.0	33,014	7,060	**21.4**	6,902	134	13	5	6	0	**158**	**11**	**2.2**	**0.2**
Gladwin	12.4	49.5	1,488	245	**16.5**	240	5	0	0	0	0	**5**	**0**	**2.0**	**0.0**
Gogebic	50.0	76.7	899	192	**21.4**	187	5	0	0	0	0	**5**	**0**	**2.6**	**0.0**
Grand Traverse	14.7	43.5	5,912	1,032	**17.5**	995	30	7	0	0	0	**37**	**0**	**3.6**	**0.0**
Gratiot	34.7	69.8	2,817	474	**16.8**	467	7	0	0	0	0	**7**	**0**	**1.5**	**0.0**
Hillsdale	36.5	63.2	3,412	785	**23.0**	759	24	1	1	0	0	**26**	**1**	**3.3**	**0.1**
Houghton	53.4	75.5	2,559	538	**21.0**	514	23	0	0	1	0	**24**	**1**	**4.5**	**0.2**
Huron	31.8	68.9	1,955	394	**20.2**	371	22	0	1	0	0	**23**	**1**	**5.8**	**0.3**
Ingham	24.9	68.2	19,374	4,700	**24.3**	4,485	208	2	4	1	0	**215**	**5**	**4.6**	**0.1**
Ionia	35.8	63.0	4,971	824	**16.6**	810	12	1	1	0	0	**14**	**1**	**1.7**	**0.1**
Iosco	12.7	65.6	1,238	146	**11.8**	142	3	1	0	0	0	**4**	**0**	**2.7**	**0.0**
Iron	44.1	72.1	616	149	**24.2**	146	3	0	0	0	0	**3**	**0**	**2.0**	**0.0**
Isabella	16.3	48.2	4,335	730	**16.8**	722	6	1	0	1	0	**8**	**1**	**1.1**	**0.1**
Jackson	33.0	67.9	11,436	2,962	**25.9**	2,772	162	12	13	2	1	**190**	**16**	**6.4**	**0.5**
Kalamazoo	22.5	62.6	18,813	3,537	**18.8**	3,410	104	12	10	1	0	**127**	**11**	**3.6**	**0.3**
Kalkaska	13.2	49.3	1,243	222	**17.9**	218	4	0	0	0	0	**4**	**0**	**1.8**	**0.0**
Kent	24.8	59.2	52,782	10,367	**19.6**	9,817	482	15	43	9	1	**550**	**53**	**5.3**	**0.5**
Keweenaw	46.9	77.6	119	28	**23.5**	26	2	0	0	0	0	**2**	**0**	**7.1**	**0.0**
Lake	12.5	52.6	632	120	**19.0**	119	1	0	0	0	0	**1**	**0**	**0.8**	**0.0**
Lapeer	20.4	52.9	5,661	1,011	**17.9**	974	36	1	0	0	0	**37**	**0**	**3.7**	**0.0**

Childhood Lead Poisoning Data Facts (PRELIMINARY)
All Counties in Michigan - Children less than Six Years of Age
Calendar Year 2013

				Children < Age 6, Tested for Lead		Children Tested, by Highest Blood Lead Level									
County	%Pre-1950 Housing	%Pre-1978 Housing	Children Under Age 6	Number of Children Tested	% Tested	<5 ug/dL (capillary or venous)	5 to 9 ug/dL (capillary or venous)	Capillary >= 10 ug/dL, not confirmed by venous	Confirmed 10-19 ug/dL (venous only)	Confirmed 20-44 ug/dL (venous only)	Confirmed ≥45 ug/dL (venous only)	Total ≥ 5 µg/dL	Total Confirmed >=10 ug/dL	% with BLL >= 5 ug/dL	% Confirmed >= 10 ug/dL
Leelanau	17.9	46.5	1,129	213	**18.9**	206	6	1	0	0	0	**7**	**0**	**3.3**	**0.0**
Lenawee	33.6	67.2	6,878	1,512	**22.0**	1,425	72	10	3	1	0	**86**	**4**	**5.7**	**0.3**
Livingston	11.4	39.0	12,273	1,095	**8.9**	1,083	11	0	0	1	0	**12**	**1**	**1.1**	**0.1**
Luce	23.8	64.3	365	73	**20.0**	71	2	0	0	0	0	**2**	**0**	**2.7**	**0.0**
Mackinac	23.4	58.6	588	116	**19.7**	110	6	0	0	0	0	**6**	**0**	**5.2**	**0.0**
Macomb	9.3	59.1	59,055	9,834	**16.7**	9,677	129	8	12	6	2	**157**	**20**	**1.6**	**0.2**
Manistee	28.8	63.9	1,319	246	**18.7**	231	12	1	2	0	0	**15**	**2**	**6.1**	**0.8**
Marquette	27.9	69.4	4,118	514	**12.5**	494	17	1	2	0	0	**20**	**2**	**3.9**	**0.4**
Mason	32.1	64.6	1,939	364	**18.8**	324	33	5	2	0	0	**40**	**2**	**11.0**	**0.6**
Mecosta	18.2	53.4	2,676	365	**13.6**	359	6	0	0	0	0	**6**	**0**	**1.6**	**0.0**
Menominee	35.4	73.2	1,402	261	**18.6**	251	9	0	1	0	0	**10**	**1**	**3.8**	**0.4**
Midland	15.2	58.7	5,704	501	**8.8**	493	7	1	0	0	0	**8**	**0**	**1.6**	**0.0**
Missaukee	21.2	56.2	1,069	133	**12.4**	133	0	0	0	0	0	**0**	**0**	**0.0**	**0.0**
Monroe	23.0	59.0	10,600	1,684	**15.9**	1,642	39	3	0	0	0	**42**	**0**	**2.5**	**0.0**
Montcalm	27.3	57.7	4,690	610	**13.0**	602	8	0	0	0	0	**8**	**0**	**1.3**	**0.0**
Montmorency	18.1	58.6	445	80	**18.0**	80	0	0	0	0	0	**0**	**0**	**0.0**	**0.0**
Muskegon	25.8	66.2	13,574	3,021	**22.3**	2,876	124	7	12	2	0	**145**	**14**	**4.8**	**0.5**
Newaygo	19.3	53.6	3,651	426	**11.7**	422	4	0	0	0	0	**4**	**0**	**0.9**	**0.0**
Oakland	14.7	60.5	83,246	14,037	**16.9**	13,820	185	6	20	4	1	**216**	**25**	**1.5**	**0.2**
Oceana	25.8	57.8	2,148	515	**24.0**	498	14	1	2	0	0	**17**	**2**	**3.3**	**0.4**
Ogemaw	12.8	61.6	1,265	95	**7.5**	93	2	0	0	0	0	**2**	**0**	**2.1**	**0.0**
Ontonagon	39.1	73.2	291	48	**16.5**	48	0	0	0	0	0	**0**	**0**	**0.0**	**0.0**
Osceola	22.6	56.6	1,762	361	**20.5**	349	8	0	1	2	1	**12**	**4**	**3.3**	**1.1**
Oscoda	17.8	62.1	532	48	**9.0**	47	1	0	0	0	0	**1**	**0**	**2.1**	**0.0**
Otsego	12.2	50.3	1,674	315	**18.8**	314	1	0	0	0	0	**1**	**0**	**0.3**	**0.0**
Ottawa	15.7	45.3	21,497	2,928	**13.6**	2,836	82	7	3	0	0	**92**	**3**	**3.1**	**0.1**
Presque Isle	21.1	66.3	649	121	**18.6**	121	0	0	0	0	0	**0**	**0**	**0.0**	**0.0**
Roscommon	13.1	58.7	1,143	215	**18.8**	211	4	0	0	0	0	**4**	**0**	**1.9**	**0.0**
Saginaw	28.1	73.1	14,304	3,769	**26.3**	3,637	110	9	12	1	0	**132**	**13**	**3.5**	**0.3**
St Clair	25.8	59.4	11,319	2,596	**22.9**	2,475	109	9	3	0	0	**121**	**3**	**4.7**	**0.1**
St Joseph	27.5	65.1	5,148	980	**19.0**	942	32	4	1	1	0	**38**	**2**	**3.9**	**0.2**
Sanilac	30.7	64.6	3,053	542	**17.8**	525	16	0	1	0	0	**17**	**1**	**3.1**	**0.2**
Schoolcraft	25.5	63.3	491	88	**17.9**	88	0	0	0	0	0	**0**	**0**	**0.0**	**0.0**
Shiawassee	33.9	68.2	4,844	1,230	**25.4**	1,184	40	1	3	2	0	**46**	**5**	**3.7**	**0.4**
Tuscola	30.2	67.4	3,768	903	**24.0**	882	21	0	0	0	0	**21**	**0**	**2.3**	**0.0**
Van Buren	23.3	58.1	5,901	879	**14.9**	859	15	1	4	0	0	**20**	**4**	**2.3**	**0.5**
Washtenaw	17.2	56.5	23,105	2,733	**11.8**	2,686	43	1	2	1	0	**47**	**3**	**1.7**	**0.1**
Wayne ex Det	22.6	74.5	78,340	19,044	**24.3**	18,560	403	28	42	11	0	**484**	**53**	**2.5**	**0.3**
Wexford	23.0	53.7	2,690	328	**12.2**	318	9	1	0	0	0	**10**	**0**	**3.0**	**0.0**
Detroit, City of	62.2	93.2	62,377	24,496	**39.3**	22,511	1,576	60	280	62	7	**1,985**	**349**	**8.1**	**1.4**
MICHIGAN	24.7	64.8	718,389	146,271	**20.4**	140,590	4,774	254	515	123	13	**5,679**	**651**	**3.9**	**0.4**

Sources: US Census Bureau, Census 2010 (Pre-1950 Housing, Pre-1978 Housing and County Populations) and American Community Survey 2010 5-year estimates (Detroit population); MDCH Data Warehouse (children tested)

Note: %EBLL is calculated as follows: Number of Children w/EBLL divided by (Number of Children Tested minus Children w/elevated capillary tests, not confirmed by venous)

February 14, 2013

Childhood Lead Poisoning Data Facts (PRELIMINARY)
All Counties in Michigan - Children One and Two Years of Age
Calendar Year 2013

				Children Ages 1 & 2, Tested for Lead		Children Tested, by Highest Blood Lead Level									
County	%Pre-1950 Housing	%Pre-1978 Housing	Children Ages One and Two	Number of Children Tested	% Tested	<5 ug/dL (capillary or venous)	5 to 9 ug/dL (capillary or venous)	Capillary >= 10 ug/dL, not confirmed by venous	Confirmed 10-19 ug/dL (venous only)	Confirmed 20-44 ug/dL (venous only)	Confirmed ≥45 ug/dL (venous only)	Total ≥ 5 µg/dL	Total Confirmed >=10 ug/dL	% with BLL >= 5 ug/dL	% Confirmed >= 10 ug/dL
Alcona	12.4	61.5	125	39	**31.2**	38	1	0	0	0	0	**1**	**0**	**2.6**	**0.0**
Alger	29.5	64.1	144	65	**45.1**	64	1	0	0	0	0	**1**	**0**	**1.5**	**0.0**
Allegan	23.2	51.1	2,962	758	**25.6**	732	23	1	2	0	0	**26**	**2**	**3.4**	**0.3**
Alpena	25.3	71.6	608	251	**41.3**	245	5	1	0	0	0	**6**	**0**	**2.4**	**0.0**
Antrim	18.8	52.6	431	174	**40.4**	170	3	1	0	0	0	**4**	**0**	**2.3**	**0.0**
Arenac	19.8	58.2	304	127	**41.8**	126	1	0	0	0	0	**1**	**0**	**0.8**	**0.0**
Baraga	34.0	71.7	163	96	**58.9**	96	0	0	0	0	0	**0**	**0**	**0.0**	**0.0**
Barry	27.1	57.3	1,386	368	**26.6**	360	7	1	0	0	0	**8**	**0**	**2.2**	**0.0**
Bay	33.9	75.6	2,478	1,239	**50.0**	1,175	57	0	6	1	0	**64**	**7**	**5.2**	**0.6**
Benzie	18.6	46.3	365	135	**37.0**	130	5	0	0	0	0	**5**	**0**	**3.7**	**0.0**
Berrien	28.6	72.2	3,848	1,321	**34.3**	1,269	42	0	8	2	0	**52**	**10**	**3.9**	**0.8**
Branch	30.9	65.3	1,205	298	**24.7**	277	18	2	0	1	0	**21**	**1**	**7.0**	**0.3**
Calhoun	36.1	75.3	3,511	1,184	**33.7**	1,144	33	0	6	1	0	**40**	**7**	**3.4**	**0.6**
Cass	22.4	59.9	1,183	373	**31.5**	358	12	2	1	0	0	**15**	**1**	**4.0**	**0.3**
Charlevoix	25.3	54.4	510	207	**40.6**	207	0	0	0	0	0	**0**	**0**	**0.0**	**0.0**
Cheboygan	20.9	53.5	460	203	**44.1**	201	0	2	0	0	0	**2**	**0**	**1.0**	**0.0**
Chippewa	25.1	58.6	745	243	**32.6**	240	3	0	0	0	0	**3**	**0**	**1.2**	**0.0**
Clare	14.5	58.8	692	329	**47.5**	328	1	0	0	0	0	**1**	**0**	**0.3**	**0.0**
Clinton	22.5	52.8	1,772	311	**17.6**	306	5	0	0	0	0	**5**	**0**	**1.6**	**0.0**
Crawford	13.7	55.6	269	72	**26.8**	67	5	0	0	0	0	**5**	**0**	**6.9**	**0.0**
Delta	33.3	68.0	768	368	**47.9**	353	12	2	1	0	0	**15**	**1**	**4.1**	**0.3**
Dickinson	38.9	71.7	525	272	**51.8**	266	3	2	1	0	0	**6**	**1**	**2.2**	**0.4**
Eaton	20.4	56.4	2,463	726	**29.5**	718	6	2	0	0	0	**8**	**0**	**1.1**	**0.0**
Emmet	23.0	48.3	675	232	**34.4**	230	2	0	0	0	0	**2**	**0**	**0.9**	**0.0**
Genesee	19.9	68.0	10,815	4,561	**42.2**	4,445	98	9	4	5	0	**116**	**9**	**2.5**	**0.2**
Gladwin	12.4	49.5	507	172	**33.9**	170	2	0	0	0	0	**2**	**0**	**1.2**	**0.0**
Gogebic	50.0	76.7	313	142	**45.4**	139	3	0	0	0	0	**3**	**0**	**2.1**	**0.0**
Grand Traverse	14.7	43.5	1,970	558	**28.3**	535	21	2	0	0	0	**23**	**0**	**4.1**	**0.0**
Gratiot	34.7	69.8	875	307	**35.1**	302	5	0	0	0	0	**5**	**0**	**1.6**	**0.0**
Hillsdale	36.5	63.2	1,126	352	**31.3**	337	14	0	1	0	0	**15**	**1**	**4.3**	**0.3**
Houghton	53.4	75.5	853	455	**53.3**	433	22	0	0	0	0	**22**	**0**	**4.8**	**0.0**
Huron	31.8	68.9	651	222	**34.1**	208	13	0	1	0	0	**14**	**1**	**6.3**	**0.5**
Ingham	24.9	68.2	6,439	2,770	**43.0**	2,638	128	1	3	0	0	**132**	**3**	**4.8**	**0.1**
Ionia	35.8	63.0	1,678	649	**38.7**	639	9	1	0	0	0	**10**	**0**	**1.5**	**0.0**
Iosco	12.7	65.6	403	103	**25.6**	102	0	1	0	0	0	**1**	**0**	**1.0**	**0.0**
Iron	44.1	72.1	218	109	**50.0**	106	3	0	0	0	0	**3**	**0**	**2.8**	**0.0**
Isabella	16.3	48.2	1,417	458	**32.3**	455	2	1	0	0	0	**3**	**0**	**0.7**	**0.0**
Jackson	33.0	67.9	3,717	2,101	**56.5**	1,953	125	10	11	1	1	**148**	**13**	**7.0**	**0.6**
Kalamazoo	22.5	62.6	6,292	2,108	**33.5**	2,019	76	8	5	0	0	**89**	**5**	**4.2**	**0.2**
Kalkaska	13.2	49.3	428	120	**28.0**	117	3	0	0	0	0	**3**	**0**	**2.5**	**0.0**
Kent	24.8	59.2	17,581	8,352	**47.5**	7,918	379	12	36	6	1	**434**	**43**	**5.2**	**0.5**
Keweenaw	46.9	77.6	43	23	**53.5**	21	2	0	0	0	0	**2**	**0**	**8.7**	**0.0**
Lake	12.5	52.6	233	89	**38.2**	89	0	0	0	0	0	**0**	**0**	**0.0**	**0.0**
Lapeer	20.4	52.9	1,814	697	**38.4**	667	29	1	0	0	0	**30**	**0**	**4.3**	**0.0**

Childhood Lead Poisoning Data Facts (PRELIMINARY)
All Counties in Michigan - Children One and Two Years of Age
Calendar Year 2013

				Children Ages 1 & 2, Tested for Lead		Children Tested, by Highest Blood Lead Level									
County	%Pre-1950 Housing	%Pre-1978 Housing	Children Ages One and Two	Number of Children Tested	% Tested	<5 ug/dL (capillary or venous)	5 to 9 ug/dL (capillary or venous)	Capillary >= 10 ug/dL, not confirmed by venous	Confirmed 10-19 ug/dL (venous only)	Confirmed 20-44 ug/dL (venous only)	Confirmed ≥45 ug/dL (venous only)	Total ≥ 5 µg/dL	Total Confirmed >=10 ug/dL	% with BLL >= 5 ug/dL	% Confirmed >= 10 ug/dL
Leelanau	17.9	46.5	349	114	**32.7**	109	5	0	0	0	0	**5**	**0**	**4.4**	**0.0**
Lenawee	33.6	67.2	2,216	959	**43.3**	908	41	7	2	1	0	**51**	**3**	**5.3**	**0.3**
Livingston	11.4	39.0	3,859	815	**21.1**	806	8	0	0	1	0	**9**	**1**	**1.1**	**0.1**
Luce	23.8	64.3	125	69	**55.2**	68	1	0	0	0	0	**1**	**0**	**1.4**	**0.0**
Mackinac	23.4	58.6	169	88	**52.1**	83	5	0	0	0	0	**5**	**0**	**5.7**	**0.0**
Macomb	9.3	59.1	19,109	6,202	**32.5**	6,108	82	3	5	2	2	**94**	**9**	**1.5**	**0.1**
Manistee	28.8	63.9	431	214	**49.7**	200	11	1	2	0	0	**14**	**2**	**6.5**	**0.9**
Marquette	27.9	69.4	1,395	432	**31.0**	413	16	1	2	0	0	**19**	**2**	**4.4**	**0.5**
Mason	32.1	64.6	619	118	**19.1**	112	6	0	0	0	0	**6**	**0**	**5.1**	**0.0**
Mecosta	18.2	53.4	880	267	**30.3**	263	4	0	0	0	0	**4**	**0**	**1.5**	**0.0**
Menominee	35.4	73.2	481	205	**42.6**	196	8	0	1	0	0	**9**	**1**	**4.4**	**0.5**
Midland	15.2	58.7	1,846	291	**15.8**	287	4	0	0	0	0	**4**	**0**	**1.4**	**0.0**
Missaukee	21.2	56.2	358	102	**28.5**	102	0	0	0	0	0	**0**	**0**	**0.0**	**0.0**
Monroe	23.0	59.0	3,400	1,235	**36.3**	1,208	26	1	0	0	0	**27**	**0**	**2.2**	**0.0**
Montcalm	27.3	57.7	1,567	417	**26.6**	410	7	0	0	0	0	**7**	**0**	**1.7**	**0.0**
Montmorency	18.1	58.6	144	64	**44.4**	64	0	0	0	0	0	**0**	**0**	**0.0**	**0.0**
Muskegon	25.8	66.2	4,515	1,707	**37.8**	1,612	79	5	9	2	0	**95**	**11**	**5.6**	**0.6**
Newaygo	19.3	53.6	1,229	358	**29.1**	355	3	0	0	0	0	**3**	**0**	**0.8**	**0.0**
Oakland	14.7	60.5	27,176	7,581	**27.9**	7,446	119	3	9	3	1	**135**	**13**	**1.8**	**0.2**
Oceana	25.8	57.8	706	252	**35.7**	245	6	0	1	0	0	**7**	**1**	**2.8**	**0.4**
Ogemaw	12.8	61.6	410	75	**18.3**	73	2	0	0	0	0	**2**	**0**	**2.7**	**0.0**
Ontonagon	39.1	73.2	86	37	**43.0**	37	0	0	0	0	0	**0**	**0**	**0.0**	**0.0**
Osceola	22.6	56.6	555	258	**46.5**	251	4	0	1	1	1	**7**	**3**	**2.7**	**1.2**
Oscoda	17.8	62.1	160	33	**20.6**	33	0	0	0	0	0	**0**	**0**	**0.0**	**0.0**
Otsego	12.2	50.3	556	186	**33.5**	186	0	0	0	0	0	**0**	**0**	**0.0**	**0.0**
Ottawa	15.7	45.3	7,028	2,509	**35.7**	2,434	68	4	3	0	0	**75**	**3**	**3.0**	**0.1**
Presque Isle	21.1	66.3	204	86	**42.2**	86	0	0	0	0	0	**0**	**0**	**0.0**	**0.0**
Roscommon	13.1	58.7	403	179	**44.4**	175	4	0	0	0	0	**4**	**0**	**2.2**	**0.0**
Saginaw	28.1	73.1	4,611	2,777	**60.2**	2,683	78	7	8	1	0	**94**	**9**	**3.4**	**0.3**
St Clair	25.8	59.4	3,618	1,221	**33.7**	1,146	69	4	2	0	0	**75**	**2**	**6.1**	**0.2**
St Joseph	27.5	65.1	1,719	645	**37.5**	617	24	4	0	0	0	**28**	**0**	**4.3**	**0.0**
Sanilac	30.7	64.6	984	266	**27.0**	255	10	0	1	0	0	**11**	**1**	**4.1**	**0.4**
Schoolcraft	25.5	63.3	165	76	**46.1**	76	0	0	0	0	0	**0**	**0**	**0.0**	**0.0**
Shiawassee	33.9	68.2	1,561	758	**48.6**	725	28	1	2	2	0	**33**	**4**	**4.4**	**0.5**
Tuscola	30.2	67.4	1,249	582	**46.6**	568	14	0	0	0	0	**14**	**0**	**2.4**	**0.0**
Van Buren	23.3	58.1	1,888	525	**27.8**	513	9	0	3	0	0	**12**	**3**	**2.3**	**0.6**
Washtenaw	17.2	56.5	7,445	1,808	**24.3**	1,776	29	1	1	1	0	**32**	**2**	**1.8**	**0.1**
Wayne ex Det	22.6	74.5	24,586	10,230	**41.6**	9,958	225	15	24	8	0	**272**	**32**	**2.7**	**0.3**
Wexford	23.0	53.7	894	254	**28.4**	246	7	1	0	0	0	**8**	**0**	**3.1**	**0.0**
Detroit, City of	62.2	93.2	20,749	10,246	**49.4**	9,175	826	31	164	44	6	**1,071**	**214**	**10.5**	**2.1**
MICHIGAN	24.7	64.8	234,410	87,980	**37.5**	84,401	3,007	151	326	83	12	**3,579**	**421**	**4.1**	**0.5**

Sources: US Census Bureau, Census 2010 (Pre-1950 Housing, Pre-1978 Housing and County Populations) and American Community Survey 2010 5-year estimates (Detroit population); MDCH Data Warehouse (children tested)

Note: %EBLL is calculated as follows: Number of Children w/EBLL divided by (Number of Children Tested minus Children w/elevated capillary tests, not confirmed by venous)

February 14, 2013

Childhood Lead Poisoning Data Facts (PRELIMINARY)
All Counties in Michigan
Calendar Year 2013
Blood Lead Testing Among Children who are Insured by Medicaid

	Children age 1 & 2 years, Insured by Medicaid							Children age 3 through 5 years, Insured by Medicaid				
County	Children, age 1-2 yrs	Children Tested	% Tested	Children with BLL 5 - 9 ug/dL	Children with Venous BLL >= 10 ug/dL	% >= 5	% >= 10	Children Tested for Lead Poisoning	Children with BLL 5 - 9 ug/dL	Children with Venous BLL >= 10 ug/dL	% >= 5	% >= 10
Alcona	80	37	46.3	1	0	2.7	0.0	9	0	0	0.0	0.0
Alger	77	54	70.1	0	0	0.0	0.0	3	0	0	0.0	0.0
Allegan	1,218	537	44.1	19	2	3.9	0.4	281	7	0	2.5	0.0
Alpena	305	232	76.1	5	0	2.2	0.0	33	1	0	3.0	0.0
Antrim	236	158	66.9	3	0	1.9	0.0	45	2	0	4.4	0.0
Arenac	155	104	67.1	1	0	1.0	0.0	31	1	0	3.2	0.0
Baraga	96	78	81.3	0	0	0.0	0.0	22	1	0	4.5	0.0
Barry	562	300	53.4	6	0	2.0	0.0	36	1	0	2.8	0.0
Bay	1,094	948	86.7	53	7	6.3	0.7	158	7	1	5.1	0.6
Benzie	156	121	77.6	5	0	4.1	0.0	46	1	0	2.2	0.0
Berrien	2,149	1,171	54.5	39	10	4.2	0.9	349	9	3	3.4	0.9
Branch	583	264	45.3	17	1	6.8	0.4	322	13	0	4.0	0.0
Calhoun	1,935	834	43.1	25	7	3.8	0.8	201	12	5	8.5	2.5
Cass	596	343	57.6	12	1	3.8	0.3	66	4	0	6.1	0.0
Charlevoix	284	194	68.3	0	0	0.0	0.0	42	2	0	4.8	0.0
Cheboygan	269	191	71.0	0	0	0.0	0.0	44	0	0	0.0	0.0
Chippewa	402	185	46.0	2	0	1.1	0.0	92	1	0	1.1	0.0
Clare	410	314	76.6	1	0	0.3	0.0	64	2	0	3.1	0.0
Clinton	526	244	46.4	5	0	2.0	0.0	166	4	0	2.4	0.0
Crawford	134	72	53.7	5	0	6.9	0.0	11	1	0	9.1	0.0
Delta	385	352	91.4	12	1	3.7	0.3	80	4	0	5.0	0.0
Dickinson	239	234	97.9	3	0	1.3	0.0	16	0	0	0.0	0.0
Eaton	926	625	67.5	7	0	1.1	0.0	334	4	0	1.2	0.0
Emmet	296	202	68.2	2	0	1.0	0.0	44	0	0	0.0	0.0
Genesee	6,054	3,667	60.6	77	10	2.4	0.3	1,714	31	1	1.9	0.1
Gladwin	261	170	65.1	2	0	1.2	0.0	68	3	0	4.4	0.0
Gogebic	155	122	78.7	2	0	1.6	0.0	34	1	0	2.9	0.0
Grand Traverse	789	424	53.7	19	0	4.5	0.0	151	2	0	1.3	0.0
Gratiot	483	293	60.7	4	0	1.4	0.0	96	1	0	1.0	0.0
Hillsdale	546	289	52.9	13	0	4.5	0.0	206	7	0	3.4	0.0
Houghton	355	268	75.5	18	0	6.7	0.0	51	1	1	3.9	2.0
Huron	331	189	57.1	12	1	6.9	0.5	135	7	0	5.2	0.0
Ingham	3,052	2,385	78.1	116	3	5.0	0.1	1638	73	2	4.6	0.1
Ionia	710	570	80.3	9	0	1.6	0.0	147	2	1	2.0	0.7
Iosco	302	97	32.1	0	0	0.0	0.0	38	3	0	7.9	0.0
Iron	117	97	82.9	3	0	3.1	0.0	28	0	0	0.0	0.0
Isabella	558	330	59.1	2	0	0.6	0.0	192	2	0	1.0	0.0
Jackson	1,958	1,520	77.6	107	11	7.8	0.7	555	27	2	5.2	0.4
Kalamazoo	2,711	1,535	56.6	67	4	4.6	0.3	503	15	6	4.2	1.2
Kalkaska	230	110	47.8	2	0	1.8	0.0	27	1	0	3.7	0.0
Kent	7,609	6,596	86.7	354	40	6.0	0.6	1,101	82	9	8.3	0.8
Keweenaw	19	12	63.2	1	0	8.3	0.0	4	0	0	0.0	0.0
Lake	128	89	69.5	0	0	0.0	0.0	26	0	0	0.0	0.0
Lapeer	806	548	68.0	24	0	4.4	0.0	243	4	0	1.6	0.0
Leelanau	143	88	61.5	4	0	4.5	0.0	33	0	0	0.0	0.0

Childhood Lead Poisoning Data Facts (PRELIMINARY)
All Counties in Michigan
Calendar Year 2013
Blood Lead Testing Among Children who are Insured by Medicaid

	Children age 1 & 2 years, Insured by Medicaid							Children age 3 through 5 years, Insured by Medicaid				
County	Children, age 1-2 yrs	Children Tested	% Tested	Children with BLL 5 - 9 ug/dL	Children with Venous BLL >= 10 ug/dL	% >= 5	% >= 10	Children Tested for Lead Poisoning	Children with BLL 5 - 9 ug/dL	Children with Venous BLL >= 10 ug/dL	% >= 5	% >= 10
Lenawee	1,057	733	69.3	36	2	5.2	0.3	297	24	1	8.4	0.3
Livingston	991	605	61.0	4	1	0.8	0.2	133	1	0	0.8	0.0
Luce	68	58	85.3	0	0	0.0	0.0	5	1	0	20.0	0.0
Mackinac	104	72	69.2	3	0	4.2	0.0	15	0	0	0.0	0.0
Macomb	7,879	3,894	49.4	55	6	1.6	0.2	1995	25	11	1.8	0.6
Manistee	229	185	80.8	9	1	5.4	0.5	20	1	0	5.0	0.0
Marquette	540	358	66.3	12	2	3.9	0.6	66	1	1	3.0	1.5
Mason	347	105	30.3	5	0	4.8	0.0	61	9	0	14.8	0.0
Mecosta	466	222	47.6	4	0	1.8	0.0	60	1	0	1.7	0.0
Menominee	204	161	78.9	8	0	5.0	0.0	43	1	0	2.3	0.0
Midland	727	222	30.5	3	0	1.4	0.0	155	3	0	1.9	0.0
Missaukee	198	101	51.0	0	0	0.0	0.0	17	0	0	0.0	0.0
Monroe	1,423	890	62.5	25	0	2.8	0.0	248	9	0	3.6	0.0
Montcalm	830	370	44.6	6	0	1.6	0.0	126	1	0	0.8	0.0
Montmorency	80	59	73.8	0	0	0.0	0.0	10	0	0	0.0	0.0
Muskegon	2,548	1,304	51.2	78	10	6.7	0.8	1029	41	3	4.3	0.3
Newaygo	672	292	43.5	3	0	1.0	0.0	40	0	0	0.0	0.0
Oakland	8,003	4,241	53.0	82	9	2.1	0.2	2633	34	7	1.6	0.3
Oceana	424	240	56.6	4	1	2.1	0.4	205	1	1	1.0	0.5
Ogemaw	236	70	29.7	2	0	2.9	0.0	19	0	0	0.0	0.0
Ontonagon	40	32	80.0	0	0	0.0	0.0	10	0	0	0.0	0.0
Osceola	313	243	77.6	4	3	2.9	1.2	91	4	1	5.5	1.1
Oscoda	87	29	33.3	0	0	0.0	0.0	10	0	0	0.0	0.0
Otsego	304	172	56.6	0	0	0.0	0.0	116	1	0	0.9	0.0
Ottawa	2,114	1,468	69.4	43	2	3.1	0.1	249	8	1	3.6	0.4
Presque Isle	117	73	62.4	0	0	0.0	0.0	17	0	0	0.0	0.0
Roscommon	259	176	68.0	4	0	2.3	0.0	35	0	0	0.0	0.0
Saginaw	2,625	2,147	81.8	73	10	3.9	0.5	728	27	4	4.3	0.5
St Clair	1,804	1,073	59.5	64	2	6.2	0.2	865	33	0	3.8	0.0
St Joseph	903	567	62.8	21	0	3.7	0.0	255	7	1	3.1	0.4
Sanilac	513	234	45.6	8	1	3.8	0.4	160	4	0	2.5	0.0
Schoolcraft	80	71	88.8	0	0	0.0	0.0	0	0	0	---	---
Shiawassee	751	610	81.2	27	4	5.1	0.7	302	9	1	3.3	0.3
Tuscola	592	464	78.4	13	0	2.8	0.0	242	7	0	2.9	0.0
Van Buren	1,090	438	40.2	6	3	2.1	0.7	185	3	0	1.6	0.0
Washtenaw	2,422	1,082	44.7	16	2	1.7	0.2	702	11	1	1.7	0.1
Wayne ex Det	11,515	7,375	64.0	183	24	2.8	0.3	5,878	132	22	2.6	0.4
Wexford	529	243	45.9	7	0	2.9	0.0	35	0	0	0.0	0.0
Detroit, City of	17,476	9,811	56.1	816	209	10.4	2.1	12,197	720	141	7.1	1.2
MICHIGAN	110,990	67,683	61.0	2,683	390	4.5	0.6	38,739	1,458	227	4.3	0.6

Source: MDCH Data Warehouse

February 14, 2013

Childhood Lead Poisoning Data Facts (PREMLIMINARY)
Fourteen Target Communities in Michigan
Calendar Year 2012
Children less than Six Years of Age

				Children < Age 6, Tested for Lead		Children Tested, by Highest Blood Lead Level									
Target Community	%Pre-1950 Housing	%Pre-1978 Housing	Children Under Age 6	Number of Children Tested	**% Tested**	<5 ug/dL (capillary, venous or unknown)	5 to 9 ug/dL (capillary, venous or unknown)	Capillary >= 10 ug/dL, not confirmed by venous	Confirmed 10-19 ug/dL (venous only)	Confirmed 20-44 ug/dL (venous only)	Confirmed ≥45 ug/dL (venous only)	**Total ≥ 5 µg/dL**	**Total Confirmed >=10 ug/dL**	**% with BLL >= 5 ug/dL**	**% Confirmed >= 10 ug/dL**
Battle Creek	43.0	79.6	4,824	868	**18.0**	837	26	0	2	3	0	31	5	3.6	0.6
Benton Harbor	57.7	84.0	1,330	299	**22.5**	273	24	0	2	0	0	26	2	8.7	0.7
Dearborn	48.1	85.3	10,184	2,381	**23.4**	2,328	40	2	7	4	0	53	11	2.2	0.5
Detroit	62.2	93.3	62,377	24,496	**39.3**	22,511	1,576	60	280	62	7	1985	349	8.1	1.4
Flint	38.0	89.7	10,071	2,304	**22.9**	2,226	70	0	4	4	0	78	8	3.4	0.3
Grand Rapids	48.1	81.5	17,604	4,624	**26.3**	4,196	369	12	38	8	1	428	47	9.3	1.0
Hamtramck	78.2	94.6	2,203	997	**45.3**	922	59	8	6	2	0	75	8	7.5	0.8
Highland Park	68.8	87.9	1,041	327	**31.4**	277	36	11	3	0	0	50	3	15.3	0.9
Jackson	67.6	91.6	3,502	1,126	**32.2**	1,006	101	7	10	1	1	120	12	10.7	1.1
Kalamazoo	40.8	78.8	5,331	1,407	**26.4**	1,320	69	10	7	1	0	87	8	6.2	0.6
Lansing	35.7	81.9	9,857	3,109	**31.5**	2,923	179	2	4	1	0	186	5	6.0	0.2
Muskegon/MuskHts	48.6	84.4	4,509	1,250	**27.7**	1,131	102	6	9	2	0	119	11	9.5	0.9
Pontiac	32.6	77.3	5,316	1,604	**30.2**	1,561	35	2	5	1	0	43	6	2.7	0.4
Saginaw	55.6	91.4	4,998	1,551	**31.0**	1,461	70	8	11	1	0	90	12	5.8	0.8
Subtotal	53.5	88.4	143,147	46,343	**32.4**	42,972	2,756	128	388	90	9	3,371	487	7.3	1.1
Michigan	24.7	64.8	718,389	146,271	**20.4**	140,590	4,774	254	515	123	13	5,679	651	3.9	0.4

Sources: US Census Bureau, Census 2010 (Pre-1950 Housing & Pre-1978 Housing) and American Community Survey 2010 5-year estimates, (Target Community populations); MDCH Data Warehouse (children tested)

February 14, 2013

Childhood Lead Poisoning Data Facts (PRELIMINARY)
Fourteen Target Communities in Michigan
Calendar Year 2012
Children One and Two Years of Age

				Children Age 1 & 2, Tested for Lead		Children Tested, by Highest Blood Lead Level									
Target Community	%Pre-1950 Housing	%Pre-1978 Housing	Children Age 1 & 2	Number of Children Tested	**% Tested**	<5 ug/dL (capillary, venous or unknown)	5 to 9 ug/dL (capillary, venous or unknown)	Capillary >= 10 ug/dL, not confirmed by venous	Confirmed 10-19 ug/dL (venous only)	Confirmed 20-44 ug/dL (venous only)	Confirmed ≥45 ug/dL (venous only)	**Total ≥ 5 µg/dL**	**Total Confirmed >=10 ug/dL**	**% with BLL >= 5 ug/dL**	**% Confirmed >= 10 ug/dL**
Battle Creek	43.0	79.6	1,652	522	**31.6**	520	18	0	2	0	0	20	2	3.8	0.4
Benton Harbor	57.7	84.0	458	195	**42.6**	193	18	0	2	0	0	20	2	10.3	1.0
Dearborn	48.1	85.3	3,448	1,224	**35.5**	1,217	24	2	5	2	0	33	7	2.7	0.6
Detroit	62.2	93.3	20,749	10,246	**49.4**	10,032	826	31	164	44	6	1071	214	10.5	2.1
Flint	38.0	89.7	3,409	1,483	**43.5**	1,475	52	6	4	4	0	66	8	4.5	0.5
Grand Rapids	48.1	81.5	5,949	3,655	**61.4**	3,618	290	10	31	5	1	337	37	9.2	1.0
Hamtramck	78.2	94.6	693	446	**64.4**	440	37	3	4	2	0	46	6	10.3	1.4
Highland Park	68.8	87.9	348	132	**37.9**	126	20	0	4	2	0	26	6	19.7	4.5
Jackson	67.6	91.6	1,193	770	**64.5**	761	76	7	9	0	0	92	9	11.9	1.2
Kalamazoo	40.8	78.8	1,783	814	**45.7**	810	51	8	4	0	0	63	4	7.7	0.5
Lansing	35.7	81.9	3,429	1,784	**52.0**	1,781	106	1	3	0	0	110	3	6.2	0.2
Muskegon/MuskHts	48.6	84.4	1,521	661	**43.5**	652	63	5	7	2	0	77	9	11.6	1.4
Pontiac	32.6	77.3	1,762	912	**51.8**	909	21	0	3	0	0	24	3	2.6	0.3
Saginaw	55.6	91.4	1,643	1,115	**67.9**	1,106	46	7	8	1	0	62	9	5.6	0.8
Subtotal	53.5	88.4	48,037	23,959	**49.9**	23,640	1,648	80	250	62	7	2,047	319	8.5	1.3
Michigan	24.7	64.8	234,410	87,980	**37.5**	84,401	3,007	151	326	83	12	3,579	421	4.1	0.5

Sources: US Census Bureau, Census 2010 (Pre-1950 Housing & Pre-1978 Housing) and American Community Survey 2010 5-year estimates, (Target Community populations); MDCH Data Warehouse (children tested)

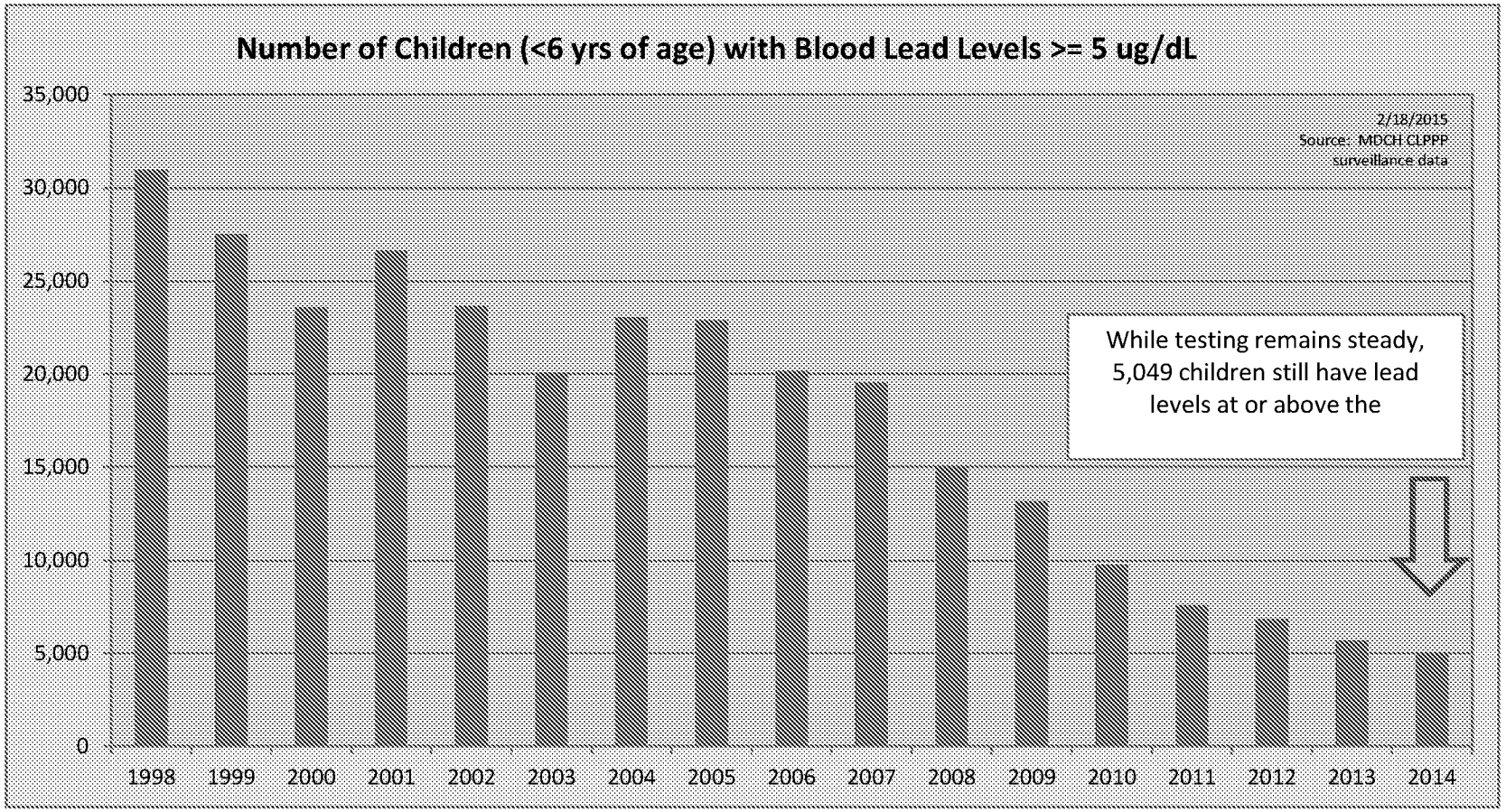
February 14, 2013

From: Scott, Robert L. (DCH)
Sent: Monday, February 23, 2015 12:52 PM
To: Cooper, Jessica (DCH);Speidel, Carin (DCH)
Subject: graph
Attachments: Book1.pdf

Hi! This is Jess sending from Bob's computer. Bob sends his apologies for forgetting to send it. Let me know if you need anything else.

Thanks.

Robert L. Scott
Childhood Lead Poisoning Prevention Program
Michigan Department of Community Health
(517) 335-8178
fax (517) 335-8509


Number of Children (<6 yrs of age) with Blood Lead Levels >= 5 ug/dL
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2/18/2015
Source: MDCH CLPPP surveillance data
While testing remains steady, 5,049 children still have lead levels at or above the

From: Peeler, Nancy (DHHS)
Sent: Monday, November 02, 2015 4:31 PM
To: Cooper, Jessica (DHHS);Scott, Robert L. (DHHS);Lishinski, Karen (DHHS)
Subject: Fwd: 2015-557 Edwards FOIA
Attachments: 2015-557 Edwards FOIA Assign.doc; ATT00001.htm; FOIA Request records on blood lead studies and associated discussion in Flint; ATT00002.htm

See attached, new FOIA. I can see the assignment, but not the actual request (may be something funky about my iPad and what it does or doesn't show?). Can you all see the actual FOIA request in what I am forwarding? I'll try to access later on my laptop. But if you all can starting looking at this now, see if you have any questions or concerns, etc, I would appreciate it!

Nancy

Sent from my iPad

Begin forwarded message:

> **From:** "Colston, Leslie (DHHS)" <ColstonL@michigan.gov>
> **Date:** November 2, 2015 at 2:56:45 PM CST
> **To:** "Peeler, Nancy (DHHS)" <PeelerN@michigan.gov>, "Fink, Brenda (DHHS)" <FinkB@michigan.gov>
> **Cc:** "Lounds, Elizabeth (DHHS)" <LoundsE@michigan.gov>, "Mayes, Nanette (DHHS)" <MayesN@michigan.gov>, "Travis, Rashmi (DHHS)" <TravisR@michigan.gov>
> **Subject: FW: 2015-557 Edwards FOIA**
>
> Hi Nancy,
>
> This is a new FIOA request from Edwards. Please respond to the FIOA email address below and copy Paula Anderson.
>
> Brenda said to feel free to give her a call, and it can be outside of work hours. Thanks.
>
> **DUE: 11-5-15**

From: Anderson, Paula (DHHS)
Sent: Monday, November 02, 2015 2:38 PM
To: Miller, Corinne (DHHS); Travis, Rashmi (DHHS)
Cc: Colston, Leslie (DHHS); Bouters, Janese (DHHS)
Subject: FW: 2015-557 Edwards FOIA
Importance: High

New FOIA (Edwards) attached. Please respond to MDHHS-FOIA@michigan.gov and copy me. Due date: 11/5/15. Thanks.

From: MDHHS-FOIA
Sent: Monday, November 02, 2015 10:53 AM
To: Anderson, Paula (DHHS)
Cc: Eisner, Jennifer (DHHS); Lawson, Brenda (DHHS)

Subject: 2015-557 Edwards FOIA
Importance: High

Paula-

Attached is a new FOIA request/assign sheet. The due date for info to me from your program area is **November 5, 2015. Jennifer, I will forward to you any info I receive from the program area before I respond to the requester on the Flint water blood lead studies on children in Flint MI 2014-present.**

Thanks, Christine

Christine S. Dingee, Assistant FOIA Coordinator
Michigan Department of Health and Human Services
Office of Legal Affairs and FOIA
201 Townsend St
Lansing, MI 48913
T: 517-241-5794
F: 517-241-1200

From: Marc Edwards <edwardsm@vt.edu>
Sent: Sunday, November 01, 2015 1:00 PM
To: MDHHS-FOIA
Subject: FOIA Request records on blood lead studies and associated discussion in Flint

I am requesting documents (e-mails, notes, reports, etc) related to blood lead studies on children in Flint Michigan 2014-present.

Robert Scott and Karen Lishinski of DCH would know about these documents, and who else might know about them. In particular, I am interested in:

1) all documents and e-mails related to a "study" done by DCH that was repeatedly cited by MDEQ, as showing there was no problem with Flint's children, but acknowledging that there was a "spike" in blood lead in 2014 summer
2) communications between MDEQ and DCH and others about this original study and presentations thereof
3) all documents about the study of Mona Hanna-Attisha, including the extensive attempts by the State to discredit her work. Again, MDEQ and others were involved in those discussions.
4) all documents about finally verifying Ms. Hanna-Attisha's study
5) all documents about Ms. Hanna-Attisha's study to the present day, including any e-mails to the U.S. CDC or ATSDR about the work.
6) all documents about my work, and my attempt to get the blood lead data from DCH

I would submit the FOIA through the DCH web-link, but that link does not work.

Marc Edwards

This Document is a Non-Responsive Attachment.

From: Noble, Kim <knoble@gchd.us>
Sent: Tuesday, January 05, 2016 3:12 PM
To: July, Jori;LaRocco, Toni;Lishinski, Karen (DHHS);Peeler, Nancy (DHHS)
Cc: Wenstrom, Janet;Cook, April;Taylor, Sherry;Taipalus, Sue
Subject: 010116 Edited FLINT BLOOD LEAD CM - weekly status tracking form v5 12.22.15.xlsx
Attachments: 010116 Edited FLINT BLOOD LEAD CM - weekly status tracking form v5 12.22.15.xlsx

Hello
With updated columns
Thanks
Kim

FLINT BLOOD LEAD CM

Weekly Status Tracking Form for week ending 1/1/2016

	A	B
1	**Target Population**	**Total for Row**
2		
3		
4		
5		
6	All 0-5 year old children with elevated Capillary ≥ 5 from April 2014 – September 2015	77
7		
8	All 0-5 year old children with newly elevated Venous ≥ 5 from April 2014 – September 2015	83
9		
10	All 0-5 year old children with new elevated Capillary ≥ 5 since October 2015	11
11		
12	All 0-5 year old children with new elevated Venous ≥ 5 since October 2015	15
13		
14	**TOTALS**	
15	All **6-17** year old children with elevated Capillary or Venous > 5 since April 2014	12
16		
17	** Column B will reflect the new, weekly numbers*	
18	1. Number and percentage of target children with elevated blood lead levels of **≥ 5 ug/dL** for whom contact has been attempted.	
19	2. Number and percentage of target children with elevated blood lead levels of **≥ 5 ug/dL** that are successfully contacted and offered case management services.	
20	3. Number and percentage of target children receiving case management services.	
21	4. Number and percentage of target children receiving case management services residing in the City of Flint.	
22	5. Number of Medicaid claims filed for children enrolled in Medicaid who receive testing or nursing assessment visits.	

FLINT BLOOD LEAD CM

Weekly Status Tracking Form for week ending 1/1/2016

	C	D	E
1	**# for whom contact has been attempted**	**% for whom contact has been attempted** (Col.C/Col.B)	**# successfully contacted and offered CM**
2			
3			
4			
5			
6	77	100%	41
7			
8	83	100%	47
9			
10	11	100%	8
11			
12	15	100%	13
13			
14			
15	12	100%	6
16			
17		Metrics included in contract (as amended 11.18.15):	
18			
19			
20			
21			
22			

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FLINT BLOOD LEAD CM

Weekly Status Tracking Form for week ending 1/1/2016

	F		G	H	
1	**% of total** (Col.E/Col.B)	**% of attempted** (Col.E/Col.C)	**# of children receiving CM**	**% of total** (Col.G/Col.B)	**% of contacted** (Col.G/Col.E)
2					
3					
4					
5					
6	53%		NA	#VALUE!	
7	53%			#VALUE!	
8	57%		19	23%	
9	57%			40%	
10	73%		NA	#VALUE!	
11	73%			#VALUE!	
12	87%		6	40%	
13	87%			46%	
14					
15	50%		2	17%	
16	50%			33%	
17					
18					
19					
20					
21					
22					

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FLINT BLOOD LEAD CM

Weekly Status Tracking Form for week ending 1/1/2016

	I	J	K	L
1	**# of children receiving CM who live in Flint**	**% of CM in Flint** (Col.I/Col.G)	**# of CM Medicaid claims filed**	**% for whom Medicaid claims filed** (Col. K / Col. G)
2				
3				
4				
5				
6	NA	#VALUE!	NA	#VALUE!
7				
8	19	100%	9	47%
9				
10	NA	#VALUE!	NA	#VALUE!
11				
12	6	100%	5	83%
13				
14				
15	2	100%	1	50%
16				
17				
18				
19				
20				
21				
22	*v5 12.22.15*			

FLINT BLOOD LEAD CM

Weekly Status Tracking Form for week ending 1/1/2016

	M	N	O	P
1	**# other disposition** (closed, moved)	**% with other disposition** (Col.M/Col.B)	**# of cleaning kits provided GCHD**	**Disposition notes**
2				
3				
4				
5				
6	5	6%		3 have been retested and now <5, but were capillary screenings; 2 have moved out of the county
7				
8	14	17%		2 moved out of county; 12 have retested and now <5
9				
10	1	9%		1 level is reading as 5 but really was a 3
11				
12	3	20%		3 have retested and are < 5
13				
14				
15	1	8%		1 has been retested and now < 5
16				
17				
18				
19				
20				
21				
22				

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From: Lishinski, Karen (DHHS)
Sent: Tuesday, January 05, 2016 11:03 AM
To: Peeler, Nancy (DHHS)
Subject: RE: CLPPP Grant

I am here- just got back from working with Katie

From: Peeler, Nancy (DHHS)
Sent: Tuesday, January 05, 2016 9:52 AM
To: Lishinski, Karen (DHHS) <LishinskiK@michigan.gov>
Subject: FW: CLPPP Grant

Hi, hoping to connect this morning to follow up on this before the 1pm call.

From: Peeler, Nancy (DHHS)
Sent: Monday, January 04, 2016 4:11 PM
To: Lishinski, Karen (DHHS) <LishinskiK@michigan.gov>
Subject: Re: CLPPP Grant

Sure - I thought Courtney had already addressed this on one of our weekly calls with them, and her take on it was that they shouldn't stop helping people to engage in prevention activities. What exactly was the conversation with Bob on 12/22? I'm a little confused about where this came from?

Sent from my iPad

On Jan 4, 2016, at 3:29 PM, Lishinski, Karen (DHHS) <LishinskiK@michigan.gov> wrote:

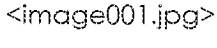
> Can we talk about this tomorrow?
>
> **From:** Henry, James [mailto:jhenry@gchd.us]
> **Sent:** Tuesday, December 29, 2015 4:58 PM
> **To:** Lishinski, Karen (DHHS) <LishinskiK@michigan.gov>
> **Cc:** Valacak, Mark <MVALACAK@gchd.us>; tlarocco@gchd.us
> **Subject:** Fw: CLPPP Grant
>
> Karen, I'm following up since, I did not receive a response from the email below.
>
> During the12/22/15, CLPPP Grant (lead) meeting at the Burton Clinic, our GCHD staff were informed by Bob Scott, that cleaning supplies and education could affect the ETC results. This helps clarify the intent of the recent restrictions of our CLPPP Grant.
>
> GCHD has also been informed that ETC Consulting has only conducted 11 residential lead assessments for the approximate 140 known EBL cases.

GCHD will not conform to the recent restrictions of the CLPPP grant and we will provide assistance for the known EBL families in Flint, immediately.

The rate at which the assessments are being conducted and the actions by your department, which allows for continued lead exposure for the known EBL children, is unacceptable.

Jim Henry RS, MBA
Environmental Health Supervisor
Genesee County Health Department www.gchd.us
630 S. Saginaw St., Suite 4
Flint, MI 48502-1540
Phone (810) 257-3618 Fax (810) 257-3125

E-mail jhenry@gchd.us



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From: Henry, James
Sent: Friday, December 18, 2015 7:46 PM
To: 'LishinskiK@michigan.gov'
Subject: CLPPP Grant

Hi Karen,

I'm trying to get a better understanding of the CLPPP Grant. Dawn Hallwood recently left GCHD and I'm helping coordinate the grant activities.

Andrew Schacher informed me that the scope of the grant has recently been limited to first time pregnant women and also for known EBL families, but only after ETC Consulting has conducted a residential assessment.

My office has been informed that ETC Consulting has not conducted many residential lead assessments, relative to the number of known EBL cases.

The CLPPP grant is essential to help GCHD assist these known EBL families. The imminent threat that is causing the elevated blood needs to be identified and mitigated as soon as possible. GCHD is prepared to provide immediate assistance.

Will you please provide clarification of our restrictions? If the scope has changed, I propose that we maintain our original agreement.

Jim Henry RS, MBA
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Genesee County Health Department www.gchd.us
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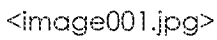
Flint, MI 48502-1540
Phone (810) 257-3618 Fax (810) 257-3125

E-mail jhenry@gchd.us



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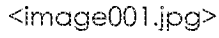
E-mail jhenry@gchd.us



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For a copy of the Health Department's Notice of Information Practices, contact the Health Department or visit the Health Department's website at http://www.gchd.us/

From: Emily Houk <emily@r2pconsultants.com>
Sent: Wednesday, October 21, 2015 1:13 PM
To: Peeler, Nancy (DHHS)
Cc: Lishinski, Karen (DHHS)
Subject: Internal Protocol Doc
Attachments: Flint Blood Lead Level Testing Protocols Internal Notes.docx

See if this works

--
Emily Houk, President and Chief Mischief Maker
Research to Practice Consulting, LLC
216 North Chestnut
Lansing, Michigan 48933
517-896-2712
r2pconsultants.com

Flint Blood Lead Level Testing Protocols
October 21, 2015

Target Populations

Priority Level 1:

- All children in Freeman, Brunnell, Eisenhower schools
- Retesting of any child with an existing EBLL capillary >5
- Retesting of all of venous samples as directed by AAP periodicity follow-up schedule

Priority Level 2:

All Genesee County school facilities not listed above.

Methodology

Priority Level 1:

Encouraging patients to contact Medical Home to obtain testing through primary care provider

Priority Level 2:

- Community and Medicaid Health plan Testing Events
- Hurley Pediatric testing events

Outreach, Follow-up and Resources

- Genesee County Health Department case management and support for EBLL>5
- Distribution of letters to families via community partners for guidance, resource and support
- Distribution of letters to primary care provider with guidance and support

From: Emily Houk <emily@r2pconsultants.com>
Sent: Wednesday, November 18, 2015 3:35 PM
To: Peeler, Nancy (DHHS)
Cc: Lishinski, Karen (DHHS)
Subject: Updated CM Forms and Protocol
Attachments: CM_PROTOCOL_Flint_Nov182015.docx; Case_ClosureNov182015.pdf

Hi Nancy,
Talked to Karen. I think I captured your needs. LMK.

Em

--
Emily Houk, President and Chief Mischief Maker
Research to Practice Consulting, LLC
216 North Chestnut
Lansing, Michigan 48933
517-896-2712
r2pconsultants.com

From: Emily Houk <emily@r2pconsultants.com>
Sent: Monday, December 14, 2015 3:36 PM
To: Lishinski, Karen (DHHS)
Cc: Peeler, Nancy (DHHS)
Subject: CM Updates for Flint
Attachments: CMprotocol121315_Flint_EH Edits.docx

See attached.

When I combed through it, it seemed like there were only a few places where you would want to differentiate what you ask because of the child's age. The developmental screening was the most

obvious...see if the approach works. I added several questions in the comments.

Also--Project Find is no more! When the grant was defunded some items were continued--but the statewise hotline was disallowed. OSE has a number you can call...but it isn't really a "find line". Might be a good question for Susan Broman's people.

Karen--we will have to go over the forms again....sigh.

Em
--
Emily Houk, President and Chief Mischief Maker
Research to Practice Consulting, LLC
216 North Chestnut
Lansing, Michigan 48933
517-896-2712
r2pconsultants.com

Michigan's Case Management Protocol for Children with Elevated Blood Lead Levels in Flint, Michigan

Case Management Protocol for Children with Elevated Blood Lead Levels
Michigan Department of Health and Human Services
Revised 12/13/15

Section 1: Application of this Protocol

The State of Michigan's childhood lead poisoning elimination goal is to identify and provide appropriate follow-up services to all children with Elevated Blood Lead Levels (EBLLs) in order to support their continued health and safety.

To meet this goal, case management services should be performed for children with BLLs>5ug/dL as determined by a venipuncture test.

Origin

This document represents a standard of care as prescribed by the United States Centers for Disease Control and Prevention (CDC), the American Academy of Pediatrics (AAP), Michigan state law and Medicaid. This document contains case management guidelines developed by the Nursing and Health Support component of the Michigan Department of Health and Human Services Childhood Lead Poisoning Prevention Program (CLPPP).

Section 2: Expectations

Desired outcomes of EBLL case management include:

- Reducing an elevated blood lead level below the current CDC reference value of >5 ug/dL;
- Evidence that communication has occurred between caregivers and other service providers to ensure the child's continued health and safety;
- Evidence and assurance that appropriate action has been taken by case managers as required by this protocol.

Section 3: Required Activities

Activities defined by Medicaid, the CDC and AAP as encompassing case management include:

- Client identification and outreach
- Individual assessment and diagnosis
- Service planning and resource identification
- Linking clients to needed services
- Service implementation and coordination
- Monitoring of service delivery
- Advocacy
- Evaluation

1. Client Identification and Outreach

Case managers must continually review the list of EBLLs >5ug/dL provided on a weekly basis by the MDHHS Surveillance Manger. Case managers must contact and offer case management services to these families based on the schedule below. Outreach efforts must be deliberate, ongoing and varied in order to ensure that contact with families is made.

All outreach activities must be documented in activity logs and the HHLPP system.

a. Schedule

The following schedule must be used when initiating initial in-home nursing visits:

- BLL 5-14 within 2 weeks of referral;
- BLL 15-44 within one week of referral;
- BLL 45+ within 48 hours of referral;

b. Fees for Services

Medicaid provides reimbursement for the following in-home visits related to a venipuncture EBLL > 5ug/dL:

- Two Environmental Investigations (One initial and one alternative location as needed)
- Two Blood Lead Nursing Assessment Visits (two in-home visits)

Comment [E1]: Karen...this was still highlighted...

What if we said one primary residence visit and one alternative location where child spends >6 hours per day?

2. In Home Visits

Nursing Assessments Overview

Nursing Assessment visits must be provided in the child's home. The objectives of the first home visit are:

- **Individual assessment and diagnosis** through a health, development, social and dietary history for the affected child and identification of the possible sources of lead in the child's environment.
- **Development of a Plan of Care** that identifies resources specific to the individual child and

family so that exposure is reduced, appropriate referrals and recommendations can be implemented, and the impact of lead exposure minimized.
- To **provide education and anticipatory guidance** for caregivers so that the effects of exposure are minimized
- To **advocate for families** to ensure they receive the appropriate support for managing their child's exposure through community referrals and resources; and
- To **ensure that the Individualized Plan of Care is continually reevaluated** until the child's lead level is below the current CDC reference value of 5ug/dL.

The initial visit will focus on:
- Assessment of the growth and development of the child, including any symptomology that may be present in the child (refer to Initial Home Visit assessment form for a list of common symptoms)
- Behavioral assessment of the child including any aggressive and/or hyperactivity
- Nutritional assessment of the child
- Assessment of typical family practices that may produce lead risk (e.g., hobbies, occupation, cultural practices)
- Limited physical identification of lead hazards within the dwelling
- Identification and planning for testing of any other family member at risk for lead hazard exposure
- Education and information regarding lead hazards and ways to minimize those risks in the future
- Development of a family plan of care to increase the safety of the child from lead hazards
- Facilitating blood lead follow-up testing and treatment recommended by the PCP.

a. First visit activities

The purpose of the initial nursing assessment home visit is to gather sufficient information to develop an Individualized Plan of Care for the child with an EBLL and to ensure that all siblings and pregnant women in the household are identified for further screening. The child with EBLL must be present at the initial visit for a physical assessment and observation of his/her behavior.

While many of the activities described below are designed to engage parents and caregivers of children ages 0-6 (lead poisoning is most prevalent in this age group), *lead poisoning can occur at any age*. Given the widespread testing, outreach and efforts underway to engage families in Genesee County, this case management protocol has been revised to include information relevant for children and caregivers up to age 18.

Comment [E2]: Karen. I added this. What do you think?

During the initial visit, the following must be accomplished:

- Obtaining Caregiver authorization to release protected health information to the case management team and to referral sources as needed using the MOCH HIPAA Authorization to Disclose Protected Health Information Form or any other agency-developed disclosure form.

- Discuss possible sources of lead exposure:

- Lead Paint (walls, doors, windows, furniture)
- Child's toys or common household items
- Cultural foods, cookware or other items
- Parent occupation
- Lead in water or pipes
- Other

Comment [E3]: Should we include something here like "other dwelling or outside risk"

- Interview of the child's caregiver(s) to collect the child's health, social and nutritional history. (Refer to the Initial Nursing Visit form).
  - For all children, obtaining a health history that addresses the current health status of the child, including:
    - Past history of lead testing and, if necessary, chelation for the child;
    - Past history of lead testing for other family members;
    - Child's history of anemia (if any); ask caregiver to relate information re: the child's hemoglobin status;
    - A visual/physical assessment of the child's body systems including eyes, heart and lungs, abdomen/digestive, elimination, muscular and skeletal;
  - For children ages 0-6, obtaining a developmental history that addresses the current status of the child, including:
    - Caregiver's observations about the child's developmental progress;
    - Caregiver's assessment of the child's behavior;
    - Caregiver's assessment of the child's cognitive development;
    - Performing a standardized developmental screening (ASQ or children ages 0-6 or psychosocial screening like the *Pediatric Symptom Checklist* for children over age 6);
    - If the child is already enrolled in Early On or Special Education, you may instead obtain parent consent and request the evaluation assessment results from Early On or Special Education.
  - For children ages 6+, obtaining a developmental history that addresses the current status of the child, including:
    - Caregiver's observations or knowledge about the child's developmental progress (inquire about special education or services the child currently receives);
    - Caregiver's assessment of the child's current behavior including aggressive behaviors, irritability, difficulty concentrating, sleep loss, memory loss and fatigue;
    - Caregiver's assessment or other documentation of the child's cognitive development including difficulty in school, poor grades, or low IQ scores;
    - Performing a standardized developmental screening (Pediatric Symptom Checklist);
    - If the child is already enrolled in Early On or Special Education, you may instead obtain parent consent and request the evaluation assessment results from Early On or Special Education.
  - A complete nutrition history for the child including the following:
    - Caregiver's description of the child's usual diet pattern. This should begin with a twenty-four hour recall of his/her intake and ask if this is typical of the child's

Comment [E4]: Karen...I made this up with some help from the internet...is this how you would say this?

intake. (For children over age 6, discuss diet with child and caregiver):
    - Ask about child's intake of breast milk, formula and/or cow's milk;
    - Ask about child's intake of other dairy/calcium sources;
    - Ask caregiver about child's intake of iron-containing foods and dietary fat;
    - Inquire about ethnic food products imported or carried from another country;
    - Ask about dietary supplements;
    - Ask child and caregiver about the number of meals and number of snacks the child consumes each day; and
    - Ask where the child sits to eat meals and snacks.
- A social history for the child including:
    - Caregiver's description of play and sleep habits. For children over age 6 inquire about daily school habits;
    - A child's usual play area (for children over 6 inquire as to where the child spends after school time);
    - Environments other than the child's primary residence where the child spends 20 hours per week or more (caregiver name(s) and addresses/childcare center name and addresses for children ages 0-6, school name and address for children 6+);
    - Family occupational and hobby history: include occupations and hobbies of adults in the home and other adults with whom the child spends time;
    - Cultural practices or foods in use by the immediate family as well as other adults with whom the child spends time;
    - Unusual behaviors including excessive hand-mouth; chewing on toys, crayons, newspaper/other print material, matches; consumes non-food items, such as dirt, grass, cigarettes/ashes; chews on furniture? crib/playpen? window sills/frames/doors?; plays at or near chipping or flaking paint, or has been seen eating paint chips.
- Documentation of other information including:
    - Family income source
    - Whether the family receives: WIC, food stamps, Medicaid/Medicare, other support, such as a food pantry.
    - If the residence is a rental property: name, address, phone number and/or other contact information for the rental property owner.
    - 'Barriers to obtaining medical care: time, both amount of time needed and time of day, child care, transportation, literacy, language barrier, etc.

After the child's history is completed, ask the caregiver for permission to look around the child's common areas for visual evidence of exposure sources, exposure behaviors and family practices.

The Individualized Plan of Care and Referral forms should be completed after reviewing the information obtained in the course of the initial nursing visit.

Appropriate referrals will be made in a timely manner. Early On or Special Education referrals should include ASQ (children 0-6) or Pediatric Symptom Checklist (ages 6+) results as well as documentation of diagnosis. A report to the child's healthcare provider should also be completed and submitted at this time. (Use the Report to Healthcare Provider form).

Comment [E5]: Karen-I reworded this to get at the idea of "excessive" hand to mouth (since SOME would be normal) and thought we could include older children in the sentiment that way...

Comment [E6]: New language

b. Second and subsequent home visit activities

The purpose of the second and/or subsequent nursing home visits is to assess caregiver implementation of the plan of care, including compliance with medical follow up, housekeeping practices, and reductions in exposure. Objectives of the second home visit are to:

- Reinforce the educational information presented to the family during the first visit
- Validate the family's ability to carry out activities to minimize risks of continued lead exposure
- Modify the plan of care to minimize lead risks, as needed
- Facilitate blood lead follow-up testing and treatment recommended by the PCP
- Follow up on any referrals made

The second visit must include:

- A review of contact information and primary care provider information with child's caregiver(s);
- Review of initial forms and documenting changes in EBLL, child's health history, nutritional history, social history, and conditions in the home;
- Review of the Individualized Plan of Care to identify additional messages to communicate at this visit;
- Assessment of the family's understanding of their responsibilities under the Plan of Care and a determination as to whether additional education or resources are needed to implement the plan;
- Revising the Individualized Plan of Care as needed and obtaining consent or signatures; and
- Notifying the health care provider and other members of the team, including the Environmental Investigators, of significant changes.
- Complete any activities not finished during the first visit.
- Timing of the second subsequent visits may be influenced by observations/ information from the first visit, and at the case manager's discretion, may take place relatively quickly.

Results of the second and/or subsequent follow-up visits must be recorded on the Follow Up Visit form.

c. Nursing assessment case closure activities

Nursing services may not be discontinued until all of the following are completed

- At least 2 home visits in which lead education was provided are done
- Nutritional, medical and developmental assessments are done
- There is one blood lead level below 5 ug/dL
- Recommended abatements and/or lead hazard reduction is completed

Use of administrative case closure should be infrequent and reserved for the following extenuating circumstances:

- Parent refuses services
- Family has moved out of jurisdiction (a new referral MUST be made)
- At least 3 documented attempts to locate or gain access to the child and caregiver have failed (2 visits/ 1 certified mail) and attempts to reach the family using PCP or MIWIC,

MICAR, CLPPP staff and other resources have been made

Section 4: Environmental Investigations

The Michigan Department of Health and Human Services Healthy Homes Section is available to assist case managers with environmental investigations.

The case manager must work collaboratively with the environmental investigator to maximize the opportunity for scheduling joint visits and to ensure that inspection and remediation take place in a timely fashion.

If the child's BLL is > 44 ug/dL, the case manager will contact the primary care provider and the hospital immediately to understand the plan of care. Coordination with the EBL investigators, and hospital must be done to ensure that the child will discharged to a safe environment (e.g., the designated property has been certified free of lead hazards before the child returns to that location.)

Contact the Health Homes Section at (866) 691-5323 or 517 335 8252 or refer to the case management guidelines for environmental visits at http://www.michigan.gov/documents/mdch/EBL_EI_Protocol_February_2015_484429_7.pdf.

Comment [E7]: Karen do we want to update this sentence at all?

Comment [E8]: Updated this to ug/dL since that is what we use above...

From: Lishinski, Karen (DHHS)
Sent: Thursday, October 15, 2015 11:11 AM
To: Peeler, Nancy (DHHS)
Subject: RE: NEWS UPDATE--Flint Water Funds Head To Snyder

We are working on the CM training! Let us know what Sue has to say!

From: Peeler, Nancy (DHHS)
Sent: Thursday, October 15, 2015 11:09 AM
To: Lishinski, Karen (DHHS); Cooper, Jessica (DHHS); Houk, Emily (DHHS); Fink, Brenda (DHHS)
Cc: Scott, Robert L. (DHHS)
Subject: Fwd: NEWS UPDATE--Flint Water Funds Head To Snyder

Sharing FYI - the $850,000 is to be split between CLPPP for case management and Healthy Homes for EBL investigations. Next step for us is decisions about how to put the case management services into place, which Sue Moran has already scheduled a meeting to discuss. I'll be calling in for that meeting - feels good to know we can do more to contribute to something good happening for families in Flint.

Sent from my iPad

Begin forwarded message:

> **From:** Gongwer News Service <gongwerreports@gongwer.com>
> **Date:** October 15, 2015 at 10:56:29 AM EDT
> **To:** <Michigan_State_Employees_updates@gongwer.com>
> **Subject: NEWS UPDATE--Flint Water Funds Head To Snyder**
> **Reply-To:** <gongwerreports@gongwer.com>
>
>
>
> Thursday, October 15, 2015, 10:56 AM
>
> ## Flint Water Funds Head To Snyder
>
> The Senate wasted no time in approving today more than $9 million to help pay for temporarily returning the city of Flint to the Detroit water system and fund additional staffing in the city's schools to gauge the exposure to lead.
>
> The fix came with unanimous passage of HB 4102, a supplemental appropriations bill the House passed late Wednesday.
>
> The bill allocates $6 million to get the city back on Detroit's water system; $300,000 for the Department of Environmental Quality's drinking water and environmental health services; $1 million for the department's laboratory services; $1 million for Department of Health and Human Services emergency services to purchase and distribute water to Flint residents; $850,000

for follow-up services for children, including lead testing and care for those with abnormal levels; and $200,000 for plumbing inspections.

Senate Minority Leader Jim Ananich (D-Flint) expressed thanks for his colleagues' support in the matter. The move to pump water for the city from the Flint River without proper corrosion controls allowed lead in service lines and welds to leach into the drinking water at levels beyond those requiring remediation.

Gongwer News Service will have more on this story in Thursday's Michigan Report.

Please send all correspondence to gongwer@gongwer.com This mailbox is not regularly monitored.

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From: Schoenow, Kris (DHHS)
Sent: Monday, October 26, 2015 9:03 AM
To: Peeler, Nancy (DHHS)
Cc: Scott, Robert L. (DHHS);Moran, Susan (DHHS)
Subject: RE: addresses and parent names
Attachments: Copy of Addresses for Match with Filters.xlsx

I completed the data comparison this weekend. The first tab has a summary and the second tab lists the addresses with and without filters.

Kris Schoenow
Executive Director
Bureau of Community Action and Economic Opportunity
Michigan Department of Health and Human Services
235 Grand Avenue
Suite 202
PO Box 30037
Lansing, MI 48909

517-241-4871
517-373-8896
schoenowk@michigan.gov

From: Peeler, Nancy (DHHS)
Sent: Friday, October 23, 2015 8:11 PM
To: Schoenow, Kris (DHHS) <SchoenowK@michigan.gov>
Cc: Scott, Robert L. (DHHS) <ScottR9@michigan.gov>
Subject: Re: addresses and parent names

Sounds good, Kris, thanks!

Sent from my iPhone

On Oct 23, 2015, at 6:34 PM, Schoenow, Kris (DHHS) <SchoenowK@michigan.gov> wrote:

> Hi Nancy,
>
> Thank you for the list. I was out of the office all day. I will compare the list with our data and identify the addresses that have a filter and the addresses that don't. I should have it done this weekend.
>
> Thank you for the data,
> Kris
>
> Kris Schoenow
> Executive Director
> Bureau of Community Action and Economic Opportunity
> Michigan Department of Health and Human Services
> 235 Grand Avenue

Suite 202
PO Box 30037
Lansing, MI 48909

517-241-4871
517-373-8896
schoenowk@michigan.gov

From: Peeler, Nancy (DHHS)
Sent: Friday, October 23, 2015 10:39 AM
To: Schoenow, Kris (DHHS) <SchoenowK@michigan.gov>
Cc: Scott, Robert L. (DHHS) <ScottR9@michigan.gov>
Subject: FW: addresses and parent names
Importance: High

Hi Kris -- attached is the file of addresses and Guardian names we have associated with children for whom our data indicates elevated blood lead levels. I am hoping to touch base about the best way to compare this list with your database of who has received filters. You had indicated (a week ago?) that your area could do the comparison -- is that still true, or how can we assist?

Nancy Peeler, Manager
Early Childhood Health Section

Bob Scott, Surveillance Manager
Childhood Lead Poisoning Prevention Program

From: Scott, Robert L. (DHHS)
Sent: Friday, October 23, 2015 9:45 AM
To: Peeler, Nancy (DHHS)
Subject: addresses and parent names

Please see attached. I removed two lines where most recent address is not in one of the seven zip codes (i.e., family moved).

Robert L. Scott
Childhood Lead Poisoning Prevention Program
Michigan Department of Health & Human Services
(517) 335-8178
fax (517) 335-8509

Flint Water Filter

Summary of Cross Referenced Data: as of 10/24/15

# of Addresses with no filters:	119	See Data tab for details
# of Addresses that need filters by zip:		
48502	1	
48503	23	
48504	37	
48505	24	
48506	19	
48507	15	
Total:	119	

# of BRITA filters distributed:	15
# of PUR filters distributed:	13
	28

House Number	Street Name	Apt	Patient City	ZIP	Guardian Last Name	Guardian First Name	matched address	matched name
							no	
							no	
							no	
							no	
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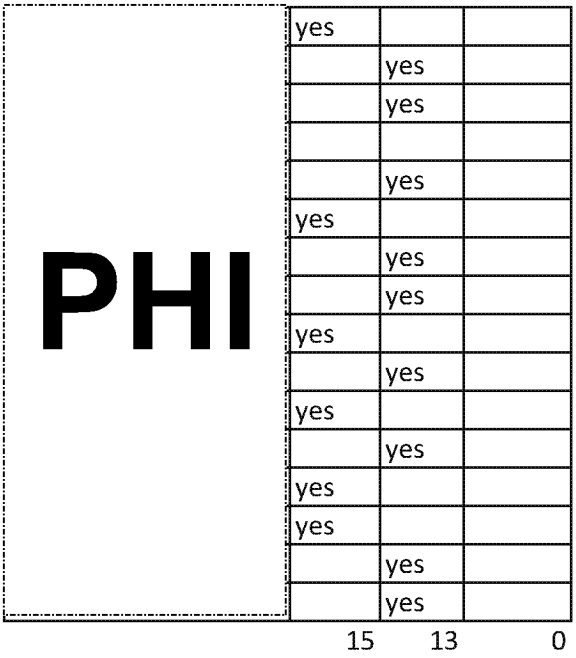
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From: Schoenow, Kris (DHHS)
Sent: Monday, October 26, 2015 10:03 AM
To: Peeler, Nancy (DHHS);Moran, Susan (DHHS)
Cc: Scott, Robert L. (DHHS)
Subject: RE: addresses and parent names

Hi Nancy,

Thank you. Please let me know if we need to deliver the filters to the Health Department.

Thanks,
Kris

Kris Schoenow
Executive Director
Bureau of Community Action and Economic Opportunity
Michigan Department of Health and Human Services
235 Grand Avenue
Suite 202
PO Box 30037
Lansing, MI 48909

517-241-4871
517-373-8896
schoenowk@michigan.gov

From: Peeler, Nancy (DHHS)
Sent: Monday, October 26, 2015 9:58 AM
To: Moran, Susan (DHHS) <MoranS@michigan.gov>
Cc: Schoenow, Kris (DHHS) <SchoenowK@michigan.gov>; Scott, Robert L. (DHHS) <ScottR9@michigan.gov>
Subject: Re: addresses and parent names

We will pass this information on to GCHD as they get Case Management activities underway, so they can be sure to build discussions about filters into those contacts/visits.

Nancy

Sent from my iPad

On Oct 26, 2015, at 9:27 AM, Moran, Susan (DHHS) <MoranS@michigan.gov> wrote:

> So we have a total of 147 names, and of those 147, 28 names matched and we can confirm a filter was distributed to the residence at the address.
> 80% (n = 119) of addresses on the list **do not have filter**
> 20% (n = 28) do have a filter.
>
> Correct?

From: Schoenow, Kris (DHHS)
Sent: Monday, October 26, 2015 9:03 AM
To: Peeler, Nancy (DHHS)
Cc: Scott, Robert L. (DHHS); Moran, Susan (DHHS)
Subject: RE: addresses and parent names

I completed the data comparison this weekend. The first tab has a summary and the second tab lists the addresses with and without filters.

Kris Schoenow
Executive Director
Bureau of Community Action and Economic Opportunity
Michigan Department of Health and Human Services
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PO Box 30037
Lansing, MI 48909

517-241-4871
517-373-8896
schoenowk@michigan.gov

From: Peeler, Nancy (DHHS)
Sent: Friday, October 23, 2015 8:11 PM
To: Schoenow, Kris (DHHS) <SchoenowK@michigan.gov>
Cc: Scott, Robert L. (DHHS) <ScottR9@michigan.gov>
Subject: Re: addresses and parent names

Sounds good, Kris, thanks!

Sent from my iPhone

On Oct 23, 2015, at 6:34 PM, Schoenow, Kris (DHHS) <SchoenowK@michigan.gov> wrote:

> Hi Nancy,
>
> Thank you for the list. I was out of the office all day. I will compare the list with our data and identify the addresses that have a filter and the addresses that don't. I should have it done this weekend.
>
> Thank you for the data,
> Kris
>
> Kris Schoenow
> Executive Director
> Bureau of Community Action and Economic Opportunity
> Michigan Department of Health and Human Services
> 235 Grand Avenue
> Suite 202
> PO Box 30037
> Lansing, MI 48909

517-241-4871
517-373-8896
schoenowk@michigan.gov

From: Peeler, Nancy (DHHS)
Sent: Friday, October 23, 2015 10:39 AM
To: Schoenow, Kris (DHHS) <SchoenowK@michigan.gov>
Cc: Scott, Robert L. (DHHS) <ScottR9@michigan.gov>
Subject: FW: addresses and parent names
Importance: High

Hi Kris – attached is the file of addresses and Guardian names we have associated with children for whom our data indicates elevated blood lead levels. I am hoping to touch base about the best way to compare this list with your database of who has received filters. You had indicated (a week ago?) that your area could do the comparison – is that still true, or how can we assist?

Nancy Peeler, Manager
Early Childhood Health Section

Bob Scott, Surveillance Manager
Childhood Lead Poisoning Prevention Program

From: Scott, Robert L. (DHHS)
Sent: Friday, October 23, 2015 9:45 AM
To: Peeler, Nancy (DHHS)
Subject: addresses and parent names

Please see attached. I removed two lines where most recent address is not in one of the seven zip codes (i.e., family moved).

Robert L. Scott
Childhood Lead Poisoning Prevention Program
Michigan Department of Health & Human Services
(517) 335-8178
fax (517) 335-8509

From: Priem, Wesley F. (DHHS)
Sent: Wednesday, October 21, 2015 2:24 PM
To: Miller, Mark (DHHS);Peeler, Nancy (DHHS)
Cc: Travis, Rashmi (DHHS);Robinson, Mikelle (DHHS);Moran, Susan (DHHS);Dykema, Linda D. (DHHS)
Subject: RE: Emergency Elevated Lead Management in Flint, financial vehicle for Follow-up Nurses, contract development for Flint

As Nancy mentioned earlier in the week, we will want to try, when possible, to have the nurse consultant and the EBL investigator perform the site visits at the same time. Language to this, should put into the contract. Secondly, coordinating education and outreach events with both the CLPPP program and our Healthy Homes Section is important. I believe that most of the data on the families will be the same between the county and with CLPPP so there shouldn't be a need to discuss this. Nancy will Genesee Co. do any reporting functions?

From: Miller, Mark (DHHS)
Sent: Tuesday, October 20, 2015 8:04 AM
To: Peeler, Nancy (DHHS); Priem, Wesley F. (DHHS)
Cc: Travis, Rashmi (DHHS); Robinson, Mikelle (DHHS); Moran, Susan (DHHS); Dykema, Linda D. (DHHS)
Subject: FW: Emergency Elevated Lead Management in Flint, financial vehicle for Follow-up Nurses, contract development for Flint

Nancy, see below email from Ms. Hensler.

We need to do the following (if everybody agrees):

Nancy should draft a letter for Sue's signature, to Mark Valacak, that says we're sending him $xxxxxx through Egrams, for a project called XXXXXX, for the time period XXXXXX, and it should be for the following activities, reports, etc (a short list). Say we'll work with Ingrid Fink on the details and that we'd like all this finalized by the end of the week. Letter should go out **today**. Mark Valacak can take that to his administrator, and it'll make it easier for him to get started on logistics on his end. He might need some approvals from the County.

Work with Jeanette and your budget liaison to develop and execute the project and amendment. The contract requirements will go in Attachment III, and as soon as we get the amendment executed, they (Genesee) can begin activities. ***Wes, is there any reason to build in any items from your area?***

Nancy, build in a bunch of specific metrics on data collection and reporting, as we want to assure we can evaluate this new project, as there will be some interest in the outcomes from persons way above my pay grade.

As Mark Valacak said yesterday, you can work directly with Ingrid Fink on the budget particulars. ***I suspect all of this can be done before the end of the week.***

Likewise Wes, Jeanette Hensler and staff will do whatever they can to facilitate your contracts.

From: Hensler, Jeanette (DHHS)
Sent: Monday, October 19, 2015 5:06 PM
To: Miller, Mark (DHHS) <millerm1@michigan.gov>; Peeler, Nancy (DHHS) <PeelerN@michigan.gov>
Cc: Travis, Rashmi (DHHS) <TravisR@michigan.gov>
Subject: RE: Emergency Elevated Lead Management in Flint, financial vehicle for Follow-up Nurses

Hi Mark,
We need to set this up as a new project.

Please send the project title and the amount to the shared mailbox and copy the budget liaison. Please also include the project period and any provisions/requirements to be added to Attachment III.

This project will be released as soon as we receive the information.

This project will be in the executed amendment as soon as the application is submitted and approved.
Thank you,
Jeanette

From: Miller, Mark (DHHS)
Sent: Monday, October 19, 2015 3:56 PM
To: Hensler, Jeanette (DHHS); Peeler, Nancy (DHHS)
Cc: Travis, Rashmi (DHHS)
Subject: Emergency Elevated Lead Management in Flint, financial vehicle for Follow-up Nurses
Importance: High

Jeanette and Nancy,

I just had a call with Sue, Rashmi and Genesee on possible vehicles to get nurses to do the follow-up on children in Flint with elevated lead levels.

Mark Valacak, the health officer already has a nurse, Sherry XXXX, who is experienced in lead management, but currently working in immunization. He also has another nurse ID'ed who can do the task. Depending on how much $ we send, he could get a couple more nurses for the follow-up, from his seasonal nurse bank (retired public health nurses).

At any rate, looks like the vehicle would be through the GCHD, rather than us trying to contract from up here.

Nancy what do you think of this scheme?

Jeanette, how should we work this in Egrams. Set up a separate new project?

Augment an existing project, like MCH Block Grant?

Some other procedure?

What would be fastest?

Thanks

Mark Miller
Director, Local Health Services
Michigan Department of Health & Human Services
201 Townsend, 6th Floor
Lansing MI 48913
(517) 335-8032
millerm1@michigan.gov

From: Dykema, Linda D. (DHHS)
Sent: Monday, November 09, 2015 1:55 PM
To: Moran, Susan (DHHS)
Subject: Fwd: 2015-11-09 Flint Drinking Water Action Plan Update - FOIA EXEMPT AND ATTORNEY-CLIENT PRIVILEGED
Attachments: 2015-11-09 Action Steps Week of November 2-6.pdf; ATT00001.htm; 2015-11-09 Flint Drinking Water Action Plan Update.pdf; ATT00002.htm; Freeman Elementary Report Final.pdf; ATT00003.htm; Freeman Elementary Final Lead Results.pdf; ATT00004.htm; Freeman Elementary Final Copper Results.pdf; ATT00005.htm; Flint Home Owner Data by ZIP Code (09-03 thru 11-05-15).pdf; ATT00006.htm; Flint Home Owner Data by Concentration (09-03 thru 11-05-15).pdf; ATT00007.htm

Sent from my iPhone

Begin forwarded message:

From: "Wyant, Dan (DEQ)" <WyantD@michigan.gov>
To: "Scott, Allison (GOV)" <scotta12@michigan.gov>, "Muchmore, Dennis (GOV)" <muchmored@michigan.gov>, "Agen, Jarrod (GOV)" <AgenJ@michigan.gov>, "Emmitt, Beth (GOV)" <emmittb@michigan.gov>, "Bedan, Morgan (GOV)" <BedanM@michigan.gov>
Cc: "Wyant, Dan (DEQ)" <WyantD@michigan.gov>, "Dickinson, Sarah (GOV)" <DickinsonS@michigan.gov>, "Edgerton, Shelly (LARA)" <EdgertonS1@michigan.gov>, "Dykema, Linda D. (DHHS)" <DykemaL@michigan.gov>
Subject: 2015-11-09 Flint Drinking Water Action Plan Update - FOIA EXEMPT AND ATTORNEY-CLIENT PRIVILEGED

Dear Governor's Office:

Please provide the following to the Governor as a part of his daily briefing packet. If you have any questions, please let us know.

1. Action Steps Updated Document for the week of November 2-6, 2015
2. Flint Drinking Water Action Plan Update
3. Freeman Elementary Report Final
4. Freeman Elementary Final Lead Results
5. Freeman Elementary Final Copper Results
6. Flint Home Owner Data by ZIP Code
7. Flint Home Owner Data by Concentration

As a reminder we will prepare these reports to you weekly, every Monday afternoon, for the previous week's actions.

Morgan, When sending these data results to the Governor, you may want to consider keeping documents 4-7 as separate pdfs for the Governor, in

lieu of assembling them all together in one pdf, but I'll make that your call. (Thanks, Mary Beth)

Thank you.

Dan Wyant
Director

City of Flint Water
Action Steps for Week of November 2-6

Step No.	Action Step	Involved Parties	DEQ Point(s) of Contact	Status
1.	Conduct After Action Plan	DEQ	George Krisztian	Meeting held on 10/29/15 to discuss time line
2.	Introduce legislative changes to Part 54 of NREPA – Drinking Water Revolving Loan Fund	DEQ, Treasury, and EPA	Maggie Pallone George Krisztian Sonya Butler	Draft language submitted to Maggie Pallone for review
3.	Assist After Action Review Panel	DEQ	Madhu Anderson George Krisztian Karen Tommasulo	Panel created and press release issued on 10/21/15
4.	Staff hiring plan	DEQ	Jim Sygo Maggie Pallone George Krisztian	Negotiations underway to contract with the Genesee County Health Department
5.	Finalize fiscal year 2017 budget request	DEQ	Maggie Pallone George Krisztian	
6.	Meeting(s) with school staff/management	DEQ	Jim Sygo Steve Busch Pat Cook Mike Prysby	A summary report for Freeman Elementary School has been drafted
7.	Contact DHHS regarding lead education material for schools; provide information as requested by DHHS	DEQ and DHHS	Jim Sygo Steve Busch Pat Cook Mike Prysby	Meeting held on 10/27/15; action items created
8.	Follow up with city of Flint regarding corrosion control treatment and their plans to address requirements and options provided for in 10/30/15 DEQ letter	DEQ and EPA	Jim Sygo Steve Busch Pat Cook Mike Prysby	

Step No.	Action Step	Involved Parties	DEQ Point(s) of Contact	Status
9.	E-mail city of Flint regarding timing to install corrosion control now that the construction permit has been issued	DEQ	Jim Sygo Steve Busch Pat Cook Mike Prysby	E-mailed city of Flint on 11/4/15; 11/5/15 response indicated equipment to be ordered and plan to start installing feed piping on 11/9/15
10.	Review Monthly Operation Reports (MORs) for Standby Operation of Flint Water Treatment Plant with city of Flint; draft letter to city of Flint documenting Standby Operation requirements	DEQ and Flint	Jim Sygo Steve Busch Pat Cook Mike Prysby	Letter is drafted and will be sent to city of Flint the week of 11/9/15; MOR review with city of Flint will be conducted during next routine site visit
11.	Work with Karegnondi Water Authority (KWA) and other agencies to address bottleneck issues; check weekly for status update	DEQ and KWA	Jim Sygo Steve Busch Pat Cook Mike Prysby	Issues regarding soil erosion controls during construction are being addressed
12.	Continue evaluating city of Flint Service Line Record status and comparison to sampling pool	DEQ and Flint	Jim Sygo Steve Busch Pat Cook Mike Prysby	Letter requesting additional information/documentation to be provided to city of Flint on 11/9/15
13.	Provide DHHS with any available cross-reference information regarding lead service lines and plumbing materials	DEQ and DHHS	Jim Sygo Steve Busch Pat Cook Mike Prysby	
14.	Develop childcare facility guidance or review DHHS-related materials	DEQ and DHHS	Jim Sygo Steve Busch Pat Cook Mike Prysby	Meeting held on 10/27/15; DHHS to provide materials
15.	Develop draft sampling protocol for residential exposure assessment for DHHS	DEQ and DHHS	Jim Sygo Steve Busch Pat Cook	Draft document under development; discussed preliminary plan with DHHS

Step No.	Action Step	Involved Parties	DEQ Point(s) of Contact	Status
			Mike Prysby	
16.	Make progress on drafting a generic school sampling guidance document for statewide distribution; target audience: schools served by municipal water	DEQ and LARA	Jim Sygo Steve Busch Richard Benzie	Draft document under development to make it an easy-to-read and follow guidance document
17.	Attend 11/5/15 meeting arranged by DHHS regarding residential elevated blood lead investigations and water testing	DEQ and DHHS	Jim Sygo George Krisztian Steve Busch	Done

Flint Drinking Water Action Plan Update

FOIA EXEMPT AND ATTORNEY-CLIENT PRIVILEGE

Key Actions:

- The city of Flint has received the necessary building permits to move forward with plans for the supplemental addition of phosphate to water that is coming from the Detroit Water and Sewerage Department. The purpose of the supplemental addition of phosphate is to reestablish the protective coating throughout the distribution system. This protective coating slows the leaching process of lead from service lines, household fixtures, and solder used for connecting copper pipes. The city of Flint has made the purchase of the necessary equipment a high priority and hopes to have the pumps installed and running within the next month.

- The report for Freeman Elementary School that documents and explains the results of the plumbing evaluation conducted by the DEQ and DLARA has been completed and will be distributed on November 9. The report demonstrates that the issues in the school are fixture-specific and that there was no evidence found to suggest that significant lead contamination is occurring deep within the plumbing system. The report will recommend replacement of fixtures that were found to have lead levels exceeding 15 parts per billion. Once a press release has been issued, the report will be posted to the Flint water Web site: www.mi.gov/flintwater.

- Data for residents of the city of Flint have been compiled into spreadsheets that sort the data by ZIP Code and also by concentration. The data to date indicate that the issue of lead contamination is not system-wide but is site specific. Over three quarters of the samples showed lead levels of 5 parts per billion or less and over 91 percent of the samples were at levels of 15 parts per billion or less. These spreadsheets will also be posted to the Flint water Web site.

Positions:

- With respect to the school data and the samples submitted by residents through the free lead testing program, the issue of lead contamination in the water appears to be site specific. In both cases, the water within the distribution system does not appear to be the issue. The contamination appears to be coming from fixtures, solder used to connect copper, and from lead service lines. While the initial results are encouraging and show that the large majority of homes do not have an issue, it is important that residents do not make assumptions. The only way to know if water contains lead is to have it tested.

Concerns:

- The action level of 15 parts per billion that is used in the lead and copper rule (LCR) was set up to determine if a supply was utilizing optimized corrosion controls. It was not meant to serve as a health-based exposure model. The

DEQ will be releasing data on Freeman Elementary School and residential data on November 9. The DHHS is currently working on evaluating blood lead levels on children in the city of Flint. It is important that when the DHHS is ready to present their data that the message they present does not inadvertently contradict information provided by the DEQ. While it is recognized that the ultimate goal is to have no detectable amount of lead in the water, this goal may not be practical as the DEQ utilizes the criteria as specified by the U.S. Environmental Protection Agency (EPA).

- The State of Michigan is being criticized as a result of recent information coming to light that a significant number of samples were not collected from proper sampling locations as part of the sampling program in the city of Flint to demonstrate compliance with the LCR under Michigan's Safe Drinking Water Act, 1976 PA 399, as amended (Act 399). Recently the city of Flint began to electronically convert customer service line information. This effort, along with statements by some of the city of Flint's certified operators, directly conflicts with information certified by the city of Flint in documents referred to as LCR compliance monitoring certification reports.

- Correspondence is drafted and will be sent to the city of Flint requesting that they provide appropriate documentation to demonstrate that the sampling locations selected and certified by the city of Flint comply with Act 399. In the absence of appropriate justification/documentation, the city of Flint may be subject to enforcement for violation of Act 399.

Significant Event:

- On November 3 the EPA issued a memorandum to address "certain concerns raised about the application of the [federal] 1991 Lead and Copper Rule, specifically the requirements pertaining to maintenance of optimal corrosion control treatment, in situations in which a large water system ceases to purchase treated water and switches to a new drinking water source." This EPA memorandum further states: "This type of situation rarely arises and the language of the LCR does not specifically discuss such circumstances. After reviewing the rule with our Office of General Counsel, it appears that there are differing possible interpretations of the LCR with respect to how the rule's optimal corrosion control treatment procedures apply to this situation…." This EPA memorandum clarifies the requirements should a situation like Flint occur again in the future. However, it clearly recognizes that the options chosen by Michigan were one interpretation or option of the LCR.

Changes from Previous Report:

- Staff e-mailed Michael Glasgow and Brent Wright of the city of Flint on November 4 to request a time line and a request to notify the DEQ when the phosphate equipment is installed. Mr. Wright responded on November 5 noting

that the city of Flint just received the Act 399 permit in the mail on November 5. Equipment is to be ordered by November 6, and the Flint Water Treatment Plant operators plan to start installing the feed piping on November 9.

- A letter detailing standby operation requirements is currently being prepared by the DEQ and will be sent to the city of Flint during the week of November 9. A review of the standby operation monthly operation reports with the city of Flint will be conducted during the next routine site visit at the Flint Water Treatment Plant.

- A letter has been prepared that requests the city of Flint to provide additional information and documentation regarding all of their historic LCR compliance sampling sites and to compare the service line information reported on the LCR compliance monitoring certification reports against the service line information from the city of Flint's digitized index cards. Conflicts noted between the index cards and the LCR compliance monitoring certification will need further explanation, and the city of Flint will need to provide supporting documentation demonstrating these sites meet Tier 1 criteria. The letter will be provided to the city of Flint on November 9.

- The draft document for sampling protocol for residential exposure assessment is under development. DEQ staff discussed the preliminary plan with DHHS staff.

- The draft document for generic school sampling guidance for statewide distribution is under development. Staff is working on making this an easy-to-read and follow guidance document.

- DEQ staff met with DHHS staff on November 5 to discuss residential elevated blood lead investigations and a protocol for water testing.

Other Items:

- As provided by the DHHS, the purchased total water filter/pitcher distribution through November 6 is 13,649 units.

- Attached are the:
  - Final report for the plumbing evaluation of Freeman Elementary School
  - Spreadsheets that consolidate the lead and copper data for Freeman Elementary School
  - Consolidated spreadsheets for water samples submitted by Flint residents sorted by ZIP Code and sorted by concentration

Prepared by: George Krisztian, Flint Action Plan Coordinator
Laboratory Director
Department of Environmental Quality
Telephone: 517-284-6719
Cell: PPI
November 9, 2015

FREEMAN ELEMENTARY SCHOOL

Outlet Sampling and Plumbing Assessment Recommendations

4001 Ogema Avenue, Flint, MI 48507

BACKGROUND INFORMATION

On Friday, October 23, 2015, the Department of Licensing and Regulatory Affairs (DLARA) and the Department of Environmental Quality (DEQ) conducted an assessment of Freeman Elementary School's plumbing system to gain a comprehensive understanding of how water moves through the building and what types of plumbing materials are used. The assessment identified the following potential sources of lead leaching into drinking water:

- Lead solder joints on copper piping
- Brass valves and brass fittings
- Brass components in fixtures
- Galvanized piping

The assessment also identified 31 faucets or fountains that provide water for drinking, cooking, and/or food preparation. The team developed a sequence for sampling the 31 faucets/fountains based on how the water travels through the building.

On Saturday, October 24, 2015, the DEQ and the DLARA completed sampling of the 31 faucets/fountains, in the order determined by the plumbing assessment from the previous day, following a stagnation period of 12 hours. At each of the 31 faucets/fountains identified, staff collected four samples. Two initial, 125-milliliter samples (P1 and P2) were collected immediately after turning on the tap. The water was then flushed for 30 seconds, and a third 125-milliliter sample (F1) was collected. Finally, the water was flushed for another two minutes, and the fourth 125-milliliter sample (F2) was collected. These samples were used to determine the impact of any lead sources in and around each specific faucet/fountain and its connecting plumbing.

On Saturday, October 31, 2015, the DEQ completed consecutive sampling at three of the 31 faucets/fountains following a stagnation period of 12 hours. This sampling was used to determine the impact of any lead sources located deep in the supply plumbing. The three sites included one site near the building service line, one site near the plumbing mid-point, and one site at the far end of the plumbing system. At each of these three sites, staff collected 10, 1-liter samples. The 10 samples were collected immediately after turning on the tap, and consecutively, without any flushing time in between.

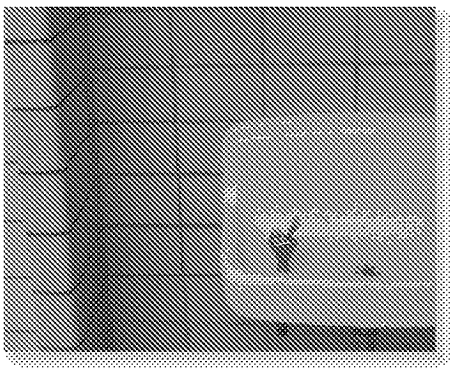
WATER SERVICE INFORMATION

A four-inch diameter cast iron water service line enters the school in the boiler room on the west wall. Piping in the boiler room immediately transitions into galvanized metal piping for cold water lines. Two separate galvanized cold water supply lines exit the boiler room. One in the northeast corner appears to serve the gym, auditorium, and proposed pre-K facilities on the north end of the school. The other exits the boiler room in the southwest corner and appears to serve the remainder of the school to the south, including the library. This line was also found to have grounding connections attached to the piping. Hot water is distributed in continuous loops that feed from and return to a central water heater in the boiler room. Hot water piping material, where exposed, was copper piping with 50/50 lead solder joints. Brass valves were seen throughout the building.

Outlets With Lead Levels Greater Than 15 Parts per Billion

The DEQ recommends school facilities take action if samples from any drinking water outlets show lead levels greater than 15 parts per billion. Based on the sampling conducted at 31 faucets/fountains on October 24, 2015, the following nine drinking water outlets had lead water level results greater than 15 parts per billion. Each of these nine outlets is listed below with its sample results, including a description of the potential source(s) of lead, and recommended actions for the school to take.

Outlet: Bubbler Drinking Fountain, Left (DW001)

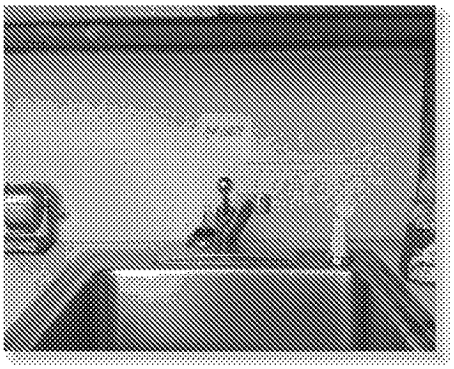


Location: Hallway outside Janitorial Room
Results: P1=40 parts per billion, P2=6 parts per billion
F1=4 parts per billion, F2=1 part per billion

These results suggest the highest contribution of lead may be from the bubbler itself. This bubbler fixture is believed to have a brass valve. The connection underneath the sink also appears to have some brass components, including the valve at the wall.

Replacement of this bubbler tap and its connection plumbing with lead-free materials will significantly reduce lead exposure at this location. If replacement is not currently feasible, sample results indicate that flushing this tap for 3 minutes following periods of stagnation is likely to reduce lead concentrations and lead exposure.

Outlet: Sink Faucet (CF029)



Location: DHHS Office, west wall
Results: P1=17 parts per billion, P2=12 parts per billion
F1=2 parts per billion, F2=non-detect

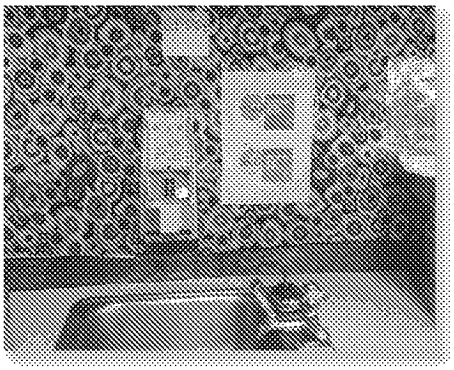
These results suggest the highest contribution of lead may be from the faucet and its connecting plumbing. The faucet is a Delta 400. This model faucet valve has brass components. This style faucet also has a mixing valve that may allow mixing of hot and cold water. Connecting plumbing in the cabinet under the sink may also contain brass components.

This faucet also has an aerator at the outlet. The aerator should be removed, inspected for particulate accumulations, scrubbed clean, and reinstalled. If particulates are found, the aerator should be periodically checked and cleaned.

Replacement of this faucet and its connection plumbing with lead-free materials will significantly reduce lead exposure at this location. If replacement is not currently feasible, sample results indicate that flushing this tap for 3 minutes following periods of stagnation is likely to reduce lead concentrations and lead exposure.

Outlet: Integrated faucet and bubbler fountain (CF006)

Location: Classroom 2, south wall
Results: P1=16 parts per billion, P2=3 parts per billion
F1=1 part per billion, F2=1 part per billion

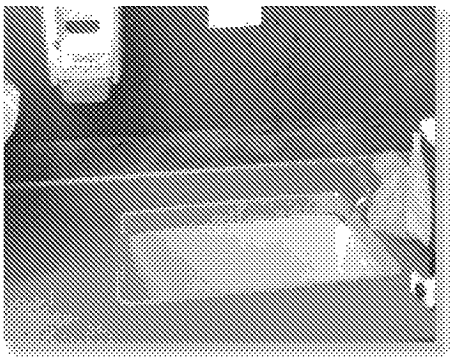


These results were collected from the faucet portion of the fixture and suggest the highest contribution of lead may be from the fixture itself. The make and model of this fixture is unknown, but appears to be made of chrome plated brass and may be connected on the underside of the sink using a brass nipple.

Replacement of this fixture and its connection plumbing with lead-free materials will significantly reduce lead exposure at this location. If replacement is not currently feasible, sample results indicate that flushing this tap for 3 minutes following periods of stagnation is likely to reduce lead concentrations and lead exposure.

Outlet: Integrated faucet and bubbler fountain (CF014)

Location: Classroom 10, north wall
Results: P1=27 parts per billion, P2=7 parts per billion
F1=4 parts per billion, F2=3 parts per billion



These results were collected from the faucet portion of the fixture and suggest the highest contribution of lead may be from the fixture itself and its connecting plumbing. The make and model of this fixture is unknown, but appears to be made of chrome plated brass and may be connected on the underside of the sink using a brass nipple. Connecting plumbing in the cabinet under the sink may also contain brass components.

Replacement of this fixture and its connection plumbing with lead-free materials will significantly reduce lead exposure at this location. If replacement is not currently feasible, sample results indicate that flushing this tap for 3 minutes following periods of stagnation is likely to reduce lead concentrations and lead exposure.

Outlet: Sink Faucet (CF013)

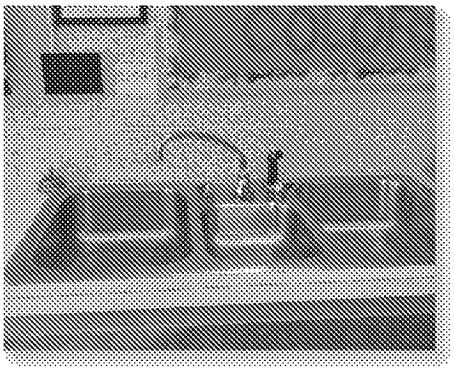
Location: Classroom 10, north wall
Results: P1=9 parts per billion, P2=18 parts per billion
F1=3 parts per billion, F2=3 parts per billion

These results suggest the highest contribution of lead may be from the connecting plumbing with some contribution from the faucet itself. The faucet appears to be a Delta 500 series. This model faucet may have some brass components. This style faucet also has a mixing valve that may allow mixing of hot and cold water. Connecting plumbing in the cabinet under the sink should be checked for brass components, including brass valves.

This faucet also has an aerator at the outlet. The aerator should be removed, inspected for particulate accumulations, scrubbed clean, and reinstalled. If particulates are found, the aerator should be periodically checked and cleaned.

Replacement of this faucet and its connection plumbing with lead-free materials will significantly reduce lead exposure at this location. If replacement is not currently feasible, sample results indicate that flushing this tap for 3 minutes following periods of stagnation is likely to reduce lead concentrations and lead exposure.

Outlet: Sink Faucet (CF015)



Location: Classroom 11, northeast corner
Results: P1=102 parts per billion, P2=326 parts per billion
F1=14 parts per billion, F2=11 parts per billion

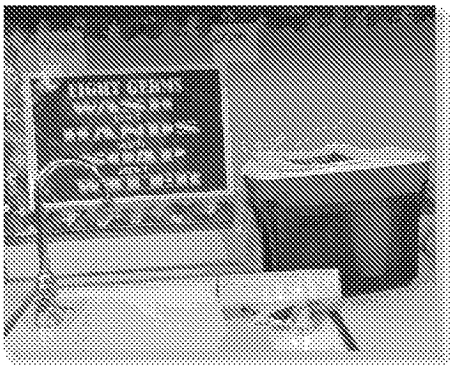
These results suggest the highest contribution of lead may be from the connecting plumbing and from the faucet itself. The faucet is an older design that uses a brass tube approximately 8 inches in length between the hot and cold water valves and connects to the outlet under the sink. This brass tube may be the primary source of lead, explaining the higher second (P2) sample result. The faucet and valves may also contain brass components. Connecting plumbing in the cabinet under the sink should be checked for additional brass components, including brass valves.

This faucet also has an aerator at the outlet. The aerator should be removed, inspected for particulate accumulations, scrubbed clean, and reinstalled. If particulates are found, the aerator should be periodically checked and cleaned.

Replacement of this faucet and its connection plumbing with lead-free materials will significantly reduce lead exposure at this location and needs to be completed. If replacement is not currently feasible, **DO NOT USE THIS FAUCET FOR DRINKING OR COOKING.**

Outlet: Integrated faucet and bubbler fountain (CF024)

Location: Classroom 19, east wall
Results: P1=23 parts per billion, P2=3 parts per billion
F1=4 part per billion, F2=3 parts per billion



These results were collected from the faucet portion of the fixture and suggest the highest contribution of lead may be from the fixture itself. The make and model of this fixture is unknown, but appears to be made of chrome plated brass and may be connected on the underside of the sink using a brass nipple.

Replacement of this fixture and its connection plumbing with lead-free materials will significantly reduce lead exposure at this location. If replacement is not currently feasible, sample results indicate that flushing this tap for 3 minutes following periods of stagnation is likely to reduce lead concentrations and lead exposure.

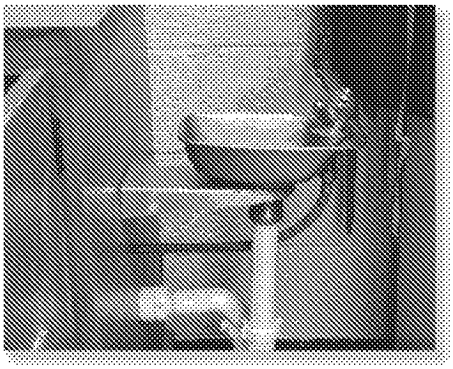
Outlet: Bubbler fountain (CF026)

Location: Classroom 14, west wall
Results: P1=36 parts per billion, P2=30 parts per billion
F1=17 parts per billion, F2=4 parts per billion

These results suggest the highest contribution of lead may be from the bubbler itself. This bubbler fixture appears to be made of chrome plated brass. This style bubbler typically has a 4-5-inch brass fitting that connects to a 3-inch brass nipple on the underside of the sink. This would explain the higher concentrations in the first two sample results. The connection underneath the sink may also have some brass components and should be checked, including the valve.

Replacement of this bubbler tap and its connection plumbing with lead-free materials will significantly reduce lead exposure at this location and should be completed. If replacement is not currently feasible, sample results indicate that flushing this tap for 3 minutes prior to each use and for at least 4 minutes following periods of stagnation is likely to reduce lead concentrations and lead exposure. **In general, use of this fountain for drinking water should be discouraged.**

Outlet: Bubbler fountain (CF031)



Location: Proposed Pre-K Room, south wall
Results: P1=57 parts per billion, P2=3 parts per billion
F1=2 parts per billion, F2=non-detect

These results suggest the highest contribution of lead may be from the bubbler itself. This bubbler fixture appears to be made of chrome plated brass. This bubbler has a brass fitting connection to a brass nipple. The connector hose is not expected to be contributing lead.

Replacement of this bubbler tap and its connection plumbing with lead-free materials will significantly reduce lead exposure at this location and should be completed. If replacement is not currently feasible, sample results indicate that flushing this tap for 3 minutes following periods of stagnation is likely to reduce lead concentrations and lead exposure.

Outlets With Lead Levels 15 Parts per Billion or Less

While the remaining 22 outlets showed sample results to be at levels requiring no further action, several recommendations have been identified.

The fourth sample at each of these 22 outlets following approximately 3 minutes of use and flushing at a reduced flow reduced lead concentrations to 4 parts per billion or less. This indicates that flushing of all taps used for drinking, cooking, and/or food preparation for 4 minutes following periods of stagnation will further reduce lead exposure. It is recommended that a flushing operational procedure be developed for use by staff responsible for plumbing operations and maintenance.

Twelve of these outlets are comprised of similar materials as the outlets listed above and could potentially experience higher lead levels under extended periods of stagnation. These faucets/fountains include:

- Sink Side Bubbler Units in Classroom 12 (CF022), Classroom 5 (CF009), Classroom 21 (CF028), Hallway Fountain (DW002), Classroom 15 (CF018), Classroom 17 (CF020), and Classroom 1 (DW005).
- Integrated Faucet Bubbler Fountain Units in Classroom 6 (CF010), Classroom 9 (CF012), Classroom 4 (CF008), Classroom 3 (CF007), and Classroom 7 (CF011).

Replacement of these fixtures with lead-free materials is also recommended.

The remaining 10 outlets showed sample results of 15 parts per billion or less, requiring no further action or additional recommendations. These faucets/fountains include:

- Sink Faucets in Classroom 1 (CF004), Classroom 15 (CF017), Classroom 17 (CF019), Classroom 12 (CF021), Classroom 19 (CF023), Classroom 14 (CF025), Classroom 21 (CF027), and Proposed Pre-K Room (CF030).
- Kitchen Sink (cold) in the Community Room (KC003).
- Sink Side Bubbler Fountain in Classroom 11 (CF016).

Consecutive Sampling Results and Building Plumbing Recommendations

The consecutive samples taken at three sites in the building on October 31, 2015, provide additional confirmation that the highest contribution of lead appears to be from the individual faucet/fountains and not from the larger diameter supply plumbing within the school building.

Consecutive Sample No.	1	2	3	4	5	6	7	8	9	10
LOCATION	LEAD RESULT (PARTS PER BILLION; ND = NOT-DETECTED)									
Proposed Pre-K Rm Sink Faucet (CF030)	2	1	ND	ND	ND	ND	ND	ND	ND	ND
Classroom 11 Sink Faucet (CF015)	62	8	8	7	7	7	7	6	6	6
Classroom 21 Sink Faucet (CF027)	2	ND	ND	ND	ND	ND	ND	ND	ND	ND

The continued presence of lead in samples collected at Classroom 11 (CF015) may be a result of lead particulates caught in the aerator/screen installed on the faucet outlet or may be from a source of lead further back in the plumbing system. However, the non-detect results from consecutive samples collected in Proposed Pre-K Room (CF030) and Classroom 21 (CF027) suggest any additional source of lead associated with Classroom 11 (CF015) is localized to the plumbing branch serving this faucet. The faucet aerator/screen in Classroom 11 (CF015) should be removed and inspected before completing a more in-depth plumbing analysis. Consecutive sampling results at Classroom 11 (CF015) support the water use restrictions specified for this outlet.

ANALYTE	RESULT (mg\L)	Sample Location	Sample Description	Site Code	Site Code Description
Lead	0.010	Classroom 12	CF022	P1	First Primary draw of 125 milliliters
Lead	0.003	Classroom 12	CF022	P2	Second Primary draw of 125 milliliters
Lead	0.001	Classroom 12	CF022	F01	Flush Sample taken 30 Seconds after Second
Lead	0.001	Classroom 12	CF022	F02	Flush Sample taken 2 minutes after First Flush
Lead	0.004	Classroom 12	CF021	P1	First Primary draw of 125 milliliters
Lead	0.007	Classroom 12	CF021	P2	Second Primary draw of 125 milliliters
Lead	0.000	Classroom 12	CF021	F01	Flush Sample taken 30 Seconds after Second
Lead	0.000	Classroom 12	CF021	F02	Flush Sample taken 2 minutes after First Flush
Lead	0.009	Classroom 5	CF009	P1	First Primary draw of 125 milliliters
Lead	0.002	Classroom 5	CF009	P2	Second Primary draw of 125 milliliters
Lead	0.002	Classroom 5	CF009	F01	Flush Sample taken 30 Seconds after Second
Lead	0.001	Classroom 5	CF009	F02	Flush Sample taken 2 minutes after First Flush
Lead	0.102	Classroom 11	CF015	P1	First Primary draw of 125 milliliters
Lead	0.326	Classroom 11	CF015	P2	Second Primary draw of 125 milliliters
Lead	0.014	Classroom 11	CF015	F01	Flush Sample taken 30 Seconds after Second
Lead	0.011	Classroom 11	CF015	F02	Flush Sample taken 2 minutes after First Flush
Lead	0.003	Classroom 11	CF016	P1	First Primary draw of 125 milliliters
Lead	0.003	Classroom 11	CF016	P2	Second Primary draw of 125 milliliters
Lead	0.005	Classroom 11	CF016	F01	Flush Sample taken 30 Seconds after Second
Lead	0.004	Classroom 11	CF016	F02	Flush Sample taken 2 minutes after First Flush
Lead	0.009	Classroom 21	CF027	P1	First Primary draw of 125 milliliters
Lead	0.007	Classroom 21	CF027	P2	Second Primary draw of 125 milliliters
Lead	0.000	Classroom 21	CF027	F01	Flush Sample taken 30 Seconds after Second
Lead	0.000	Classroom 21	CF027	F02	Flush Sample taken 2 minutes after First Flush
Lead	0.012	Classroom 6	CF010	P1	First Primary draw of 125 milliliters
Lead	0.004	Classroom 6	CF010	P2	Second Primary draw of 125 milliliters
Lead	0.002	Classroom 6	CF010	F01	Flush Sample taken 30 Seconds after Second
Lead	0.000	Classroom 6	CF010	F02	Flush Sample taken 2 minutes after First Flush
Lead	0.009	Classroom 21	CF028	P1	First Primary draw of 125 milliliters
Lead	0.002	Classroom 21	CF028	P2	Second Primary draw of 125 milliliters
Lead	0.001	Classroom 21	CF028	F01	Flush Sample taken 30 Seconds after Second
Lead	0.001	Classroom 21	CF028	F02	Flush Sample taken 2 minutes after First Flush
Lead	0.023	Classroom 19	CF024	P1	First Primary draw of 125 milliliters
Lead	0.003	Classroom 19	CF024	P2	Second Primary draw of 125 milliliters
Lead	0.004	Classroom 19	CF024	F01	Flush Sample taken 30 Seconds after Second
Lead	0.003	Classroom 19	CF024	F02	Flush Sample taken 2 minutes after First Flush
Lead	0.005	Community Room	KC003	P1	First Primary draw of 125 milliliters
Lead	0.002	Community Room	KC003	P2	Second Primary draw of 125 milliliters
Lead	0.000	Community Room	KC003	F01	Flush Sample taken 30 Seconds after Second
Lead	0.000	Community Room	KC003	F02	Flush Sample taken 2 minutes after First Flush
Lead	0.009	Classroom 19	CF023	P1	First Primary draw of 125 milliliters
Lead	0.009	Classroom 19	CF023	P2	Second Primary draw of 125 milliliters
Lead	0.001	Classroom 19	CF023	F01	Flush Sample taken 30 Seconds after Second
Lead	0.000	Classroom 19	CF023	F02	Flush Sample taken 2 minutes after First Flush
Lead	0.015	Hallway	DW002	P1	First Primary draw of 125 milliliters
Lead	0.006	Hallway	DW002	P2	Second Primary draw of 125 milliliters
Lead	0.004	Hallway	DW002	F01	Flush Sample taken 30 Seconds after Second
Lead	0.001	Hallway	DW002	F02	Flush Sample taken 2 minutes after First Flush
Lead	0.002	Classroom 9	CF012	P1	First Primary draw of 125 milliliters
Lead	0.004	Classroom 9	CF012	P2	Second Primary draw of 125 milliliters
Lead	0.002	Classroom 9	CF012	F01	Flush Sample taken 30 Seconds after Second
Lead	0.000	Classroom 9	CF012	F02	Flush Sample taken 2 minutes after First Flush
Lead	0.040	Hallway	DW001	P1	First Primary draw of 125 milliliters
Lead	0.006	Hallway	DW001	P2	Second Primary draw of 125 milliliters
Lead	0.004	Hallway	DW001	F01	Flush Sample taken 30 Seconds after Second
Lead	0.001	Hallway	DW001	F02	Flush Sample taken 2 minutes after First Flush

ANALYTE	RESULT (mg\L)	Sample Location	Sample Description	Site Code	Site Code Description
Lead	0.014	Classroom 15	CF018	P1	First Primary draw of 125 milliliters
Lead	0.005	Classroom 15	CF018	P2	Second Primary draw of 125 milliliters
Lead	0.002	Classroom 15	CF018	F01	Flush Sample taken 30 Seconds after Second
Lead	0.002	Classroom 15	CF018	F02	Flush Sample taken 2 minutes after First Flush
Lead	0.010	Classroom 15	CF017	P1	First Primary draw of 125 milliliters
Lead	0.014	Classroom 15	CF017	P2	Second Primary draw of 125 milliliters
Lead	0.002	Classroom 15	CF017	F01	Flush Sample taken 30 Seconds after Second
Lead	0.002	Classroom 15	CF017	F02	Flush Sample taken 2 minutes after First Flush
Lead	0.017	DHHS Office	CF029	P1	First Primary draw of 125 milliliters
Lead	0.012	DHHS Office	CF029	P2	Second Primary draw of 125 milliliters
Lead	0.002	DHHS Office	CF029	F01	Flush Sample taken 30 Seconds after Second
Lead	0.000	DHHS Office	CF029	F02	Flush Sample taken 2 minutes after First Flush
Lead	0.013	Classroom 4	CF008	P1	First Primary draw of 125 milliliters
Lead	0.006	Classroom 4	CF008	P2	Second Primary draw of 125 milliliters
Lead	0.001	Classroom 4	CF008	F01	Flush Sample taken 30 Seconds after Second
Lead	0.000	Classroom 4	CF008	F02	Flush Sample taken 2 minutes after First Flush
Lead	0.007	Classroom 3	CF007	P1	First Primary draw of 125 milliliters
Lead	0.006	Classroom 3	CF007	P2	Second Primary draw of 125 milliliters
Lead	0.003	Classroom 3	CF007	F01	Flush Sample taken 30 Seconds after Second
Lead	0.002	Classroom 3	CF007	F02	Flush Sample taken 2 minutes after First Flush
Lead	0.027	Classroom 10	CF014	P1	First Primary draw of 125 milliliters
Lead	0.007	Classroom 10	CF014	P2	Second Primary draw of 125 milliliters
Lead	0.004	Classroom 10	CF014	F01	Flush Sample taken 30 Seconds after Second
Lead	0.003	Classroom 10	CF014	F02	Flush Sample taken 2 minutes after First Flush
Lead	0.036	Classroom 14	CF026	P1	First Primary draw of 125 milliliters
Lead	0.030	Classroom 14	CF026	P2	Second Primary draw of 125 milliliters
Lead	0.017	Classroom 14	CF026	F01	Flush Sample taken 30 Seconds after Second
Lead	0.004	Classroom 14	CF026	F02	Flush Sample taken 2 minutes after First Flush
Lead	0.005	Classroom 17	CF019	P1	First Primary draw of 125 milliliters
Lead	0.003	Classroom 17	CF019	P2	Second Primary draw of 125 milliliters
Lead	0.001	Classroom 17	CF019	F01	Flush Sample taken 30 Seconds after Second
Lead	0.000	Classroom 17	CF019	F02	Flush Sample taken 2 minutes after First Flush
Lead	0.000	Classroom 14	CF025	P1	First Primary draw of 125 milliliters
Lead	0.003	Classroom 14	CF025	P2	Second Primary draw of 125 milliliters
Lead	0.003	Classroom 14	CF025	F01	Flush Sample taken 30 Seconds after Second
Lead	0.002	Classroom 14	CF025	F02	Flush Sample taken 2 minutes after First Flush
Lead	0.009	Classroom 10	CF013	P1	First Primary draw of 125 milliliters
Lead	0.018	Classroom 10	CF013	P2	Second Primary draw of 125 milliliters
Lead	0.003	Classroom 10	CF013	F01	Flush Sample taken 30 Seconds after Second
Lead	0.003	Classroom 10	CF013	F02	Flush Sample taken 2 minutes after First Flush
Lead	0.013	Classroom 17	CF020	P1	First Primary draw of 125 milliliters
Lead	0.004	Classroom 17	CF020	P2	Second Primary draw of 125 milliliters
Lead	0.005	Classroom 17	CF020	F01	Flush Sample taken 30 Seconds after Second
Lead	0.003	Classroom 17	CF020	F02	Flush Sample taken 2 minutes after First Flush
Lead	0.016	Classroom 2	CF006	P1	First Primary draw of 125 milliliters
Lead	0.003	Classroom 2	CF006	P2	Second Primary draw of 125 milliliters
Lead	0.001	Classroom 2	CF006	F01	Flush Sample taken 30 Seconds after Second
Lead	0.001	Classroom 2	CF006	F02	Flush Sample taken 2 minutes after First Flush
Lead	0.002	Classroom 7	CF011	P1	First Primary draw of 125 milliliters
Lead	0.000	Classroom 7	CF011	P2	Second Primary draw of 125 milliliters
Lead	0.002	Classroom 7	CF011	F01	Flush Sample taken 30 Seconds after Second
Lead	0.000	Classroom 7	CF011	F02	Flush Sample taken 2 minutes after First Flush
Lead	0.057	Proposed Pre K	CF031	P1	First Primary draw of 125 milliliters
Lead	0.003	Proposed Pre K	CF031	P2	Second Primary draw of 125 milliliters
Lead	0.002	Proposed Pre K	CF031	F01	Flush Sample taken 30 Seconds after Second
Lead	0.000	Proposed Pre K	CF031	F02	Flush Sample taken 2 minutes after First Flush

ANALYTE	RESULT (mg\L)	Sample Location	Sample Description	Site Code	Site Code Description
Lead	0.010	Proposed Pre K	CF030	P1	First Primary draw of 125 milliliters
Lead	0.003	Proposed Pre K	CF030	P2	Second Primary draw of 125 milliliters
Lead	0.007	Proposed Pre K	CF030	F01	Flush Sample taken 30 Seconds after Second
Lead	0.000	Proposed Pre K	CF030	F02	Flush Sample taken 2 minutes after First Flush
Lead	0.012	Classroom 1	CF004	P1	First Primary draw of 125 milliliters
Lead	0.007	Classroom 1	CF004	P2	Second Primary draw of 125 milliliters
Lead	0.004	Classroom 1	CF004	F01	Flush Sample taken 30 Seconds after Second
Lead	0.002	Classroom 1	CF004	F02	Flush Sample taken 2 minutes after First Flush
Lead	0.005	Classroom 1	DW005	P1	First Primary draw of 125 milliliters
Lead	0.003	Classroom 1	DW005	P2	Second Primary draw of 125 milliliters
Lead	0.003	Classroom 1	DW005	F01	Flush Sample taken 30 Seconds after Second
Lead	0.002	Classroom 1	DW005	F02	Flush Sample taken 2 minutes after First Flush
Lead	0.002	Proposed Pre K	CF030	CA1	First Sequential Sample
Lead	0.001	Proposed Pre K	CF030	CA2	Second Sequential Sample
Lead	0.000	Proposed Pre K	CF030	CA3	Third Sequential Sample
Lead	0.000	Proposed Pre K	CF030	CA4	Forth Sequential Sample
Lead	0.000	Proposed Pre K	CF030	CA5	Fifth Sequential Sample
Lead	0.000	Proposed Pre K	CF030	CA6	Sixth Sequential Sample
Lead	0.000	Proposed Pre K	CF030	CA7	Seventh Sequential Sample
Lead	0.000	Proposed Pre K	CF030	CA8	Eigth Sequential Sample
Lead	0.000	Proposed Pre K	CF030	CA9	Ninth Sequential Sample
Lead	0.000	Proposed Pre K	CF030	CA10	Tenth Sequential Sample
Lead	0.062	Classroom 11	CF015	CB1	First Sequential Sample
Lead	0.008	Classroom 11	CF015	CB2	Second Sequential Sample
Lead	0.008	Classroom 11	CF015	CB3	Third Sequential Sample
Lead	0.007	Classroom 11	CF015	CB4	Forth Sequential Sample
Lead	0.007	Classroom 11	CF015	CB5	Fifth Sequential Sample
Lead	0.007	Classroom 11	CF015	CB6	Sixth Sequential Sample
Lead	0.007	Classroom 11	CF015	CB7	Seventh Sequential Sample
Lead	0.006	Classroom 11	CF015	CB8	Eigth Sequential Sample
Lead	0.006	Classroom 11	CF015	CB9	Ninth Sequential Sample
Lead	0.006	Classroom 11	CF015	CB10	Tenth Sequential Sample
Lead	0.002	Classroom 21	CF027	CC1	First Sequential Sample
Lead	0.000	Classroom 21	CF027	CC2	Second Sequential Sample
Lead	0.000	Classroom 21	CF027	CC3	Third Sequential Sample
Lead	0.000	Classroom 21	CF027	CC4	Forth Sequential Sample
Lead	0.000	Classroom 21	CF027	CC5	Fifth Sequential Sample
Lead	0.000	Classroom 21	CF027	CC6	Sixth Sequential Sample
Lead	0.000	Classroom 21	CF027	CC7	Seventh Sequential Sample
Lead	0.000	Classroom 21	CF027	CC8	Eigth Sequential Sample
Lead	0.000	Classroom 21	CF027	CC9	Ninth Sequential Sample
Lead	0.000	Classroom 21	CF027	CC10	Tenth Sequential Sample

Note: Results of "Not Detected" have been converted to a numerical value of zero to allow for ease of sorting

Results in RED exceed 15 ppb
1 ppb = 0.001 mg\L

ANALYTE	RESULT (mg\L)	Sample Location	Sample Description	Site Code	Site Code Description
Copper	0.32	Classroom 12	CF022	P1	First Primary draw of 125 milliliters
Copper	0.17	Classroom 12	CF022	P2	Second Primary draw of 125 milliliters
Copper	0.15	Classroom 12	CF022	F01	Flush Sample taken 30 Seconds after Second
Copper	0.15	Classroom 12	CF022	F02	Flush Sample taken 2 minutes after First Flush
Copper	0.09	Classroom 12	CF021	P1	First Primary draw of 125 milliliters
Copper	0.15	Classroom 12	CF021	P2	Second Primary draw of 125 milliliters
Copper	0.14	Classroom 12	CF021	F01	Flush Sample taken 30 Seconds after Second
Copper	0.15	Classroom 12	CF021	F02	Flush Sample taken 2 minutes after First Flush
Copper	0.31	Classroom 5	CF009	P1	First Primary draw of 125 milliliters
Copper	0.28	Classroom 5	CF009	P2	Second Primary draw of 125 milliliters
Copper	0.08	Classroom 5	CF009	F01	Flush Sample taken 30 Seconds after Second
Copper	0.07	Classroom 5	CF009	F02	Flush Sample taken 2 minutes after First Flush
Copper	0.43	Classroom 11	CF015	P1	First Primary draw of 125 milliliters
Copper	0.66	Classroom 11	CF015	P2	Second Primary draw of 125 milliliters
Copper	0.19	Classroom 11	CF015	F01	Flush Sample taken 30 Seconds after Second
Copper	0.13	Classroom 11	CF015	F02	Flush Sample taken 2 minutes after First Flush
Copper	0.99	Classroom 11	CF016	P1	First Primary draw of 125 milliliters
Copper	0.89	Classroom 11	CF016	P2	Second Primary draw of 125 milliliters
Copper	0.16	Classroom 11	CF016	F01	Flush Sample taken 30 Seconds after Second
Copper	0.13	Classroom 11	CF016	F02	Flush Sample taken 2 minutes after First Flush
Copper	0.19	Classroom 21	CF027	P1	First Primary draw of 125 milliliters
Copper	0.21	Classroom 21	CF027	P2	Second Primary draw of 125 milliliters
Copper	0.16	Classroom 21	CF027	F01	Flush Sample taken 30 Seconds after Second
Copper	0.15	Classroom 21	CF027	F02	Flush Sample taken 2 minutes after First Flush
Copper	0.24	Classroom 6	CF010	P1	First Primary draw of 125 milliliters
Copper	0.22	Classroom 6	CF010	P2	Second Primary draw of 125 milliliters
Copper	0.17	Classroom 6	CF010	F01	Flush Sample taken 30 Seconds after Second
Copper	0.12	Classroom 6	CF010	F02	Flush Sample taken 2 minutes after First Flush
Copper	0.17	Classroom 21	CF028	P1	First Primary draw of 125 milliliters
Copper	0.16	Classroom 21	CF028	P2	Second Primary draw of 125 milliliters
Copper	0.15	Classroom 21	CF028	F01	Flush Sample taken 30 Seconds after Second
Copper	0.15	Classroom 21	CF028	F02	Flush Sample taken 2 minutes after First Flush
Copper	0.23	Classroom 19	CF024	P1	First Primary draw of 125 milliliters
Copper	0.17	Classroom 19	CF024	P2	Second Primary draw of 125 milliliters
Copper	0.16	Classroom 19	CF024	F01	Flush Sample taken 30 Seconds after Second
Copper	0.16	Classroom 19	CF024	F02	Flush Sample taken 2 minutes after First Flush
Copper	0.31	Community Room	KC003	P1	First Primary draw of 125 milliliters
Copper	0.27	Community Room	KC003	P2	Second Primary draw of 125 milliliters
Copper	0.14	Community Room	KC003	F01	Flush Sample taken 30 Seconds after Second
Copper	0.13	Community Room	KC003	F02	Flush Sample taken 2 minutes after First Flush
Copper	0.13	Classroom 19	CF023	P1	First Primary draw of 125 milliliters
Copper	0.18	Classroom 19	CF023	P2	Second Primary draw of 125 milliliters
Copper	0.15	Classroom 19	CF023	F01	Flush Sample taken 30 Seconds after Second
Copper	0.15	Classroom 19	CF023	F02	Flush Sample taken 2 minutes after First Flush
Copper	0.21	Hallway	DW002	P1	First Primary draw of 125 milliliters
Copper	0.10	Hallway	DW002	P2	Second Primary draw of 125 milliliters
Copper	0.07	Hallway	DW002	F01	Flush Sample taken 30 Seconds after Second
Copper	0.00	Hallway	DW002	F02	Flush Sample taken 2 minutes after First Flush
Copper	0.23	Classroom 9	CF012	P1	First Primary draw of 125 milliliters
Copper	0.16	Classroom 9	CF012	P2	Second Primary draw of 125 milliliters
Copper	0.11	Classroom 9	CF012	F01	Flush Sample taken 30 Seconds after Second
Copper	0.08	Classroom 9	CF012	F02	Flush Sample taken 2 minutes after First Flush

ANALYTE	RESULT (mg\L)	Sample Location	Sample Description	Site Code	Site Code Description
Copper	0.41	Hallway	DW001	P1	First Primary draw of 125 milliliters
Copper	0.29	Hallway	DW001	P2	Second Primary draw of 125 milliliters
Copper	0.17	Hallway	DW001	F01	Flush Sample taken 30 Seconds after Second
Copper	0.00	Hallway	DW001	F02	Flush Sample taken 2 minutes after First Flush
Copper	0.20	Classroom 15	CF018	P1	First Primary draw of 125 milliliters
Copper	0.17	Classroom 15	CF018	P2	Second Primary draw of 125 milliliters
Copper	0.14	Classroom 15	CF018	F01	Flush Sample taken 30 Seconds after Second
Copper	0.14	Classroom 15	CF018	F02	Flush Sample taken 2 minutes after First Flush
Copper	0.17	Classroom 15	CF017	P1	First Primary draw of 125 milliliters
Copper	0.29	Classroom 15	CF017	P2	Second Primary draw of 125 milliliters
Copper	0.17	Classroom 15	CF017	F01	Flush Sample taken 30 Seconds after Second
Copper	0.15	Classroom 15	CF017	F02	Flush Sample taken 2 minutes after First Flush
Copper	0.59	DHS Office	CF029	P1	First Primary draw of 125 milliliters
Copper	0.40	DHS Office	CF029	P2	Second Primary draw of 125 milliliters
Copper	0.08	DHS Office	CF029	F01	Flush Sample taken 30 Seconds after Second
Copper	0.00	DHS Office	CF029	F02	Flush Sample taken 2 minutes after First Flush
Copper	0.28	Classroom 4	CF008	P1	First Primary draw of 125 milliliters
Copper	0.54	Classroom 4	CF008	P2	Second Primary draw of 125 milliliters
Copper	0.17	Classroom 4	CF008	F01	Flush Sample taken 30 Seconds after Second
Copper	0.15	Classroom 4	CF008	F02	Flush Sample taken 2 minutes after First Flush
Copper	0.17	Classroom 3	CF007	P1	First Primary draw of 125 milliliters
Copper	0.27	Classroom 3	CF007	P2	Second Primary draw of 125 milliliters
Copper	0.09	Classroom 3	CF007	F01	Flush Sample taken 30 Seconds after Second
Copper	0.07	Classroom 3	CF007	F02	Flush Sample taken 2 minutes after First Flush
Copper	0.11	Classroom 10	CF014	P1	First Primary draw of 125 milliliters
Copper	0.10	Classroom 10	CF014	P2	Second Primary draw of 125 milliliters
Copper	0.10	Classroom 10	CF014	F01	Flush Sample taken 30 Seconds after Second
Copper	0.08	Classroom 10	CF014	F02	Flush Sample taken 2 minutes after First Flush
Copper	0.75	Classroom 14	CF026	P1	First Primary draw of 125 milliliters
Copper	0.66	Classroom 14	CF026	P2	Second Primary draw of 125 milliliters
Copper	0.35	Classroom 14	CF026	F01	Flush Sample taken 30 Seconds after Second
Copper	0.20	Classroom 14	CF026	F02	Flush Sample taken 2 minutes after First Flush
Copper	0.16	Classroom 17	CF019	P1	First Primary draw of 125 milliliters
Copper	0.15	Classroom 17	CF019	P2	Second Primary draw of 125 milliliters
Copper	0.14	Classroom 17	CF019	F01	Flush Sample taken 30 Seconds after Second
Copper	0.14	Classroom 17	CF019	F02	Flush Sample taken 2 minutes after First Flush
Copper	0.14	Classroom 14	CF025	P1	First Primary draw of 125 milliliters
Copper	0.25	Classroom 14	CF025	P2	Second Primary draw of 125 milliliters
Copper	0.17	Classroom 14	CF025	F01	Flush Sample taken 30 Seconds after Second
Copper	0.18	Classroom 14	CF025	F02	Flush Sample taken 2 minutes after First Flush
Copper	0.06	Classroom 10	CF013	P1	First Primary draw of 125 milliliters
Copper	0.07	Classroom 10	CF013	P2	Second Primary draw of 125 milliliters
Copper	0.19	Classroom 10	CF013	F01	Flush Sample taken 30 Seconds after Second
Copper	0.10	Classroom 10	CF013	F02	Flush Sample taken 2 minutes after First Flush
Copper	0.19	Classroom 17	CF020	P1	First Primary draw of 125 milliliters
Copper	0.16	Classroom 17	CF020	P2	Second Primary draw of 125 milliliters
Copper	0.16	Classroom 17	CF020	F01	Flush Sample taken 30 Seconds after Second
Copper	0.14	Classroom 17	CF020	F02	Flush Sample taken 2 minutes after First Flush
Copper	0.17	Classroom 2	CF006	P1	First Primary draw of 125 milliliters
Copper	0.22	Classroom 2	CF006	P2	Second Primary draw of 125 milliliters
Copper	0.11	Classroom 2	CF006	F01	Flush Sample taken 30 Seconds after Second
Copper	0.11	Classroom 2	CF006	F02	Flush Sample taken 2 minutes after First Flush

ANALYTE	RESULT (mg\L)	Sample Location	Sample Description	Site Code	Site Code Description
Copper	0.20	Classroom 7	CF011	P1	First Primary draw of 125 milliliters
Copper	0.15	Classroom 7	CF011	P2	Second Primary draw of 125 milliliters
Copper	0.11	Classroom 7	CF011	F01	Flush Sample taken 30 Seconds after Second
Copper	0.06	Classroom 7	CF011	F02	Flush Sample taken 2 minutes after First Flush
Copper	0.38	Proposed Pre K	CF031	P1	First Primary draw of 125 milliliters
Copper	0.21	Proposed Pre K	CF031	P2	Second Primary draw of 125 milliliters
Copper	0.27	Proposed Pre K	CF031	F01	Flush Sample taken 30 Seconds after Second
Copper	0.19	Proposed Pre K	CF031	F02	Flush Sample taken 2 minutes after First Flush
Copper	0.38	Proposed Pre K	CF030	P1	First Primary draw of 125 milliliters
Copper	0.42	Proposed Pre K	CF030	P2	Second Primary draw of 125 milliliters
Copper	0.59	Proposed Pre K	CF030	F01	Flush Sample taken 30 Seconds after Second
Copper	0.21	Proposed Pre K	CF030	F02	Flush Sample taken 2 minutes after First Flush
Copper	0.27	Classroom 1	CF004	P1	First Primary draw of 125 milliliters
Copper	0.25	Classroom 1	CF004	P2	Second Primary draw of 125 milliliters
Copper	0.21	Classroom 1	CF004	F01	Flush Sample taken 30 Seconds after Second
Copper	0.08	Classroom 1	CF004	F02	Flush Sample taken 2 minutes after First Flush
Copper	0.10	Classroom 1	DW005	P1	First Primary draw of 125 milliliters
Copper	0.09	Classroom 1	DW005	P2	Second Primary draw of 125 milliliters
Copper	0.09	Classroom 1	DW005	F01	Flush Sample taken 30 Seconds after Second
Copper	0.06	Classroom 1	DW005	F02	Flush Sample taken 2 minutes after First Flush
Copper	0.45	Proposed Pre K	CF030	CA1	First Sequential Sample
Copper	0.37	Proposed Pre K	CF030	CA2	Second Sequential Sample
Copper	0.22	Proposed Pre K	CF030	CA3	Third Sequential Sample
Copper	0.22	Proposed Pre K	CF030	CA4	Forth Sequential Sample
Copper	0.21	Proposed Pre K	CF030	CA5	Fifth Sequential Sample
Copper	0.21	Proposed Pre K	CF030	CA6	Sixth Sequential Sample
Copper	0.20	Proposed Pre K	CF030	CA7	Seventh Sequential Sample
Copper	0.20	Proposed Pre K	CF030	CA8	Eigth Sequential Sample
Copper	0.20	Proposed Pre K	CF030	CA9	Ninth Sequential Sample
Copper	0.20	Proposed Pre K	CF030	CA10	Tenth Sequential Sample
Copper	0.40	Classroom 11	CF015	CB1	First Sequential Sample
Copper	0.14	Classroom 11	CF015	CB2	Second Sequential Sample
Copper	0.13	Classroom 11	CF015	CB3	Third Sequential Sample
Copper	0.13	Classroom 11	CF015	CB4	Forth Sequential Sample
Copper	0.13	Classroom 11	CF015	CB5	Fifth Sequential Sample
Copper	0.13	Classroom 11	CF015	CB6	Sixth Sequential Sample
Copper	0.13	Classroom 11	CF015	CB7	Seventh Sequential Sample
Copper	0.12	Classroom 11	CF015	CB8	Eigth Sequential Sample
Copper	0.12	Classroom 11	CF015	CB9	Ninth Sequential Sample
Copper	0.12	Classroom 11	CF015	CB10	Tenth Sequential Sample
Copper	0.16	Classroom 21	CF027	CC1	First Sequential Sample
Copper	0.14	Classroom 21	CF027	CC2	Second Sequential Sample
Copper	0.14	Classroom 21	CF027	CC3	Third Sequential Sample
Copper	0.14	Classroom 21	CF027	CC4	Forth Sequential Sample
Copper	0.14	Classroom 21	CF027	CC5	Fifth Sequential Sample
Copper	0.15	Classroom 21	CF027	CC6	Sixth Sequential Sample
Copper	0.15	Classroom 21	CF027	CC7	Seventh Sequential Sample
Copper	0.15	Classroom 21	CF027	CC8	Eigth Sequential Sample
Copper	0.15	Classroom 21	CF027	CC9	Ninth Sequential Sample
Copper	0.15	Classroom 21	CF027	CC10	Tenth Sequential Sample

Note: Results of "Not Detected" have been converted to a numerical value of zero to allow for ease of sorting

None of the results for Copper exceeded 1.3 PPM
1 ppb = 0.001 mg\L

ANALYTE (Pb)	RESULT (mg/L)		ANALYTE (Cu)	RESULT (mg/L)	ZIP CODE
LEAD	0.000		COPPER	0.34	48502
LEAD	0.000		COPPER	0.19	48502
LEAD	0.001		COPPER	0.00	48502
LEAD	0.001		COPPER	0.59	48502
LEAD	0.002		COPPER	0.92	48502
LEAD	0.002		COPPER	0.00	48502
LEAD	0.002		COPPER	0.19	48502
LEAD	0.004		COPPER	0.00	48502
LEAD	0.000		COPPER	0.00	48503
LEAD	0.000		COPPER	0.00	48503
LEAD	0.000		COPPER	0.22	48503
LEAD	0.000		COPPER	0.33	48503
LEAD	0.000		COPPER	0.00	48503
LEAD	0.000		COPPER	0.00	48503
LEAD	0.000		COPPER	0.00	48503
LEAD	0.000		COPPER	0.00	48503
LEAD	0.000		COPPER	0.36	48503
LEAD	0.000		COPPER	0.34	48503
LEAD	0.000		COPPER	0.49	48503
LEAD	0.000		COPPER	0.00	48503
LEAD	0.000		COPPER	0.00	48503
LEAD	0.000		COPPER	0.00	48503
LEAD	0.000		COPPER	0.00	48503
LEAD	0.000		COPPER	0.50	48503
LEAD	0.000		COPPER	0.00	48503
LEAD	0.000		COPPER	0.00	48503
LEAD	0.000		COPPER	0.00	48503
LEAD	0.000		COPPER	0.00	48503
LEAD	0.000		COPPER	0.00	48503
LEAD	0.000		COPPER	0.00	48503
LEAD	0.000		COPPER	0.00	48503
LEAD	0.000		COPPER	0.05	48503
LEAD	0.000		COPPER	0.00	48503
LEAD	0.000		COPPER	0.15	48503
LEAD	0.000		COPPER	0.00	48503
LEAD	0.000		COPPER	0.00	48503
LEAD	0.000		COPPER	0.52	48503
LEAD	0.000		COPPER	0.00	48503
LEAD	0.000		COPPER	0.61	48503
LEAD	0.000		COPPER	0.56	48503
LEAD	0.000		COPPER	0.59	48503
LEAD	0.000		COPPER	0.53	48503
LEAD	0.000		COPPER	0.61	48503
LEAD	0.000		COPPER	0.63	48503
LEAD	0.000		COPPER	0.71	48503
LEAD	0.000		COPPER	0.67	48503
LEAD	0.000		COPPER	0.45	48503
LEAD	0.000		COPPER	0.91	48503
LEAD	0.000		COPPER	0.80	48503
LEAD	0.000		COPPER	0.80	48503
LEAD	0.000		COPPER	0.00	48503
LEAD	0.000		COPPER	0.00	48503
LEAD	0.000		COPPER	0.00	48503

ANALYTE (Pb)	RESULT (mg/L)		ANALYTE (Cu)	RESULT (mg/L)	ZIP CODE
LEAD	0.000		COPPER	0.00	48503
LEAD	0.001		COPPER	0.00	48503
LEAD	0.001		COPPER	0.00	48503
LEAD	0.001		COPPER	0.34	48503
LEAD	0.001		COPPER	0.00	48503
LEAD	0.001		COPPER	0.05	48503
LEAD	0.001		COPPER	0.50	48503
LEAD	0.001		COPPER	0.11	48503
LEAD	0.001		COPPER	0.63	48503
LEAD	0.001		COPPER	0.00	48503
LEAD	0.001		COPPER	0.13	48503
LEAD	0.001		COPPER	0.63	48503
LEAD	0.001		COPPER	0.00	48503
LEAD	0.001		COPPER	0.33	48503
LEAD	0.001		COPPER	0.46	48503
LEAD	0.001		COPPER	0.00	48503
LEAD	0.001		COPPER	0.22	48503
LEAD	0.001		COPPER	0.19	48503
LEAD	0.001		COPPER	0.19	48503
LEAD	0.001		COPPER	0.05	48503
LEAD	0.001		COPPER	0.00	48503
LEAD	0.002		COPPER	0.08	48503
LEAD	0.002		COPPER	0.07	48503
LEAD	0.002		COPPER	0.11	48503
LEAD	0.002		COPPER	0.00	48503
LEAD	0.002		COPPER	0.00	48503
LEAD	0.002		COPPER	0.41	48503
LEAD	0.002		COPPER	0.15	48503
LEAD	0.002		COPPER	0.08	48503
LEAD	0.002		COPPER	0.13	48503
LEAD	0.002		COPPER	0.54	48503
LEAD	0.002		COPPER	0.72	48503
LEAD	0.002		COPPER	0.00	48503
LEAD	0.002		COPPER	0.25	48503
LEAD	0.002		COPPER	0.09	48503
LEAD	0.002		COPPER	0.31	48503
LEAD	0.002		COPPER	0.00	48503
LEAD	0.002		COPPER	0.00	48503
LEAD	0.002		COPPER	0.00	48503
LEAD	0.002		COPPER	0.62	48503
LEAD	0.002		COPPER	0.18	48503
LEAD	0.002		COPPER	0.18	48503
LEAD	0.002		COPPER	0.00	48503
LEAD	0.002		COPPER	0.07	48503
LEAD	0.002		COPPER	0.00	48503
LEAD	0.002		COPPER	0.14	48503
LEAD	0.002		COPPER	0.00	48503
LEAD	0.002		COPPER	0.11	48503
LEAD	0.003		COPPER	0.37	48503
LEAD	0.003		COPPER	0.00	48503
LEAD	0.003		COPPER	0.00	48503
LEAD	0.003		COPPER	0.00	48503
LEAD	0.003		COPPER	0.10	48503

ANALYTE (Pb)	RESULT (mg/L)		ANALYTE (Cu)	RESULT (mg/L)	ZIP CODE
LEAD	0.003		COPPER	0.00	48503
LEAD	0.003		COPPER	0.00	48503
LEAD	0.003		COPPER	0.00	48503
LEAD	0.003		COPPER	0.00	48503
LEAD	0.003		COPPER	0.00	48503
LEAD	0.003		COPPER	0.15	48503
LEAD	0.003		COPPER	0.00	48503
LEAD	0.003		COPPER	0.00	48503
LEAD	0.003		COPPER	0.16	48503
LEAD	0.003		COPPER	0.00	48503
LEAD	0.003		COPPER	0.11	48503
LEAD	0.003		COPPER	0.12	48503
LEAD	0.003		COPPER	0.08	48503
LEAD	0.004		COPPER	0.00	48503
LEAD	0.004		COPPER	0.16	48503
LEAD	0.004		COPPER	0.23	48503
LEAD	0.004		COPPER	0.00	48503
LEAD	0.004		COPPER	0.00	48503
LEAD	0.004		COPPER	0.00	48503
LEAD	0.004		COPPER	0.06	48503
LEAD	0.004		COPPER	0.24	48503
LEAD	0.004		COPPER	0.07	48503
LEAD	0.004		COPPER	0.00	48503
LEAD	0.004		COPPER	0.07	48503
LEAD	0.004		COPPER	0.22	48503
LEAD	0.004		COPPER	0.00	48503
LEAD	0.005		COPPER	0.00	48503
LEAD	0.005		COPPER	0.05	48503
LEAD	0.005		COPPER	0.00	48503
LEAD	0.005		COPPER	0.00	48503
LEAD	0.005		COPPER	0.09	48503
LEAD	0.005		COPPER	0.00	48503
LEAD	0.005		COPPER	0.06	48503
LEAD	0.005		COPPER	0.24	48503
LEAD	0.005		COPPER	0.00	48503
LEAD	0.005		COPPER	0.00	48503
LEAD	0.006		COPPER	0.07	48503
LEAD	0.006		COPPER	0.00	48503
LEAD	0.006		COPPER	0.10	48503
LEAD	0.006		COPPER	0.15	48503
LEAD	0.006		COPPER	0.07	48503
LEAD	0.006		COPPER	0.11	48503
LEAD	0.006		COPPER	0.00	48503
LEAD	0.006		COPPER	0.00	48503
LEAD	0.006		COPPER	0.00	48503
LEAD	0.006		COPPER	0.00	48503
LEAD	0.007		COPPER	0.00	48503
LEAD	0.007		COPPER	0.41	48503
LEAD	0.007		COPPER	0.00	48503
LEAD	0.007		COPPER	0.22	48503
LEAD	0.008		COPPER	1.11	48503
LEAD	0.008		COPPER	0.07	48503
LEAD	0.008		COPPER	0.00	48503

ANALYTE (Pb)	RESULT (mg/L)		ANALYTE (Cu)	RESULT (mg/L)	ZIP CODE
LEAD	0.008		COPPER	0.36	48503
LEAD	0.009		COPPER	0.17	48503
LEAD	0.009		COPPER	0.07	48503
LEAD	0.010		COPPER	0.00	48503
LEAD	0.010		COPPER	0.16	48503
LEAD	0.011		COPPER	0.00	48503
LEAD	0.011		COPPER	0.18	48503
LEAD	0.015		COPPER	0.00	48503
LEAD	0.016		COPPER	0.06	48503
LEAD	0.016		COPPER	0.00	48503
LEAD	0.018		COPPER	0.29	48503
LEAD	0.020		COPPER	0.13	48503
LEAD	0.021		COPPER	0.06	48503
LEAD	0.023		COPPER	0.00	48503
LEAD	0.030		COPPER	0.00	48503
LEAD	0.036		COPPER	0.00	48503
LEAD	0.053		COPPER	0.07	48503
LEAD	0.075		COPPER	0.57	48503
LEAD	0.088		COPPER	0.09	48503
LEAD	0.116		COPPER	0.13	48503
LEAD	0.131		COPPER	0.55	48503
LEAD	0.253		COPPER	0.18	48503
LEAD	0.327		COPPER	0.19	48503
LEAD	0.000		COPPER	0.14	48504
LEAD	0.000		COPPER	0.00	48504
LEAD	0.000		COPPER	0.08	48504
LEAD	0.000		COPPER	0.00	48504
LEAD	0.000		COPPER	0.00	48504
LEAD	0.000		COPPER	0.00	48504
LEAD	0.000		COPPER	0.00	48504
LEAD	0.000		COPPER	0.00	48504
LEAD	0.000		COPPER	0.23	48504
LEAD	0.000		COPPER	0.15	48504
LEAD	0.000		COPPER	0.00	48504
LEAD	0.000		COPPER	0.00	48504
LEAD	0.000		COPPER	0.00	48504
LEAD	0.000		COPPER	0.05	48504
LEAD	0.000		COPPER	0.00	48504
LEAD	0.000		COPPER	0.57	48504
LEAD	0.001		COPPER	0.07	48504
LEAD	0.001		COPPER	0.12	48504
LEAD	0.001		COPPER	0.16	48504
LEAD	0.002		COPPER	0.05	48504
LEAD	0.002		COPPER	0.00	48504
LEAD	0.002		COPPER	0.06	48504
LEAD	0.002		COPPER	0.00	48504
LEAD	0.002		COPPER	0.15	48504
LEAD	0.002		COPPER	0.00	48504
LEAD	0.002		COPPER	0.00	48504
LEAD	0.002		COPPER	0.10	48504
LEAD	0.002		COPPER	0.10	48504
LEAD	0.002		COPPER	0.00	48504
LEAD	0.002		COPPER	0.14	48504

ANALYTE (Pb)	RESULT (mg/L)		ANALYTE (Cu)	RESULT (mg/L)	ZIP CODE
LEAD	0.002		COPPER	0.00	48504
LEAD	0.003		COPPER	0.00	48504
LEAD	0.003		COPPER	0.06	48504
LEAD	0.003		COPPER	0.18	48504
LEAD	0.003		COPPER	0.19	48504
LEAD	0.004		COPPER	0.12	48504
LEAD	0.004		COPPER	0.08	48504
LEAD	0.004		COPPER	0.00	48504
LEAD	0.004		COPPER	0.00	48504
LEAD	0.005		COPPER	0.50	48504
LEAD	0.006		COPPER	0.00	48504
LEAD	0.006		COPPER	0.32	48504
LEAD	0.006		COPPER	0.00	48504
LEAD	0.007		COPPER	0.00	48504
LEAD	0.008		COPPER	0.15	48504
LEAD	0.008		COPPER	0.00	48504
LEAD	0.009		COPPER	0.25	48504
LEAD	0.011		COPPER	0.00	48504
LEAD	0.012		COPPER	0.06	48504
LEAD	0.015		COPPER	0.00	48504
LEAD	0.041		COPPER	1.04	48504
LEAD	0.000		COPPER	0.00	48505
LEAD	0.000		COPPER	0.06	48505
LEAD	0.000		COPPER	0.24	48505
LEAD	0.000		COPPER	0.00	48505
LEAD	0.000		COPPER	0.00	48505
LEAD	0.001		COPPER	0.00	48505
LEAD	0.001		COPPER	0.00	48505
LEAD	0.001		COPPER	0.00	48505
LEAD	0.001		COPPER	0.05	48505
LEAD	0.001		COPPER	0.06	48505
LEAD	0.002		COPPER	0.65	48505
LEAD	0.003		COPPER	0.10	48505
LEAD	0.004		COPPER	0.09	48505
LEAD	0.004		COPPER	0.00	48505
LEAD	0.006		COPPER	0.00	48505
LEAD	0.007		COPPER	0.20	48505
LEAD	0.007		COPPER	0.08	48505
LEAD	0.008		COPPER	0.06	48505
LEAD	0.010		COPPER	0.00	48505
LEAD	0.013		COPPER	0.00	48505
LEAD	0.027		COPPER	0.08	48505
LEAD	0.035		COPPER	2.57	48505
LEAD	0.000		COPPER	0.00	48506
LEAD	0.000		COPPER	0.05	48506
LEAD	0.000		COPPER	0.00	48506
LEAD	0.000		COPPER	0.00	48506
LEAD	0.000		COPPER	0.00	48506
LEAD	0.000		COPPER	0.00	48506
LEAD	0.000		COPPER	0.00	48506
LEAD	0.000		COPPER	0.00	48506
LEAD	0.000		COPPER	0.00	48506
LEAD	0.000		COPPER	0.08	48506

ANALYTE (Pb)	RESULT (mg/L)		ANALYTE (Cu)	RESULT (mg/L)	ZIP CODE
LEAD	0.000		COPPER	0.00	48506
LEAD	0.000		COPPER	0.26	48506
LEAD	0.000		COPPER	0.11	48506
LEAD	0.000		COPPER	0.00	48506
LEAD	0.000		COPPER	0.09	48506
LEAD	0.000		COPPER	0.00	48506
LEAD	0.000		COPPER	0.00	48506
LEAD	0.000		COPPER	0.00	48506
LEAD	0.000		COPPER	0.00	48506
LEAD	0.000		COPPER	0.00	48506
LEAD	0.000		COPPER	0.07	48506
LEAD	0.000		COPPER	0.06	48506
LEAD	0.001		COPPER	0.07	48506
LEAD	0.001		COPPER	0.00	48506
LEAD	0.001		COPPER	0.00	48506
LEAD	0.001		COPPER	0.06	48506
LEAD	0.001		COPPER	0.00	48506
LEAD	0.001		COPPER	0.58	48506
LEAD	0.001		COPPER	0.05	48506
LEAD	0.002		COPPER	0.06	48506
LEAD	0.002		COPPER	0.15	48506
LEAD	0.002		COPPER	0.06	48506
LEAD	0.002		COPPER	0.55	48506
LEAD	0.002		COPPER	0.00	48506
LEAD	0.002		COPPER	0.11	48506
LEAD	0.003		COPPER	0.06	48506
LEAD	0.003		COPPER	0.00	48506
LEAD	0.004		COPPER	0.11	48506
LEAD	0.006		COPPER	0.00	48506
LEAD	0.006		COPPER	0.16	48506
LEAD	0.006		COPPER	0.00	48506
LEAD	0.010		COPPER	0.09	48506
LEAD	0.012		COPPER	0.00	48506
LEAD	0.016		COPPER	0.07	48506
LEAD	0.017		COPPER	1.33	48506
LEAD	0.017		COPPER	0.17	48506
LEAD	0.019		COPPER	0.07	48506
LEAD	0.000		COPPER	0.00	48507
LEAD	0.000		COPPER	0.27	48507
LEAD	0.000		COPPER	0.17	48507
LEAD	0.000		COPPER	0.07	48507
LEAD	0.000		COPPER	0.06	48507
LEAD	0.000		COPPER	0.00	48507
LEAD	0.000		COPPER	0.00	48507
LEAD	0.000		COPPER	0.00	48507
LEAD	0.000		COPPER	0.00	48507
LEAD	0.000		COPPER	0.00	48507
LEAD	0.000		COPPER	0.00	48507
LEAD	0.000		COPPER	0.00	48507
LEAD	0.000		COPPER	0.41	48507
LEAD	0.000		COPPER	0.00	48507
LEAD	0.000		COPPER	0.32	48507
LEAD	0.001		COPPER	0.00	48507

ANALYTE (Pb)	RESULT (mg/L)		ANALYTE (Cu)	RESULT (mg/L)	ZIP CODE
LEAD	0.001		COPPER	0.00	48507
LEAD	0.001		COPPER	0.00	48507
LEAD	0.001		COPPER	0.00	48507
LEAD	0.001		COPPER	0.00	48507
LEAD	0.002		COPPER	0.07	48507
LEAD	0.002		COPPER	0.15	48507
LEAD	0.002		COPPER	0.07	48507
LEAD	0.002		COPPER	0.07	48507
LEAD	0.002		COPPER	0.06	48507
LEAD	0.002		COPPER	0.00	48507
LEAD	0.003		COPPER	0.12	48507
LEAD	0.003		COPPER	0.37	48507
LEAD	0.003		COPPER	0.08	48507
LEAD	0.004		COPPER	0.11	48507
LEAD	0.004		COPPER	0.09	48507
LEAD	0.005		COPPER	0.00	48507
LEAD	0.005		COPPER	0.08	48507
LEAD	0.005		COPPER	0.08	48507
LEAD	0.005		COPPER	0.07	48507
LEAD	0.005		COPPER	0.00	48507
LEAD	0.005		COPPER	0.00	48507
LEAD	0.007		COPPER	0.30	48507
LEAD	0.007		COPPER	0.05	48507
LEAD	0.008		COPPER	0.08	48507
LEAD	0.009		COPPER	0.00	48507
LEAD	0.010		COPPER	0.07	48507
LEAD	0.013		COPPER	0.12	48507
LEAD	0.014		COPPER	0.23	48507
LEAD	0.021		COPPER	0.08	48507
LEAD	0.074		COPPER	0.09	48507
LEAD	0.151		COPPER	0.14	48507
LEAD	0.000		COPPER	0.17	48532
LEAD	0.000		COPPER	0.07	48532
LEAD	0.000		COPPER	0.00	48532
LEAD	0.000		COPPER	0.43	48532
LEAD	0.000		COPPER	0.08	48532
LEAD	0.002		COPPER	0.22	48532
LEAD	0.026		COPPER	0.06	48532
LEAD	0.000		COPPER	0.00	
LEAD	0.000		COPPER	0.00	
LEAD	0.000		COPPER	0.00	
LEAD	0.000		COPPER	0.00	
LEAD	0.000		COPPER	0.00	
LEAD	0.000		COPPER	0.00	
LEAD	0.000		COPPER	0.00	
LEAD	0.000		COPPER	0.13	
LEAD	0.000		COPPER	0.00	
LEAD	0.001		COPPER	0.58	
LEAD	0.001		COPPER	0.00	
LEAD	0.002		COPPER	0.00	
LEAD	0.002		COPPER	0.00	
LEAD	0.003		COPPER	0.00	
LEAD	0.003		COPPER	0.42	

ANALYTE (Pb)	RESULT (mg/L)		ANALYTE (Cu)	RESULT (mg/L)	ZIP CODE
LEAD	0.004		COPPER	0.00	
LEAD	0.004		COPPER	0.00	
LEAD	0.005		COPPER	0.00	
LEAD	0.008		COPPER	0.07	
LEAD	0.009		COPPER	0.00	
LEAD	0.012		COPPER	0.15	
LEAD	0.019		COPPER	1.22	
LEAD	0.020		COPPER	0.21	
LEAD	0.027		COPPER	0.05	
LEAD	0.078		COPPER	0.27	

NOTES:

1 PPB = 0.001 mg/L

Lead values exceeding 0.015 mg/L and Copper results exceeding 1.3 mg/L are highlighted in red.

Sample results of "Not Detected" have been replaced with a numerical value of zero for ease of sorting.

Samples without a zip code did not have one provided on the accompanying paperwork.

ANALYTE (Pb)	RESULT (mg/L)		ANALYTE (Cu)	RESULT (mg/L)	ZIP CODE
LEAD	0.000		COPPER	0.00	48503
LEAD	0.000		COPPER	0.00	48503
LEAD	0.000		COPPER	0.22	48503
LEAD	0.000		COPPER	0.00	48507
LEAD	0.000		COPPER	0.14	48504
LEAD	0.000		COPPER	0.00	48506
LEAD	0.000		COPPER	0.05	48506
LEAD	0.000		COPPER	0.27	48507
LEAD	0.000		COPPER	0.33	48503
LEAD	0.000		COPPER	0.00	48504
LEAD	0.000		COPPER	0.00	48506
LEAD	0.000		COPPER	0.08	48504
LEAD	0.000		COPPER	0.17	48532
LEAD	0.000		COPPER	0.07	48532
LEAD	0.000		COPPER	0.00	48503
LEAD	0.000		COPPER	0.00	48503
LEAD	0.000		COPPER	0.00	48503
LEAD	0.000		COPPER	0.00	48503
LEAD	0.000		COPPER	0.36	48503
LEAD	0.000		COPPER	0.17	48507
LEAD	0.000		COPPER	0.00	48506
LEAD	0.000		COPPER	0.00	48505
LEAD	0.000		COPPER	0.00	48506
LEAD	0.000		COPPER	0.00	48504
LEAD	0.000		COPPER	0.00	48506
LEAD	0.000		COPPER	0.00	
LEAD	0.000		COPPER	0.06	48505
LEAD	0.000		COPPER	0.00	48506
LEAD	0.000		COPPER	0.00	48506
LEAD	0.000		COPPER	0.34	48503
LEAD	0.000		COPPER	0.49	48503
LEAD	0.000		COPPER	0.00	48504
LEAD	0.000		COPPER	0.00	
LEAD	0.000		COPPER	0.00	48503
LEAD	0.000		COPPER	0.00	48503
LEAD	0.000		COPPER	0.00	48503
LEAD	0.000		COPPER	0.00	48503
LEAD	0.000		COPPER	0.50	48503
LEAD	0.000		COPPER	0.00	48503
LEAD	0.000		COPPER	0.00	48503
LEAD	0.000		COPPER	0.00	48503
LEAD	0.000		COPPER	0.00	48503
LEAD	0.000		COPPER	0.00	48503
LEAD	0.000		COPPER	0.00	48506
LEAD	0.000		COPPER	0.00	48504
LEAD	0.000		COPPER	0.08	48506
LEAD	0.000		COPPER	0.00	48506
LEAD	0.000		COPPER	0.26	48506
LEAD	0.000		COPPER	0.11	48506
LEAD	0.000		COPPER	0.00	48504
LEAD	0.000		COPPER	0.00	48532
LEAD	0.000		COPPER	0.00	
LEAD	0.000		COPPER	0.34	48502

ANALYTE (Pb)	RESULT (mg/L)		ANALYTE (Cu)	RESULT (mg/L)	ZIP CODE
LEAD	0.000		COPPER	0.00	48506
LEAD	0.000		COPPER	0.09	48506
LEAD	0.000		COPPER	0.24	48505
LEAD	0.000		COPPER	0.00	48503
LEAD	0.000		COPPER	0.00	
LEAD	0.000		COPPER	0.00	48504
LEAD	0.000		COPPER	0.00	48503
LEAD	0.000		COPPER	0.00	
LEAD	0.000		COPPER	0.23	48504
LEAD	0.000		COPPER	0.15	48504
LEAD	0.000		COPPER	0.00	48506
LEAD	0.000		COPPER	0.00	48506
LEAD	0.000		COPPER	0.05	48503
LEAD	0.000		COPPER	0.00	48503
LEAD	0.000		COPPER	0.00	48505
LEAD	0.000		COPPER	0.00	48504
LEAD	0.000		COPPER	0.15	48503
LEAD	0.000		COPPER	0.00	
LEAD	0.000		COPPER	0.07	48507
LEAD	0.000		COPPER	0.00	48504
LEAD	0.000		COPPER	0.00	48505
LEAD	0.000		COPPER	0.00	48503
LEAD	0.000		COPPER	0.00	48504
LEAD	0.000		COPPER	0.00	48503
LEAD	0.000		COPPER	0.00	48506
LEAD	0.000		COPPER	0.06	48507
LEAD	0.000		COPPER	0.00	
LEAD	0.000		COPPER	0.19	48502
LEAD	0.000		COPPER	0.00	48507
LEAD	0.000		COPPER	0.52	48503
LEAD	0.000		COPPER	0.00	48503
LEAD	0.000		COPPER	0.43	48532
LEAD	0.000		COPPER	0.00	48507
LEAD	0.000		COPPER	0.05	48504
LEAD	0.000		COPPER	0.61	48503
LEAD	0.000		COPPER	0.00	48507
LEAD	0.000		COPPER	0.13	
LEAD	0.000		COPPER	0.00	48507
LEAD	0.000		COPPER	0.56	48503
LEAD	0.000		COPPER	0.00	48506
LEAD	0.000		COPPER	0.59	48503
LEAD	0.000		COPPER	0.53	48503
LEAD	0.000		COPPER	0.61	48503
LEAD	0.000		COPPER	0.63	48503
LEAD	0.000		COPPER	0.71	48503
LEAD	0.000		COPPER	0.67	48503
LEAD	0.000		COPPER	0.45	48503
LEAD	0.000		COPPER	0.91	48503
LEAD	0.000		COPPER	0.80	48503
LEAD	0.000		COPPER	0.80	48503
LEAD	0.000		COPPER	0.00	48507
LEAD	0.000		COPPER	0.00	48507
LEAD	0.000		COPPER	0.00	48507

ANALYTE (Pb)	RESULT (mg/L)		ANALYTE (Cu)	RESULT (mg/L)	ZIP CODE
LEAD	0.000		COPPER	0.08	48532
LEAD	0.000		COPPER	0.00	48506
LEAD	0.000		COPPER	0.41	48507
LEAD	0.000		COPPER	0.00	48507
LEAD	0.000		COPPER	0.07	48506
LEAD	0.000		COPPER	0.00	
LEAD	0.000		COPPER	0.06	48506
LEAD	0.000		COPPER	0.00	48503
LEAD	0.000		COPPER	0.00	48504
LEAD	0.000		COPPER	0.57	48504
LEAD	0.000		COPPER	0.00	48503
LEAD	0.000		COPPER	0.00	48503
LEAD	0.000		COPPER	0.32	48507
LEAD	0.000		COPPER	0.00	48503
LEAD	0.001		COPPER	0.00	48503
LEAD	0.001		COPPER	0.00	48503
LEAD	0.001		COPPER	0.00	48505
LEAD	0.001		COPPER	0.34	48503
LEAD	0.001		COPPER	0.00	48502
LEAD	0.001		COPPER	0.00	48505
LEAD	0.001		COPPER	0.00	48503
LEAD	0.001		COPPER	0.07	48506
LEAD	0.001		COPPER	0.07	48504
LEAD	0.001		COPPER	0.00	48507
LEAD	0.001		COPPER	0.05	48503
LEAD	0.001		COPPER	0.00	48507
LEAD	0.001		COPPER	0.50	48503
LEAD	0.001		COPPER	0.00	48506
LEAD	0.001		COPPER	0.00	48505
LEAD	0.001		COPPER	0.00	48506
LEAD	0.001		COPPER	0.06	48506
LEAD	0.001		COPPER	0.11	48503
LEAD	0.001		COPPER	0.63	48503
LEAD	0.001		COPPER	0.00	48507
LEAD	0.001		COPPER	0.00	48506
LEAD	0.001		COPPER	0.58	48506
LEAD	0.001		COPPER	0.00	48503
LEAD	0.001		COPPER	0.05	48506
LEAD	0.001		COPPER	0.59	48502
LEAD	0.001		COPPER	0.05	48505
LEAD	0.001		COPPER	0.06	48505
LEAD	0.001		COPPER	0.12	48504
LEAD	0.001		COPPER	0.13	48503
LEAD	0.001		COPPER	0.58	
LEAD	0.001		COPPER	0.00	
LEAD	0.001		COPPER	0.00	48507
LEAD	0.001		COPPER	0.63	48503
LEAD	0.001		COPPER	0.00	48503
LEAD	0.001		COPPER	0.33	48503
LEAD	0.001		COPPER	0.46	48503
LEAD	0.001		COPPER	0.16	48504
LEAD	0.001		COPPER	0.00	48503
LEAD	0.001		COPPER	0.00	48507

ANALYTE (Pb)	RESULT (mg/L)		ANALYTE (Cu)	RESULT (mg/L)	ZIP CODE
LEAD	0.001		COPPER	0.22	48503
LEAD	0.001		COPPER	0.19	48503
LEAD	0.001		COPPER	0.19	48503
LEAD	0.001		COPPER	0.05	48503
LEAD	0.001		COPPER	0.00	48503
LEAD	0.002		COPPER	0.08	48503
LEAD	0.002		COPPER	0.05	48504
LEAD	0.002		COPPER	0.07	48503
LEAD	0.002		COPPER	0.00	
LEAD	0.002		COPPER	0.06	48506
LEAD	0.002		COPPER	0.11	48503
LEAD	0.002		COPPER	0.00	48504
LEAD	0.002		COPPER	0.07	48507
LEAD	0.002		COPPER	0.15	48507
LEAD	0.002		COPPER	0.06	48504
LEAD	0.002		COPPER	0.00	48503
LEAD	0.002		COPPER	0.00	48504
LEAD	0.002		COPPER	0.00	48503
LEAD	0.002		COPPER	0.22	48532
LEAD	0.002		COPPER	0.41	48503
LEAD	0.002		COPPER	0.92	48502
LEAD	0.002		COPPER	0.15	48504
LEAD	0.002		COPPER	0.15	48503
LEAD	0.002		COPPER	0.08	48503
LEAD	0.002		COPPER	0.00	48504
LEAD	0.002		COPPER	0.13	48503
LEAD	0.002		COPPER	0.00	48504
LEAD	0.002		COPPER	0.65	48505
LEAD	0.002		COPPER	0.10	48504
LEAD	0.002		COPPER	0.54	48503
LEAD	0.002		COPPER	0.72	48503
LEAD	0.002		COPPER	0.07	48507
LEAD	0.002		COPPER	0.00	48503
LEAD	0.002		COPPER	0.00	48502
LEAD	0.002		COPPER	0.25	48503
LEAD	0.002		COPPER	0.10	48504
LEAD	0.002		COPPER	0.15	48506
LEAD	0.002		COPPER	0.07	48507
LEAD	0.002		COPPER	0.09	48503
LEAD	0.002		COPPER	0.00	48504
LEAD	0.002		COPPER	0.06	48506
LEAD	0.002		COPPER	0.55	48506
LEAD	0.002		COPPER	0.31	48503
LEAD	0.002		COPPER	0.06	48507
LEAD	0.002		COPPER	0.00	48506
LEAD	0.002		COPPER	0.11	48506
LEAD	0.002		COPPER	0.00	48503
LEAD	0.002		COPPER	0.00	48503
LEAD	0.002		COPPER	0.00	48503
LEAD	0.002		COPPER	0.19	48502
LEAD	0.002		COPPER	0.62	48503
LEAD	0.002		COPPER	0.00	48507
LEAD	0.002		COPPER	0.18	48503

ANALYTE (Pb)	RESULT (mg/L)		ANALYTE (Cu)	RESULT (mg/L)	ZIP CODE
LEAD	0.002		COPPER	0.00	
LEAD	0.002		COPPER	0.18	48503
LEAD	0.002		COPPER	0.00	48503
LEAD	0.002		COPPER	0.07	48503
LEAD	0.002		COPPER	0.14	48504
LEAD	0.002		COPPER	0.00	48503
LEAD	0.002		COPPER	0.00	48504
LEAD	0.002		COPPER	0.14	48503
LEAD	0.002		COPPER	0.00	48503
LEAD	0.002		COPPER	0.11	48503
LEAD	0.003		COPPER	0.37	48503
LEAD	0.003		COPPER	0.00	48503
LEAD	0.003		COPPER	0.00	48503
LEAD	0.003		COPPER	0.00	48503
LEAD	0.003		COPPER	0.10	48503
LEAD	0.003		COPPER	0.00	48504
LEAD	0.003		COPPER	0.00	48503
LEAD	0.003		COPPER	0.00	48503
LEAD	0.003		COPPER	0.00	48503
LEAD	0.003		COPPER	0.12	48507
LEAD	0.003		COPPER	0.06	48504
LEAD	0.003		COPPER	0.00	48503
LEAD	0.003		COPPER	0.00	48503
LEAD	0.003		COPPER	0.37	48507
LEAD	0.003		COPPER	0.15	48503
LEAD	0.003		COPPER	0.00	48503
LEAD	0.003		COPPER	0.06	48506
LEAD	0.003		COPPER	0.00	48503
LEAD	0.003		COPPER	0.00	48506
LEAD	0.003		COPPER	0.16	48503
LEAD	0.003		COPPER	0.00	48503
LEAD	0.003		COPPER	0.18	48504
LEAD	0.003		COPPER	0.00	
LEAD	0.003		COPPER	0.11	48503
LEAD	0.003		COPPER	0.42	
LEAD	0.003		COPPER	0.19	48504
LEAD	0.003		COPPER	0.12	48503
LEAD	0.003		COPPER	0.08	48503
LEAD	0.003		COPPER	0.08	48507
LEAD	0.003		COPPER	0.10	48505
LEAD	0.004		COPPER	0.00	48503
LEAD	0.004		COPPER	0.16	48503
LEAD	0.004		COPPER	0.00	48502
LEAD	0.004		COPPER	0.12	48504
LEAD	0.004		COPPER	0.23	48503
LEAD	0.004		COPPER	0.00	48503
LEAD	0.004		COPPER	0.00	48503
LEAD	0.004		COPPER	0.00	48503
LEAD	0.004		COPPER	0.09	48505
LEAD	0.004		COPPER	0.11	48506
LEAD	0.004		COPPER	0.08	48504
LEAD	0.004		COPPER	0.11	48507
LEAD	0.004		COPPER	0.06	48503

ANALYTE (Pb)	RESULT (mg/L)		ANALYTE (Cu)	RESULT (mg/L)	ZIP CODE
LEAD	0.004		COPPER	0.00	
LEAD	0.004		COPPER	0.24	48503
LEAD	0.004		COPPER	0.07	48503
LEAD	0.004		COPPER	0.09	48507
LEAD	0.004		COPPER	0.00	48503
LEAD	0.004		COPPER	0.00	48504
LEAD	0.004		COPPER	0.07	48503
LEAD	0.004		COPPER	0.22	48503
LEAD	0.004		COPPER	0.00	48503
LEAD	0.004		COPPER	0.00	48504
LEAD	0.004		COPPER	0.00	48505
LEAD	0.004		COPPER	0.00	
LEAD	0.005		COPPER	0.00	48503
LEAD	0.005		COPPER	0.00	48507
LEAD	0.005		COPPER	0.05	48503
LEAD	0.005		COPPER	0.00	48503
LEAD	0.005		COPPER	0.00	48503
LEAD	0.005		COPPER	0.09	48503
LEAD	0.005		COPPER	0.00	48503
LEAD	0.005		COPPER	0.00	
LEAD	0.005		COPPER	0.08	48507
LEAD	0.005		COPPER	0.06	48503
LEAD	0.005		COPPER	0.08	48507
LEAD	0.005		COPPER	0.07	48507
LEAD	0.005		COPPER	0.24	48503
LEAD	0.005		COPPER	0.00	48503
LEAD	0.005		COPPER	0.50	48504
LEAD	0.005		COPPER	0.00	48507
LEAD	0.005		COPPER	0.00	48507
LEAD	0.005		COPPER	0.00	48503
LEAD	0.006		COPPER	0.00	48505
LEAD	0.006		COPPER	0.07	48503
LEAD	0.006		COPPER	0.00	48503
LEAD	0.006		COPPER	0.10	48503
LEAD	0.006		COPPER	0.15	48503
LEAD	0.006		COPPER	0.07	48503
LEAD	0.006		COPPER	0.11	48503
LEAD	0.006		COPPER	0.00	48503
LEAD	0.006		COPPER	0.00	48506
LEAD	0.006		COPPER	0.00	48504
LEAD	0.006		COPPER	0.16	48506
LEAD	0.006		COPPER	0.00	48503
LEAD	0.006		COPPER	0.32	48504
LEAD	0.006		COPPER	0.00	48503
LEAD	0.006		COPPER	0.00	48504
LEAD	0.006		COPPER	0.00	48503
LEAD	0.006		COPPER	0.00	48506
LEAD	0.007		COPPER	0.00	48503
LEAD	0.007		COPPER	0.00	48504
LEAD	0.007		COPPER	0.20	48505
LEAD	0.007		COPPER	0.41	48503
LEAD	0.007		COPPER	0.00	48503
LEAD	0.007		COPPER	0.30	48507

ANALYTE (Pb)	RESULT (mg/L)		ANALYTE (Cu)	RESULT (mg/L)	ZIP CODE
LEAD	0.007		COPPER	0.08	48505
LEAD	0.007		COPPER	0.05	48507
LEAD	0.007		COPPER	0.22	48503
LEAD	0.008		COPPER	0.15	48504
LEAD	0.008		COPPER	1.11	48503
LEAD	0.008		COPPER	0.07	
LEAD	0.008		COPPER	0.06	48505
LEAD	0.008		COPPER	0.08	48507
LEAD	0.008		COPPER	0.07	48503
LEAD	0.008		COPPER	0.00	48503
LEAD	0.008		COPPER	0.36	48503
LEAD	0.008		COPPER	0.00	48504
LEAD	0.009		COPPER	0.17	48503
LEAD	0.009		COPPER	0.07	48503
LEAD	0.009		COPPER	0.00	48507
LEAD	0.009		COPPER	0.00	
LEAD	0.009		COPPER	0.25	48504
LEAD	0.010		COPPER	0.09	48506
LEAD	0.010		COPPER	0.00	48503
LEAD	0.010		COPPER	0.16	48503
LEAD	0.010		COPPER	0.00	48505
LEAD	0.010		COPPER	0.07	48507
LEAD	0.011		COPPER	0.00	48503
LEAD	0.011		COPPER	0.00	48504
LEAD	0.011		COPPER	0.18	48503
LEAD	0.012		COPPER	0.15	
LEAD	0.012		COPPER	0.00	48506
LEAD	0.012		COPPER	0.06	48504
LEAD	0.013		COPPER	0.12	48507
LEAD	0.013		COPPER	0.00	48505
LEAD	0.014		COPPER	0.23	48507
LEAD	0.015		COPPER	0.00	48503
LEAD	0.015		COPPER	0.00	48504
LEAD	0.016		COPPER	0.07	48506
LEAD	0.016		COPPER	0.06	48503
LEAD	0.016		COPPER	0.00	48503
LEAD	0.017		COPPER	1.36	48506
LEAD	0.017		COPPER	0.17	48506
LEAD	0.018		COPPER	0.29	48503
LEAD	0.019		COPPER	1.22	
LEAD	0.019		COPPER	0.07	48506
LEAD	0.020		COPPER	0.13	48503
LEAD	0.020		COPPER	0.21	
LEAD	0.021		COPPER	0.08	48507
LEAD	0.021		COPPER	0.06	48503
LEAD	0.026		COPPER	0.06	48532
LEAD	0.027		COPPER	0.08	48505
LEAD	0.027		COPPER	0.05	
LEAD	0.029		COPPER	0.00	48503
LEAD	0.030		COPPER	0.00	48503
LEAD	0.035		COPPER	2.57	48505
LEAD	0.036		COPPER	0.00	48503
LEAD	0.041		COPPER	1.04	48504

ANALYTE (Pb)	RESULT (mg/L)		ANALYTE (Cu)	RESULT (mg/L)	ZIP CODE
LEAD	0.053		COPPER	0.07	48503
LEAD	0.074		COPPER	0.09	48507
LEAD	0.075		COPPER	0.57	48503
LEAD	0.078		COPPER	0.27	
LEAD	0.088		COPPER	0.09	48503
LEAD	0.116		COPPER	0.13	48503
LEAD	0.131		COPPER	0.55	48503
LEAD	0.151		COPPER	0.14	48507
LEAD	0.253		COPPER	0.18	48503
LEAD	0.327		COPPER	0.19	48503

NOTES:

1 PPB = 0.001 mg/L

Lead values exceeding 0.015 mg/L and Copper results exceeding 1.3 mg/L are highlighted in red.

Sample results of "Not Detected" have been replaced with a numerical value of zero for ease of sorting.

Samples without a zip code did not have one provided on the accompanying paperwork.

From: Moran, Susan (DHHS)
Sent: Thursday, December 03, 2015 9:00 AM
To: Dykema, Linda D. (DHHS)
Subject: RE: 2DEc15 SitRep

Maybe the statement should be re-worded, it's confusing

From: Dykema, Linda D. (DHHS)
Sent: Thursday, December 03, 2015 8:59 AM
To: Moran, Susan (DHHS)
Subject: RE: 2DEc15 SitRep

Same child. Lab report is confirmation of verbal information heard last week re the 2nd test. We only have verbal information re the drop to 20 and will watch for the lab report to come through.

From: Moran, Susan (DHHS)
Sent: Thursday, December 03, 2015 8:56 AM
To: Dykema, Linda D. (DHHS); Miller, Corinne (DHHS); Eden
Subject: RE: 2DEc15 SitRep

Under epidemiology surveillance- :

- **Second lab report received for hospitalized child in Flint who was with the very high level, confirming that his BLL had dropped from the 50s to the 30s as of the second test.**

Is this the same child referenced under the CLPPP section (nurse reports level dropped to 20?) Or is this a second child with very elevated lead level?

From: Dykema, Linda D. (DHHS)
Sent: Thursday, December 03, 2015 8:52 AM
To: Moran, Susan (DHHS); Miller, Corinne (DHHS); Eden
Subject: 2DEc15 SitRep

Attached for your review

Message

From: Scott, Robert L. (DHHS) [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=1AEFBCAADA9A48AD8D643AA95E441DF1-SCOTT ROBERT L.]
Sent: 12/8/2015 3:42:49 PM
To: Stanbury, Martha (DHHS) [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=9051f88309e84aea86fb48005135336d-Stanbury Martha]; Dykema, Linda D. (DHHS) [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=61ef63a268374d20bb1ad24e4d6e1b1e-Dykema Linda D.]
Subject: FW: 2014 Lead
Attachments: Documenting the SAS code.docx; Lead 2014 by zip.xlsx; 2014 zips.xlsx

Linda,

Martha wants to discuss this. Patti and I have talked and are digging farther.

Bob

From: McKane, Patricia (DHHS)
Sent: Tuesday, December 08, 2015 8:35 AM
To: Scott, Robert L. (DHHS) <ScottR9@michigan.gov>
Subject: 2014 Lead

Hi Bob,

Corinne and Sarah looked at our two tables and couldn't find a discernable pattern. In some zips I have more and in others you have more.

Yan and I documented the data steps and the numbers at each step, and also by age group.

Raw data set from warehouse n= 179,374

156,069 have one test per year

23,305 duplicate tests (2-22 tests)

10,906 retained highest test per individual

Total analytic set 156,069 + 10,906= 166,975

The attached word document contains the analysis by age group.

I pulled from the warehouse yesterday and there were 179,374 records, which is the same number as I had two weeks ago.

Do you have time this morning to look into this? I have a call at 10 am, and meetings all afternoon, so can meet with you sometime this morning.

Patricia McKane, DVM MPH - Manager, Maternal & Child Health Epidemiology Section | Michigan Department of Health and Human Services | Lifecourse Epidemiology and Genomics Division | PO Box 30195 / 201 Townsend St 4th Floor - Lansing, MI 48909 | **Cell** PPI **PPI** Office ph: 517-335-9456 Fax 517-335-9790 | McKanep@michigan.gov

Work Hours:

M_F 7:30am – 4:00 pm

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This message, including any attachments is intended solely for the use of the named recipient(s) and may contain confidential and/or privileged information. Any unauthorized review, use, disclosure, or distribution of any confidential and/or privileged information contained in this e-mail is expressly prohibited. If you are not the intended recipient, please contact the sender by reply e-mail and destroy any and all copies of the original message.

Documenting the process Sas code to create the datasets is at the end.

```
Raw data set from warehouse n= 179,374
156,069 have one test per year
23,305 duplicate tests (2-22 tests)
10,906 retained highest test per individual
Total analytic set 156,069 to 10,906= 166,975

proc freq data=mi2014;
tables age_grp;
run;
/*Raw data < 6 years n= 152,173
6-17 years n = 13,364
18 + years 13837
Total n=179,374*/
Proc freq data =nodup;
tables age_grp;
run;
/*children with one test per year
< 6 years n= 131,710
6-17 years n = 12,576
18 + years 11,783
total =156,069*/

Proc freq data =dup;
tables age_grp dupidno /nocum nocol;
run;
/*children with more than one test per year
< 6 years n= 20,463
6-17 years n = 788
18 + years n 2,054
total n = 23,305
dupidno Frequency Percent
2 19746 84.73
3 2220 9.53
4 836 3.59
5 260 1.12
6 102 0.44
7 28 0.12
8 24 0.10
9 36 0.15
10 20 0.09
11 11 0.05
22 22 0.09

*/

Proc freq data =dup2;
tables age_grp dupidno /nocum nocol;
run;
/* dup2 is dup sorted -numbers = dup*/

Proc freq data =dup3;
tables age_grp  /nocum nocol;
run;
/* dup3 retains highest test only from children/adults with duplicate tests
```

```
 < 6 years 9645
6 to 17 years 360
18 + years 901
Total N=10906;*/

proc freq data=mi2014_;
tables age_grp /nocum nocol;
run;
/* Analytic dataset
< 6 years n = 141,355
6 to 18 years n = 12,936
18 + years n = 12,684
Total n = 166,975


SAS code


libname pb 'T:\MCH Vital Records Data\Genesee Lead'; *Secured folder
accessable only by Patti, Yan, Sarah R, and Cristin;

options fmtsearch = (pb ) NOFMTERR;

/*Michigan Lead Data from 01/01/2014 to 12/31/2014*/

Data mi2014;
Set pb.mi2014;
run; *n=179,374;

data mi2014;
set mi2014;
format Specimen_date MMDDYY10.;
format date_reported MMDDYY10.;

Interval=intck('day',Specimen_date, date_reported);

If '01jan2014'd<=specimen_date <='31mar2014'd then Quarter='Q1';
else if '01apr2014'd<=specimen_date <='30jun2014'd then Quarter='Q2';
else if '01jul2014'd<=specimen_date <='30sep2014'd then Quarter='Q3';
else if '01oct2014'd<=specimen_date <='31dec2014'd then Quarter='Q4';

Age=intck('year',DATE OF BIRTH,Specimen date);
if age=. then age_grp='                    ';
else if age<6 then age_grp='1) <6 years';
else if age<18 then age_grp='2) 6 to 17 years';
else if age>=18 then age_grp='3) 18 + years';

IF PB_RESULT =.        THEN PB2 = '      ';
ELSE IF PB_RESULT < 5  THEN PB2 = '1) <5 ';
ELSE IF PB_RESULT >= 5 THEN PB2 = '2) >=5';

IF PB_RESULT =.        THEN PB4 = '        ';
ELSE IF PB_RESULT < 5  THEN PB4 = '1) <5   ';
ELSE IF PB_RESULT <15  THEN PB4 = '2) 5-14 ';
ELSE IF PB_RESULT <45  THEN PB4 = '3) 15-44';
ELSE IF PB_RESULT >=45 THEN PB4 = '4) 45+  ';
```

```
if sample_type in ('C' 'c') then sampletype='Capillary';
else if sample_type in ('V' 'v') then sampletype='Venous';
run;

/*create dataset dup with duplicate lead test results*/

proc sql;
create table dup as
select child_id, specimen_date, date_reported,pb_result, sampletype, age_grp,
PB2, PB4, patient_zip_code,quarter,county, count(*) as dupidno
from mi2014
group by  CHILD_ID
having count(*)>1;

/*create dataset nodup with no duplicate lead test results*/

proc sql;
create table nodup as
select child_id, specimen_date, date_reported,pb_result, sampletype, age_grp,
PB2, PB4, patient_zip_code, quarter, county,count(*) as dupidno
from mi2014
group by  CHILD_ID
having count(*)=1;

/*sort dataset dup by descending dupidno, child_id,  sampletype, pb_result,
specimen_date, date_reported*/

proc sort data=dup out=dup2; by descending dupidno child_id  sampletype
pb_result specimen_date date_reported; run;
*N =23305;

/*Choose the last observation for each child_id from the sorted dataset, this
lead test result is the highest value among all tested*/

data dup3;
set dup2;
by descending dupidno child_id  sampletype pb_result specimen_date
date_reported;
if last.child_ID then output;
run;
*N=10906;

/*combine dataset nodup and sorted dup dataset*/

data mi2014_;
set nodup dup3;
run;  *n =166975;

ods rtf;
proc freq data=mi2014_;
tables quarter*age_grp*PB2/nocol nocum;
ods output crosstabfreqs=Freq1;
Title 'Michigan by Quarter 2014';
run;
proc freq data=mi2014_;
tables quarter*age_grp*PB2/nocol nocum;
```

```
ods output crosstabfreqs=Freq1;
Title 'Genesee by Quarter 2014';
where county = 'GENESEE';
run;
proc freq data=mi2014_;
tables quarter*age_grp*PB2/nocol nocum;
ods output crosstabfreqs=Freq1;
Title 'Flint by Quarter 2014';
where 48508> patient_zip_code >  48500;
run;
ods rtf close;
ods rtf;
proc freq data=mi2014_;
tables patient_zip_code*PB2/nocol nocum norow nopct;
ods output crosstabfreqs=Freq1;
Title 'Michigan by zip 2014 where child age < 6 years';
where age_grp='1) <6 years';
run;
ods rtf close;
```

	A	B	C	D	E	F
1	Michigan by zip 2014 where child age < 6 years					
2						
3	The FREQ Procedure					
4						
5	**Frequency**		**Table of Patient_Zip_Code by PB2**			
6			**Patient_Zip_Code**	**PB2**		
7				**1) <5**	**2) >=5**	**Total**
8			**40291**	2	0	2
9			**48001**	140	2	142
10			**48002**	18	1	19
11			**48003**	42	0	42
12			**48005**	37	2	39
13			**48006**	45	0	45
14			**48009**	252	0	252
15			**48014**	66	1	67
16			**48015**	112	0	112
17			**48017**	123	0	123
18			**48021**	519	14	533
19			**48022**	23	0	23
20			**48023**	53	0	53
21			**48025**	120	4	124
22			**48026**	170	2	172
23			**48027**	48	2	50
24			**48028**	3	0	3
25			**48030**	270	10	280
26			**48032**	26	0	26
27			**48033**	275	4	279
28			**48034**	254	5	259
29			**48035**	409	4	413
30			**48036**	261	3	264
31			**48037**	7	1	8
32			**48038**	379	4	383
33			**48039**	101	1	102
34			**48040**	101	0	101
35			**48041**	40	2	42
36			**48042**	219	0	219
37			**48043**	153	6	159
38			**48044**	428	2	430
39			**48045**	197	2	199

	A	B	C	D	E	F
40			**48046**	2	0	2
41			**48047**	367	1	368
42			**48048**	83	0	83
43			**48049**	61	2	63
44			**48050**	12	0	12
45			**48051**	165	0	165
46			**48054**	57	1	58
47			**48059**	177	3	180
48			**48060**	1228	55	1283
49			**48061**	2	1	3
50			**48062**	84	2	86
51			**48063**	42	2	44
52			**48064**	38	0	38
53			**48065**	74	1	75
54			**48066**	628	8	636
55			**48067**	217	3	220
56			**48069**	24	0	24
57			**48070**	60	0	60
58			**48071**	421	6	427
59			**48072**	168	3	171
60			**48073**	325	6	331
61			**48074**	177	0	177
62			**48075**	434	6	440
63			**48076**	382	4	386
64			**48079**	116	2	118
65			**48080**	189	3	192
66			**48081**	184	1	185
67			**48082**	114	3	117
68			**48083**	252	5	257
69			**48084**	134	6	140
70			**48085**	189	0	189
71			**48088**	216	0	216
72			**48089**	660	15	675
73			**48090**	2	0	2
74			**48091**	607	17	624
75			**48092**	340	7	347
76			**48093**	271	2	273
77			**48094**	131	0	131
78			**48095**	32	0	32
79			**48096**	15	1	16
80			**48097**	91	1	92
81			**48098**	123	0	123

	A	B	C	D	E	F
82			**48101**	328	3	331
83			**48103**	314	2	316
84			**48104**	110	2	112
85			**48105**	170	1	171
86			**48106**	2	0	2
87			**48107**	1	0	1
88			**48108**	217	6	223
89			**48111**	573	5	578
90			**48112**	3	1	4
91			**48114**	99	0	99
92			**48116**	106	0	106
93			**48117**	72	1	73
94			**48118**	65	4	69
95			**48120**	313	4	317
96			**48121**	7	0	7
97			**48122**	295	3	298
98			**48123**	2	0	2
99			**48124**	345	3	348
100			**48125**	378	3	381
101			**48126**	1451	34	1485
102			**48127**	744	8	752
103			**48128**	157	1	158
104			**48130**	76	1	77
105			**48131**	81	1	82
106			**48133**	53	3	56
107			**48134**	303	1	304
108			**48135**	307	3	310
109			**48137**	17	1	18
110			**48138**	70	0	70
111			**48139**	2	0	2
112			**48140**	29	0	29
113			**48141**	715	11	726
114			**48143**	1	0	1
115			**48144**	66	0	66
116			**48145**	34	1	35
117			**48146**	901	13	914
118			**48150**	256	6	262
119			**48152**	346	2	348
120			**48153**	2	0	2
121			**48154**	312	2	314
122			**48157**	15	0	15
123			**48158**	39	0	39

	A	B	C	D	E	F
124			**48159**	23	0	23
125			**48160**	84	0	84
126			**48161**	368	2	370
127			**48162**	323	4	327
128			**48164**	80	0	80
129			**48165**	87	1	88
130			**48166**	149	3	152
131			**48167**	180	1	181
132			**48168**	147	2	149
133			**48169**	102	0	102
134			**48170**	197	2	199
135			**48173**	104	0	104
136			**48174**	587	4	591
137			**48175**	2	0	2
138			**48176**	94	2	96
139			**48177**	2	0	2
140			**48178**	308	4	312
141			**48179**	37	0	37
142			**48180**	1400	23	1423
143			**48182**	173	2	175
144			**48183**	503	9	512
145			**48184**	267	2	269
146			**48185**	760	18	778
147			**48186**	542	8	550
148			**48187**	430	8	438
149			**48188**	430	7	437
150			**48189**	91	0	91
151			**48190**	2	0	2
152			**48191**	23	0	23
153			**48192**	350	3	353
154			**48193**	225	13	238
155			**48195**	441	6	447
156			**48197**	665	12	677
157			**48198**	636	2	638
158			**48201**	363	14	377
159			**48202**	316	59	375
160			**48203**	627	81	708
161			**48204**	651	126	777
162			**48205**	1328	148	1476
163			**48206**	500	129	629
164			**48207**	509	38	547
165			**48208**	266	26	292

	A	B	C	D	E	F
166			**48209**	1331	112	1443
167			**48210**	1373	129	1502
168			**48211**	199	42	241
169			**48212**	1414	127	1541
170			**48213**	676	97	773
171			**48214**	484	99	583
172			**48215**	361	41	402
173			**48216**	118	13	131
174			**48217**	165	5	170
175			**48218**	262	9	271
176			**48219**	1420	51	1471
177			**48220**	251	6	257
178			**48221**	865	55	920
179			**48223**	708	28	736
180			**48224**	1399	128	1527
181			**48225**	260	5	265
182			**48226**	43	0	43
183			**48227**	1305	97	1402
184			**48228**	1942	86	2028
185			**48229**	266	8	274
186			**48230**	144	3	147
187			**48231**	2	0	2
188			**48232**	2	0	2
189			**48234**	1000	65	1065
190			**48235**	1193	41	1234
191			**48236**	251	7	258
192			**48237**	581	5	586
193			**48238**	848	121	969
194			**48239**	648	8	656
195			**48240**	374	4	378
196			**48243**	1	0	1
197			**48244**	3	0	3
198			**48264**	1	0	1
199			**48272**	1	0	1
200			**48277**	2	0	2
201			**48279**	1	0	1
202			**48280**	1	0	1
203			**48288**	1	0	1
204			**48301**	96	1	97
205			**48302**	92	1	93
206			**48304**	95	5	100
207			**48306**	130	1	131

	A	B	C	D	E	F
208			**48307**	336	4	340
209			**48308**	1	0	1
210			**48309**	147	0	147
211			**48310**	648	11	659
212			**48311**	5	0	5
213			**48312**	360	2	362
214			**48313**	368	4	372
215			**48314**	224	0	224
216			**48315**	155	0	155
217			**48316**	211	1	212
218			**48317**	336	3	339
219			**48318**	1	0	1
220			**48320**	41	0	41
221			**48322**	302	2	304
222			**48323**	136	1	137
223			**48324**	124	0	124
224			**48325**	3	0	3
225			**48326**	250	6	256
226			**48327**	240	1	241
227			**48328**	312	1	313
228			**48329**	218	5	223
229			**48331**	200	2	202
230			**48332**	1	0	1
231			**48333**	1	0	1
232			**48334**	184	4	188
233			**48335**	432	31	463
234			**48336**	363	4	367
235			**48340**	763	5	768
236			**48341**	304	11	315
237			**48342**	517	9	526
238			**48343**	1	0	1
239			**48346**	220	0	220
240			**48348**	224	2	226
241			**48350**	71	1	72
242			**48353**	25	1	26
243			**48356**	51	0	51
244			**48357**	56	0	56
245			**48359**	94	2	96
246			**48360**	90	1	91
247			**48362**	119	0	119
248			**48363**	40	0	40
249			**48367**	28	1	29

	A	B	C	D	E	F
250			**48370**	6	0	6
251			**48371**	175	0	175
252			**48374**	211	1	212
253			**48375**	289	1	290
254			**48376**	2	0	2
255			**48377**	294	1	295
256			**48380**	33	0	33
257			**48381**	108	0	108
258			**48382**	191	3	194
259			**48383**	129	1	130
260			**48386**	151	0	151
261			**48387**	1	0	1
262			**48390**	260	3	263
263			**48391**	1	0	1
264			**48393**	294	5	299
265			**48401**	12	1	13
266			**48410**	1	0	1
267			**48411**	6	0	6
268			**48412**	65	0	65
269			**48413**	112	3	115
270			**48414**	29	0	29
271			**48415**	170	0	170
272			**48416**	58	1	59
273			**48417**	47	0	47
274			**48418**	48	0	48
275			**48419**	31	0	31
276			**48420**	295	4	299
277			**48421**	72	0	72
278			**48422**	92	1	93
279			**48423**	385	7	392
280			**48426**	9	0	9
281			**48427**	28	0	28
282			**48428**	22	0	22
283			**48429**	110	5	115
284			**48430**	303	9	312
285			**48432**	15	0	15
286			**48433**	292	3	295
287			**48435**	29	0	29
288			**48436**	42	2	44
289			**48437**	3	0	3
290			**48438**	57	0	57
291			**48439**	505	6	511

	A	B	C	D	E	F
292			**48441**	41	1	42
293			**48442**	198	4	202
294			**48444**	136	9	145
295			**48445**	12	1	13
296			**48446**	345	12	357
297			**48449**	44	0	44
298			**48450**	42	1	43
299			**48451**	121	1	122
300			**48453**	72	2	74
301			**48454**	23	0	23
302			**48455**	38	2	40
303			**48456**	12	0	12
304			**48457**	136	4	140
305			**48458**	336	4	340
306			**48460**	36	1	37
307			**48461**	90	3	93
308			**48462**	98	1	99
309			**48463**	34	1	35
310			**48464**	20	1	21
311			**48465**	3	0	3
312			**48466**	21	0	21
313			**48467**	13	2	15
314			**48468**	7	0	7
315			**48469**	7	0	7
316			**48470**	5	0	5
317			**48471**	81	1	82
318			**48472**	24	0	24
319			**48473**	291	4	295
320			**48475**	18	1	19
321			**48476**	10	0	10
322			**48501**	1	0	1
323			**48502**	10	0	10
324			**48503**	460	29	489
325			**48504**	631	30	661
326			**48505**	567	29	596
327			**48506**	518	17	535
328			**48507**	736	17	753
329			**48509**	109	2	111
330			**48519**	118	3	121
331			**48529**	245	0	245
332			**48532**	377	8	385
333			**48548**	1	0	1

	A	B	C	D	E	F
334			**48601**	1131	48	1179
335			**48602**	723	50	773
336			**48603**	367	3	370
337			**48604**	146	2	148
338			**48605**	3	0	3
339			**48607**	26	3	29
340			**48609**	119	0	119
341			**48610**	24	0	24
342			**48611**	48	1	49
343			**48612**	117	0	117
344			**48613**	13	0	13
345			**48614**	18	0	18
346			**48615**	38	0	38
347			**48616**	107	3	110
348			**48617**	134	0	134
349			**48618**	42	1	43
350			**48619**	2	0	2
351			**48621**	9	1	10
352			**48622**	80	1	81
353			**48623**	136	2	138
354			**48624**	162	0	162
355			**48625**	208	2	210
356			**48626**	56	1	57
357			**48627**	2	0	2
358			**48628**	7	0	7
359			**48629**	79	0	79
360			**48631**	41	2	43
361			**48632**	55	1	56
362			**48633**	1	0	1
363			**48634**	32	0	32
364			**48635**	4	0	4
365			**48636**	0	1	1
366			**48637**	41	0	41
367			**48638**	200	6	206
368			**48640**	163	3	166
369			**48641**	1	0	1
370			**48642**	185	1	186
371			**48647**	16	0	16
372			**48649**	30	0	30
373			**48650**	70	0	70
374			**48651**	51	0	51
375			**48652**	12	0	12

	A	B	C	D	E	F
376			**48653**	60	0	60
377			**48654**	8	0	8
378			**48655**	94	1	95
379			**48656**	35	0	35
380			**48657**	40	0	40
381			**48658**	58	1	59
382			**48659**	44	0	44
383			**48661**	58	1	59
384			**48662**	12	0	12
385			**48701**	30	1	31
386			**48703**	30	0	30
387			**48705**	1	0	1
388			**48706**	519	16	535
389			**48707**	2	1	3
390			**48708**	436	28	464
391			**48714**	1	0	1
392			**48720**	10	1	11
393			**48721**	3	0	3
394			**48722**	42	0	42
395			**48723**	231	4	235
396			**48724**	9	1	10
397			**48725**	24	0	24
398			**48726**	90	1	91
399			**48727**	14	1	15
400			**48729**	16	1	17
401			**48730**	17	0	17
402			**48731**	23	1	24
403			**48732**	137	1	138
404			**48733**	25	1	26
405			**48734**	43	0	43
406			**48735**	16	0	16
407			**48737**	3	1	4
408			**48738**	3	0	3
409			**48739**	12	0	12
410			**48740**	12	1	13
411			**48741**	33	1	34
412			**48742**	9	0	9
413			**48744**	62	1	63
414			**48745**	11	0	11
415			**48746**	114	0	114
416			**48747**	22	0	22
417			**48748**	8	0	8

	A	B	C	D	E	F
418			**48749**	18	0	18
419			**48750**	73	4	77
420			**48754**	22	0	22
421			**48755**	28	0	28
422			**48756**	21	0	21
423			**48757**	59	0	59
424			**48758**	1	0	1
425			**48759**	45	2	47
426			**48760**	17	1	18
427			**48761**	4	0	4
428			**48762**	3	1	4
429			**48763**	22	0	22
430			**48764**	2	0	2
431			**48765**	8	0	8
432			**48766**	16	0	16
433			**48767**	25	0	25
434			**48768**	150	1	151
435			**48770**	7	0	7
436			**48801**	175	2	177
437			**48804**	2	0	2
438			**48806**	22	0	22
439			**48807**	6	0	6
440			**48808**	44	1	45
441			**48809**	156	6	162
442			**48811**	52	0	52
443			**48812**	4	0	4
444			**48813**	210	6	216
445			**48815**	28	0	28
446			**48816**	1	0	1
447			**48817**	111	1	112
448			**48818**	25	0	25
449			**48819**	23	1	24
450			**48820**	94	1	95
451			**48821**	35	0	35
452			**48822**	12	0	12
453			**48823**	337	9	346
454			**48827**	137	5	142
455			**48829**	49	0	49
456			**48830**	1	0	1
457			**48831**	28	0	28
458			**48832**	9	0	9
459			**48833**	2	0	2

	A	B	C	D	E	F
460			**48834**	18	2	20
461			**48835**	9	0	9
462			**48836**	107	4	111
463			**48837**	111	3	114
464			**48838**	220	5	225
465			**48840**	101	3	104
466			**48841**	14	0	14
467			**48842**	245	4	249
468			**48843**	263	1	264
469			**48844**	3	0	3
470			**48845**	5	0	5
471			**48846**	301	15	316
472			**48847**	71	2	73
473			**48848**	58	2	60
474			**48849**	60	1	61
475			**48850**	42	0	42
476			**48851**	24	0	24
477			**48852**	1	0	1
478			**48853**	7	0	7
479			**48854**	230	0	230
480			**48855**	75	0	75
481			**48856**	13	0	13
482			**48857**	32	0	32
483			**48858**	404	7	411
484			**48859**	1	0	1
485			**48860**	21	3	24
486			**48861**	12	0	12
487			**48862**	1	0	1
488			**48864**	136	3	139
489			**48865**	33	0	33
490			**48866**	69	1	70
491			**48867**	585	24	609
492			**48870**	3	0	3
493			**48871**	11	0	11
494			**48872**	94	4	98
495			**48873**	10	1	11
496			**48874**	7	0	7
497			**48875**	106	2	108
498			**48876**	41	2	43
499			**48877**	31	0	31
500			**48878**	26	0	26
501			**48879**	164	2	166

	A	B	C	D	E	F
502			**48880**	100	1	101
503			**48881**	51	1	52
504			**48883**	78	0	78
505			**48884**	59	0	59
506			**48885**	8	0	8
507			**48886**	19	0	19
508			**48888**	87	5	92
509			**48889**	12	0	12
510			**48890**	16	0	16
511			**48891**	30	0	30
512			**48892**	76	0	76
513			**48893**	51	0	51
514			**48894**	16	1	17
515			**48895**	83	0	83
516			**48896**	3	1	4
517			**48897**	9	0	9
518			**48901**	4	0	4
519			**48906**	646	29	675
520			**48908**	1	0	1
521			**48909**	70	2	72
522			**48910**	806	17	823
523			**48911**	1222	32	1254
524			**48912**	288	13	301
525			**48915**	292	16	308
526			**48916**	1	0	1
527			**48917**	394	13	407
528			**48933**	27	0	27
529			**48937**	1	0	1
530			**49001**	483	29	512
531			**49002**	201	2	203
532			**49003**	6	0	6
533			**49004**	196	2	198
534			**49005**	1	0	1
535			**49006**	273	5	278
536			**49007**	223	19	242
537			**49008**	169	4	173
538			**49009**	382	4	386
539			**49010**	242	11	253
540			**49011**	29	2	31
541			**49012**	26	0	26
542			**49013**	76	2	78
543			**49014**	399	20	419

	A	B	C	D	E	F
544			**49015**	501	12	513
545			**49016**	4	0	4
546			**49017**	333	20	353
547			**49019**	4	0	4
548			**49021**	75	0	75
549			**49022**	729	30	759
550			**49023**	9	0	9
551			**49024**	307	3	310
552			**49026**	22	1	23
553			**49027**	1	0	1
554			**49028**	97	2	99
555			**49029**	17	0	17
556			**49030**	24	1	25
557			**49031**	46	4	50
558			**49032**	32	3	35
559			**49033**	8	0	8
560			**49034**	17	0	17
561			**49036**	356	15	371
562			**49037**	579	22	601
563			**49038**	67	2	69
564			**49040**	27	1	28
565			**49041**	2	0	2
566			**49042**	82	3	85
567			**49043**	28	2	30
568			**49045**	68	1	69
569			**49046**	61	2	63
570			**49047**	178	4	182
571			**49048**	517	10	527
572			**49050**	22	1	23
573			**49051**	19	0	19
574			**49052**	11	0	11
575			**49053**	90	1	91
576			**49055**	56	2	58
577			**49056**	78	1	79
578			**49057**	119	3	122
579			**49058**	154	9	163
580			**49060**	13	1	14
581			**49061**	12	0	12
582			**49063**	1	0	1
583			**49064**	39	0	39
584			**49065**	51	2	53
585			**49066**	7	0	7

	A	B	C	D	E	F
586			**49067**	34	0	34
587			**49068**	148	7	155
588			**49070**	22	2	24
589			**49071**	76	4	80
590			**49072**	34	1	35
591			**49073**	42	8	50
592			**49074**	1	0	1
593			**49075**	6	0	6
594			**49076**	21	1	22
595			**49078**	90	3	93
596			**49079**	100	7	107
597			**49080**	148	2	150
598			**49081**	2	0	2
599			**49082**	86	3	89
600			**49083**	56	2	58
601			**49085**	81	1	82
602			**49087**	44	1	45
603			**49088**	30	1	31
604			**49089**	24	1	25
605			**49090**	145	6	151
606			**49091**	360	10	370
607			**49092**	16	0	16
608			**49093**	320	17	337
609			**49094**	56	1	57
610			**49095**	14	0	14
611			**49096**	31	1	32
612			**49097**	91	0	91
613			**49098**	58	1	59
614			**49099**	74	5	79
615			**49101**	20	0	20
616			**49102**	6	1	7
617			**49103**	139	5	144
618			**49104**	1	0	1
619			**49106**	26	1	27
620			**49107**	111	4	115
621			**49111**	58	0	58
622			**49112**	50	1	51
623			**49113**	16	1	17
624			**49115**	2	0	2
625			**49117**	22	1	23
626			**49119**	1	0	1
627			**49120**	481	7	488

	A	B	C	D	E	F
628			**49125**	9	0	9
629			**49126**	28	0	28
630			**49127**	51	2	53
631			**49128**	26	3	29
632			**49129**	1	0	1
633			**49130**	11	1	12
634			**49161**	1	0	1
635			**49201**	655	32	687
636			**49202**	500	28	528
637			**49203**	783	75	858
638			**49204**	6	0	6
639			**49220**	33	0	33
640			**49221**	556	76	632
641			**49224**	139	13	152
642			**49227**	26	1	27
643			**49228**	39	2	41
644			**49229**	31	3	34
645			**49230**	95	1	96
646			**49232**	57	2	59
647			**49233**	28	2	30
648			**49234**	30	3	33
649			**49235**	26	3	29
650			**49236**	27	1	28
651			**49237**	51	2	53
652			**49238**	24	1	25
653			**49239**	1	0	1
654			**49240**	78	0	78
655			**49241**	36	3	39
656			**49242**	279	9	288
657			**49244**	0	1	1
658			**49245**	56	1	57
659			**49246**	39	1	40
660			**49247**	72	13	85
661			**49248**	7	1	8
662			**49249**	40	1	41
663			**49250**	102	3	105
664			**49251**	104	3	107
665			**49252**	50	0	50
666			**49253**	23	1	24
667			**49254**	44	1	45
668			**49255**	23	1	24
669			**49256**	48	7	55

	A	B	C	D	E	F
670			**49259**	35	1	36
671			**49261**	4	0	4
672			**49262**	13	0	13
673			**49264**	20	0	20
674			**49265**	35	3	38
675			**49266**	63	1	64
676			**49267**	21	0	21
677			**49268**	4	2	6
678			**49269**	70	2	72
679			**49270**	52	2	54
680			**49271**	39	0	39
681			**49272**	22	0	22
682			**49274**	63	1	64
683			**49276**	5	0	5
684			**49277**	43	2	45
685			**49279**	5	0	5
686			**49281**	1	0	1
687			**49282**	10	0	10
688			**49283**	50	1	51
689			**49284**	41	3	44
690			**49285**	77	4	81
691			**49286**	116	4	120
692			**49287**	10	2	12
693			**49288**	37	1	38
694			**49289**	2	0	2
695			**49301**	138	0	138
696			**49302**	43	1	44
697			**49303**	9	0	9
698			**49304**	49	1	50
699			**49305**	22	1	23
700			**49306**	66	0	66
701			**49307**	151	0	151
702			**49309**	9	0	9
703			**49310**	19	0	19
704			**49312**	6	0	6
705			**49314**	1	0	1
706			**49315**	165	2	167
707			**49316**	156	4	160
708			**49317**	1	0	1
709			**49318**	32	0	32
710			**49319**	218	4	222
711			**49320**	4	0	4

	A	B	C	D	E	F
712			**49321**	295	2	297
713			**49322**	15	0	15
714			**49323**	42	2	44
715			**49325**	10	0	10
716			**49326**	21	0	21
717			**49327**	92	1	93
718			**49328**	20	1	21
719			**49329**	92	3	95
720			**49330**	108	3	111
721			**49331**	160	5	165
722			**49332**	19	0	19
723			**49333**	95	1	96
724			**49336**	27	1	28
725			**49337**	80	0	80
726			**49338**	20	0	20
727			**49339**	20	0	20
728			**49340**	29	0	29
729			**49341**	270	2	272
730			**49342**	14	0	14
731			**49343**	63	1	64
732			**49344**	37	0	37
733			**49345**	198	1	199
734			**49346**	26	0	26
735			**49347**	8	0	8
736			**49348**	77	0	77
737			**49349**	64	1	65
738			**49401**	82	0	82
739			**49402**	13	0	13
740			**49403**	76	3	79
741			**49404**	71	0	71
742			**49405**	15	1	16
743			**49406**	4	0	4
744			**49408**	130	0	130
745			**49410**	20	2	22
746			**49411**	18	1	19
747			**49412**	114	1	115
748			**49415**	74	0	74
749			**49416**	2	0	2
750			**49417**	426	12	438
751			**49418**	236	2	238
752			**49419**	69	1	70
753			**49420**	178	4	182

	A	B	C	D	E	F
754			**49421**	60	1	61
755			**49422**	2	1	3
756			**49423**	684	36	720
757			**49424**	681	20	701
758			**49425**	45	2	47
759			**49426**	207	2	209
760			**49428**	133	1	134
761			**49431**	236	17	253
762			**49435**	25	1	26
763			**49436**	19	1	20
764			**49437**	71	3	74
765			**49440**	26	2	28
766			**49441**	450	31	481
767			**49442**	734	74	808
768			**49443**	0	1	1
769			**49444**	512	33	545
770			**49445**	201	4	205
771			**49446**	39	1	40
772			**49448**	49	1	50
773			**49449**	36	0	36
774			**49450**	77	1	78
775			**49451**	54	2	56
776			**49452**	25	0	25
777			**49453**	13	0	13
778			**49454**	73	6	79
779			**49455**	118	2	120
780			**49456**	245	4	249
781			**49457**	121	4	125
782			**49458**	2	0	2
783			**49459**	37	0	37
784			**49460**	86	1	87
785			**49461**	82	1	83
786			**49464**	259	4	263
787			**49501**	4	0	4
788			**49503**	762	62	824
789			**49504**	735	72	807
790			**49505**	551	28	579
791			**49506**	396	37	433
792			**49507**	1156	145	1301
793			**49508**	800	29	829
794			**49509**	711	13	724
795			**49510**	1	0	1

	A	B	C	D	E	F
796			**49512**	274	4	278
797			**49514**	2	0	2
798			**49518**	1	0	1
799			**49519**	466	13	479
800			**49525**	265	5	270
801			**49534**	172	1	173
802			**49544**	125	2	127
803			**49546**	411	8	419
804			**49548**	729	19	748
805			**49601**	214	2	216
806			**49610**	1	0	1
807			**49611**	8	1	9
808			**49612**	11	0	11
809			**49613**	12	0	12
810			**49614**	24	0	24
811			**49615**	34	0	34
812			**49616**	34	0	34
813			**49617**	37	1	38
814			**49618**	3	0	3
815			**49619**	7	2	9
816			**49620**	52	1	53
817			**49621**	24	1	25
818			**49622**	27	0	27
819			**49623**	14	1	15
820			**49625**	20	1	21
821			**49626**	5	0	5
822			**49627**	1	0	1
823			**49628**	5	0	5
824			**49629**	14	0	14
825			**49630**	7	0	7
826			**49631**	87	5	92
827			**49632**	12	0	12
828			**49633**	35	0	35
829			**49635**	41	0	41
830			**49636**	5	0	5
831			**49637**	75	0	75
832			**49638**	8	0	8
833			**49639**	41	1	42
834			**49640**	21	0	21
835			**49642**	8	0	8
836			**49643**	116	0	116
837			**49644**	11	0	11

	A	B	C	D	E	F
838			**49645**	26	1	27
839			**49646**	101	0	101
840			**49648**	19	0	19
841			**49649**	115	0	115
842			**49650**	64	1	65
843			**49651**	72	1	73
844			**49653**	25	1	26
845			**49654**	1	0	1
846			**49655**	27	0	27
847			**49656**	15	0	15
848			**49657**	32	0	32
849			**49659**	121	1	122
850			**49660**	156	9	165
851			**49663**	57	0	57
852			**49664**	17	2	19
853			**49665**	44	0	44
854			**49666**	2	0	2
855			**49667**	1	0	1
856			**49668**	45	1	46
857			**49670**	17	0	17
858			**49674**	4	0	4
859			**49675**	8	0	8
860			**49676**	47	1	48
861			**49677**	105	4	109
862			**49679**	12	0	12
863			**49680**	34	0	34
864			**49682**	63	0	63
865			**49683**	29	0	29
866			**49684**	584	9	593
867			**49685**	28	0	28
868			**49686**	416	2	418
869			**49688**	28	1	29
870			**49689**	16	0	16
871			**49690**	77	1	78
872			**49696**	18	0	18
873			**49701**	13	1	14
874			**49705**	11	0	11
875			**49706**	79	0	79
876			**49707**	193	8	201
877			**49709**	23	0	23
878			**49710**	3	0	3
879			**49712**	91	1	92

	A	B	C	D	E	F
880			**49713**	26	0	26
881			**49715**	43	1	44
882			**49716**	2	0	2
883			**49718**	5	0	5
884			**49719**	9	0	9
885			**49720**	92	0	92
886			**49721**	161	4	165
887			**49722**	3	0	3
888			**49724**	10	0	10
889			**49725**	1	0	1
890			**49726**	3	0	3
891			**49727**	90	0	90
892			**49728**	2	0	2
893			**49729**	6	0	6
894			**49730**	22	0	22
895			**49733**	19	0	19
896			**49734**	8	0	8
897			**49735**	250	0	250
898			**49736**	2	0	2
899			**49738**	61	1	62
900			**49740**	53	0	53
901			**49743**	5	0	5
902			**49744**	4	0	4
903			**49745**	16	0	16
904			**49746**	35	0	35
905			**49747**	12	0	12
906			**49748**	2	0	2
907			**49749**	35	1	36
908			**49751**	17	0	17
909			**49752**	4	0	4
910			**49753**	18	0	18
911			**49755**	14	0	14
912			**49756**	29	2	31
913			**49757**	3	0	3
914			**49759**	12	0	12
915			**49760**	8	0	8
916			**49762**	1	0	1
917			**49764**	8	0	8
918			**49765**	47	1	48
919			**49766**	12	0	12
920			**49768**	1	0	1
921			**49769**	25	0	25

	A	B	C	D	E	F
922			**49770**	175	0	175
923			**49774**	15	0	15
924			**49776**	17	1	18
925			**49777**	5	0	5
926			**49779**	44	0	44
927			**49780**	17	1	18
928			**49781**	67	1	68
929			**49782**	5	0	5
930			**49783**	253	2	255
931			**49788**	73	0	73
932			**49791**	5	0	5
933			**49795**	31	1	32
934			**49796**	2	0	2
935			**49799**	23	1	24
936			**49801**	139	0	139
937			**49802**	74	0	74
938			**49805**	4	0	4
939			**49806**	2	0	2
940			**49807**	21	0	21
941			**49808**	3	0	3
942			**49812**	9	0	9
943			**49814**	8	1	9
944			**49815**	7	0	7
945			**49816**	5	0	5
946			**49817**	5	0	5
947			**49818**	6	0	6
948			**49820**	4	0	4
949			**49821**	9	1	10
950			**49827**	9	0	9
951			**49829**	224	11	235
952			**49831**	15	0	15
953			**49833**	3	0	3
954			**49834**	4	0	4
955			**49835**	5	0	5
956			**49836**	9	0	9
957			**49837**	100	3	103
958			**49838**	6	0	6
959			**49839**	4	0	4
960			**49840**	9	0	9
961			**49841**	93	2	95
962			**49845**	1	0	1
963			**49847**	14	2	16

	A	B	C	D	E	F
964			**49848**	0	1	1
965			**49849**	111	6	117
966			**49852**	3	0	3
967			**49853**	10	0	10
968			**49854**	77	1	78
969			**49855**	176	2	178
970			**49858**	127	11	138
971			**49861**	4	0	4
972			**49862**	54	0	54
973			**49863**	3	0	3
974			**49864**	1	0	1
975			**49866**	47	2	49
976			**49868**	78	0	78
977			**49870**	49	0	49
978			**49871**	2	0	2
979			**49872**	3	0	3
980			**49873**	2	0	2
981			**49874**	10	0	10
982			**49876**	11	1	12
983			**49878**	27	1	28
984			**49880**	4	0	4
985			**49881**	3	0	3
986			**49883**	1	0	1
987			**49884**	9	0	9
988			**49885**	6	1	7
989			**49886**	4	0	4
990			**49887**	18	0	18
991			**49891**	8	0	8
992			**49892**	13	0	13
993			**49893**	18	0	18
994			**49894**	6	1	7
995			**49895**	8	1	9
996			**49896**	27	1	28
997			**49901**	5	1	6
998			**49902**	3	0	3
999			**49903**	3	0	3
1000			**49905**	50	0	50
1001			**49908**	56	1	57
1002			**49911**	28	0	28
1003			**49912**	11	0	11
1004			**49913**	133	9	142
1005			**49915**	12	0	12

	A	B	C	D	E	F
1006			**49916**	39	0	39
1007			**49917**	2	0	2
1008			**49918**	1	0	1
1009			**49919**	1	0	1
1010			**49920**	50	0	50
1011			**49921**	7	0	7
1012			**49922**	11	1	12
1013			**49925**	2	0	2
1014			**49927**	2	0	2
1015			**49930**	127	1	128
1016			**49931**	109	0	109
1017			**49934**	14	0	14
1018			**49935**	63	3	66
1019			**49938**	84	2	86
1020			**49942**	1	0	1
1021			**49945**	44	2	46
1022			**49946**	71	0	71
1023			**49947**	3	0	3
1024			**49948**	4	1	5
1025			**49950**	13	1	14
1026			**49952**	3	0	3
1027			**49953**	19	0	19
1028			**49955**	9	0	9
1029			**49958**	14	0	14
1030			**49959**	4	0	4
1031			**49960**	3	0	3
1032			**49961**	1	0	1
1033			**49963**	18	1	19
1034			**49964**	2	0	2
1035			**49965**	4	0	4
1036			**49967**	1	0	1
1037			**49968**	10	0	10
1038			**49969**	23	0	23
1039			**49970**	3	0	3
1040			**49971**	6	1	7
1041			**Total**	136341	4947	141288
1042			**Frequency Missing = 67**			

	B	C	D	E	F
2	**Table of Patient_Zip_Code by PB2**				
3	**Patient_Zip_Code**	**PB2**			
4		**1) <5**	**2) >=5**	**Total**	**Incidence**
5	**48205**	1328	148	1476	10.03
6	**49507**	1156	145	1301	11.15
7	**48206**	500	129	629	20.51
8	**48210**	1373	129	1502	8.59
9	**48224**	1399	128	1527	8.38
10	**48212**	1414	127	1541	8.24
11	**48204**	651	126	777	16.22
12	**48238**	848	121	969	12.49
13	**48209**	1331	112	1443	7.76
14	**48214**	484	99	583	16.98
15	**48213**	676	97	773	12.55
16	**48227**	1305	97	1402	6.92
17	**48228**	1942	86	2028	4.24
18	**48203**	627	81	708	11.44
19	**49221**	556	76	632	12.03
20	**49203**	783	75	858	8.74
21	**49442**	734	74	808	9.16
22	**49504**	735	72	807	8.92
23	**48234**	1000	65	1065	6.10
24	**49503**	762	62	824	7.52
25	**48202**	316	59	375	15.73
26	**48060**	1228	55	1283	4.29
27	**48221**	865	55	920	5.98
28	**48219**	1420	51	1471	3.47
29	**48602**	723	50	773	6.47
30	**48601**	1131	48	1179	4.07
31	**48211**	199	42	241	17.43
32	**48215**	361	41	402	10.20
33	**48235**	1193	41	1234	3.32
34	**48207**	509	38	547	6.95
35	**49506**	396	37	433	8.55
36	**49423**	684	36	720	5.00
37	**48126**	1451	34	1485	2.29
38	**49444**	512	33	545	6.06
39	**48911**	1222	32	1254	2.55
40	**49201**	655	32	687	4.66
41	**48335**	432	31	463	6.70
42	**49441**	450	31	481	6.44
43	**48504**	631	30	661	4.54

	B	C	D	E	F
44	**49022**	729	30	759	3.95
45	**48503**	460	29	489	5.93
46	**48505**	567	29	596	4.87
47	**48906**	646	29	675	4.30
48	**49001**	483	29	512	5.66
49	**49508**	800	29	829	3.50
50	**48223**	708	28	736	3.80
51	**48708**	436	28	464	6.03
52	**49202**	500	28	528	5.30
53	**49505**	551	28	579	4.84
54	**48208**	266	26	292	8.90
55	**48867**	585	24	609	3.94
56	**48180**	1400	23	1423	1.62
57	**49037**	579	22	601	3.66
58	**49014**	399	20	419	4.77
59	**49017**	333	20	353	5.67
60	**49424**	681	20	701	2.85
61	**49007**	223	19	242	7.85
62	**49548**	729	19	748	2.54
63	**48185**	760	18	778	2.31
64	**48091**	607	17	624	2.72
65	**48506**	518	17	535	3.18
66	**48507**	736	17	753	2.26
67	**48910**	806	17	823	2.07
68	**49093**	320	17	337	5.04
69	**49431**	236	17	253	6.72
70	**48706**	519	16	535	2.99
71	**48915**	292	16	308	5.19
72	**48089**	660	15	675	2.22
73	**48846**	301	15	316	4.75
74	**49036**	356	15	371	4.04
75	**48021**	519	14	533	2.63
76	**48201**	363	14	377	3.71
77	**48146**	901	13	914	1.42
78	**48193**	225	13	238	5.46
79	**48216**	118	13	131	9.92
80	**48912**	288	13	301	4.32
81	**48917**	394	13	407	3.19
82	**49224**	139	13	152	8.55
83	**49247**	72	13	85	15.29
84	**49509**	711	13	724	1.80
85	**49519**	466	13	479	2.71

	B	C	D	E	F
86	**48197**	665	12	677	1.77
87	**48446**	345	12	357	3.36
88	**49015**	501	12	513	2.34
89	**49417**	426	12	438	2.74
90	**48141**	715	11	726	1.52
91	**48310**	648	11	659	1.67
92	**48341**	304	11	315	3.49
93	**49010**	242	11	253	4.35
94	**49829**	224	11	235	4.68
95	**49858**	127	11	138	7.97
96	**48030**	270	10	280	3.57
97	**49048**	517	10	527	1.90
98	**49091**	360	10	370	2.70
99	**48183**	503	9	512	1.76
100	**48218**	262	9	271	3.32
101	**48342**	517	9	526	1.71
102	**48430**	303	9	312	2.88
103	**48444**	136	9	145	6.21
104	**48823**	337	9	346	2.60
105	**49058**	154	9	163	5.52
106	**49242**	279	9	288	3.13
107	**49660**	156	9	165	5.45
108	**49684**	584	9	593	1.52
109	**49913**	133	9	142	6.34
110	**48066**	628	8	636	1.26
111	**48127**	744	8	752	1.06
112	**48186**	542	8	550	1.45
113	**48187**	430	8	438	1.83
114	**48229**	266	8	274	2.92
115	**48239**	648	8	656	1.22
116	**48532**	377	8	385	2.08
117	**49073**	42	8	50	16.00
118	**49546**	411	8	419	1.91
119	**49707**	193	8	201	3.98
120	**48092**	340	7	347	2.02
121	**48188**	430	7	437	1.60
122	**48236**	251	7	258	2.71
123	**48423**	385	7	392	1.79
124	**48858**	404	7	411	1.70
125	**49068**	148	7	155	4.52
126	**49079**	100	7	107	6.54
127	**49120**	481	7	488	1.43

	B	C	D	E	F
128	**49256**	48	7	55	12.73
129	**48043**	153	6	159	3.77
130	**48071**	421	6	427	1.41
131	**48073**	325	6	331	1.81
132	**48075**	434	6	440	1.36
133	**48084**	134	6	140	4.29
134	**48108**	217	6	223	2.69
135	**48150**	256	6	262	2.29
136	**48195**	441	6	447	1.34
137	**48220**	251	6	257	2.33
138	**48326**	250	6	256	2.34
139	**48439**	505	6	511	1.17
140	**48638**	200	6	206	2.91
141	**48809**	156	6	162	3.70
142	**48813**	210	6	216	2.78
143	**49090**	145	6	151	3.97
144	**49454**	73	6	79	7.59
145	**49849**	111	6	117	5.13
146	**48034**	254	5	259	1.93
147	**48083**	252	5	257	1.95
148	**48111**	573	5	578	0.87
149	**48217**	165	5	170	2.94
150	**48225**	260	5	265	1.89
151	**48237**	581	5	586	0.85
152	**48304**	95	5	100	5.00
153	**48329**	218	5	223	2.24
154	**48340**	763	5	768	0.65
155	**48393**	294	5	299	1.67
156	**48429**	110	5	115	4.35
157	**48827**	137	5	142	3.52
158	**48838**	220	5	225	2.22
159	**48888**	87	5	92	5.43
160	**49006**	273	5	278	1.80
161	**49099**	74	5	79	6.33
162	**49103**	139	5	144	3.47
163	**49331**	160	5	165	3.03
164	**49525**	265	5	270	1.85
165	**49631**	87	5	92	5.43
166	**48025**	120	4	124	3.23
167	**48033**	275	4	279	1.43
168	**48035**	409	4	413	0.97
169	**48038**	379	4	383	1.04

	B	C	D	E	F
170	**48076**	382	4	386	1.04
171	**48118**	65	4	69	5.80
172	**48120**	313	4	317	1.26
173	**48162**	323	4	327	1.22
174	**48174**	587	4	591	0.68
175	**48178**	308	4	312	1.28
176	**48240**	374	4	378	1.06
177	**48307**	336	4	340	1.18
178	**48313**	368	4	372	1.08
179	**48334**	184	4	188	2.13
180	**48336**	363	4	367	1.09
181	**48420**	295	4	299	1.34
182	**48442**	198	4	202	1.98
183	**48457**	136	4	140	2.86
184	**48458**	336	4	340	1.18
185	**48473**	291	4	295	1.36
186	**48723**	231	4	235	1.70
187	**48750**	73	4	77	5.19
188	**48836**	107	4	111	3.60
189	**48842**	245	4	249	1.61
190	**48872**	94	4	98	4.08
191	**49008**	169	4	173	2.31
192	**49009**	382	4	386	1.04
193	**49031**	46	4	50	8.00
194	**49047**	178	4	182	2.20
195	**49071**	76	4	80	5.00
196	**49107**	111	4	115	3.48
197	**49285**	77	4	81	4.94
198	**49286**	116	4	120	3.33
199	**49316**	156	4	160	2.50
200	**49319**	218	4	222	1.80
201	**49420**	178	4	182	2.20
202	**49445**	201	4	205	1.95
203	**49456**	245	4	249	1.61
204	**49457**	121	4	125	3.20
205	**49464**	259	4	263	1.52
206	**49512**	274	4	278	1.44
207	**49677**	105	4	109	3.67
208	**49721**	161	4	165	2.42
209	**48036**	261	3	264	1.14
210	**48059**	177	3	180	1.67
211	**48067**	217	3	220	1.36

	B	C	D	E	F
212	**48072**	168	3	171	1.75
213	**48080**	189	3	192	1.56
214	**48082**	114	3	117	2.56
215	**48101**	328	3	331	0.91
216	**48122**	295	3	298	1.01
217	**48124**	345	3	348	0.86
218	**48125**	378	3	381	0.79
219	**48133**	53	3	56	5.36
220	**48135**	307	3	310	0.97
221	**48166**	149	3	152	1.97
222	**48192**	350	3	353	0.85
223	**48230**	144	3	147	2.04
224	**48317**	336	3	339	0.88
225	**48382**	191	3	194	1.55
226	**48390**	260	3	263	1.14
227	**48413**	112	3	115	2.61
228	**48433**	292	3	295	1.02
229	**48461**	90	3	93	3.23
230	**48519**	118	3	121	2.48
231	**48603**	367	3	370	0.81
232	**48607**	26	3	29	10.34
233	**48616**	107	3	110	2.73
234	**48640**	163	3	166	1.81
235	**48837**	111	3	114	2.63
236	**48840**	101	3	104	2.88
237	**48860**	21	3	24	12.50
238	**48864**	136	3	139	2.16
239	**49024**	307	3	310	0.97
240	**49032**	32	3	35	8.57
241	**49042**	82	3	85	3.53
242	**49057**	119	3	122	2.46
243	**49078**	90	3	93	3.23
244	**49082**	86	3	89	3.37
245	**49128**	26	3	29	10.34
246	**49229**	31	3	34	8.82
247	**49234**	30	3	33	9.09
248	**49235**	26	3	29	10.34
249	**49241**	36	3	39	7.69
250	**49250**	102	3	105	2.86
251	**49251**	104	3	107	2.80
252	**49265**	35	3	38	7.89
253	**49284**	41	3	44	6.82

	B	C	D	E	F
254	**49329**	92	3	95	3.16
255	**49330**	108	3	111	2.70
256	**49403**	76	3	79	3.80
257	**49437**	71	3	74	4.05
258	**49837**	100	3	103	2.91
259	**49935**	63	3	66	4.55
260	**48001**	140	2	142	1.41
261	**48005**	37	2	39	5.13
262	**48026**	170	2	172	1.16
263	**48027**	48	2	50	4.00
264	**48041**	40	2	42	4.76
265	**48044**	428	2	430	0.47
266	**48045**	197	2	199	1.01
267	**48049**	61	2	63	3.17
268	**48062**	84	2	86	2.33
269	**48063**	42	2	44	4.55
270	**48079**	116	2	118	1.69
271	**48093**	271	2	273	0.73
272	**48103**	314	2	316	0.63
273	**48104**	110	2	112	1.79
274	**48152**	346	2	348	0.57
275	**48154**	312	2	314	0.64
276	**48161**	368	2	370	0.54
277	**48168**	147	2	149	1.34
278	**48170**	197	2	199	1.01
279	**48176**	94	2	96	2.08
280	**48182**	173	2	175	1.14
281	**48184**	267	2	269	0.74
282	**48198**	636	2	638	0.31
283	**48312**	360	2	362	0.55
284	**48322**	302	2	304	0.66
285	**48331**	200	2	202	0.99
286	**48348**	224	2	226	0.88
287	**48359**	94	2	96	2.08
288	**48436**	42	2	44	4.55
289	**48453**	72	2	74	2.70
290	**48455**	38	2	40	5.00
291	**48467**	13	2	15	13.33
292	**48509**	109	2	111	1.80
293	**48604**	146	2	148	1.35
294	**48623**	136	2	138	1.45
295	**48625**	208	2	210	0.95

	B	C	D	E	F
296	**48631**	41	2	43	4.65
297	**48759**	45	2	47	4.26
298	**48801**	175	2	177	1.13
299	**48834**	18	2	20	10.00
300	**48847**	71	2	73	2.74
301	**48848**	58	2	60	3.33
302	**48875**	106	2	108	1.85
303	**48876**	41	2	43	4.65
304	**48879**	164	2	166	1.20
305	**48909**	70	2	72	2.78
306	**49002**	201	2	203	0.99
307	**49004**	196	2	198	1.01
308	**49011**	29	2	31	6.45
309	**49013**	76	2	78	2.56
310	**49028**	97	2	99	2.02
311	**49038**	67	2	69	2.90
312	**49043**	28	2	30	6.67
313	**49046**	61	2	63	3.17
314	**49055**	56	2	58	3.45
315	**49065**	51	2	53	3.77
316	**49070**	22	2	24	8.33
317	**49080**	148	2	150	1.33
318	**49083**	56	2	58	3.45
319	**49127**	51	2	53	3.77
320	**49228**	39	2	41	4.88
321	**49232**	57	2	59	3.39
322	**49233**	28	2	30	6.67
323	**49237**	51	2	53	3.77
324	**49268**	4	2	6	33.33
325	**49269**	70	2	72	2.78
326	**49270**	52	2	54	3.70
327	**49277**	43	2	45	4.44
328	**49287**	10	2	12	16.67
329	**49315**	165	2	167	1.20
330	**49321**	295	2	297	0.67
331	**49323**	42	2	44	4.55
332	**49341**	270	2	272	0.74
333	**49410**	20	2	22	9.09
334	**49418**	236	2	238	0.84
335	**49425**	45	2	47	4.26
336	**49426**	207	2	209	0.96
337	**49440**	26	2	28	7.14

	B	C	D	E	F
338	**49451**	54	2	56	3.57
339	**49455**	118	2	120	1.67
340	**49544**	125	2	127	1.57
341	**49601**	214	2	216	0.93
342	**49619**	7	2	9	22.22
343	**49664**	17	2	19	10.53
344	**49686**	416	2	418	0.48
345	**49756**	29	2	31	6.45
346	**49783**	253	2	255	0.78
347	**49841**	93	2	95	2.11
348	**49847**	14	2	16	12.50
349	**49855**	176	2	178	1.12
350	**49866**	47	2	49	4.08
351	**49938**	84	2	86	2.33
352	**49945**	44	2	46	4.35
353	**48002**	18	1	19	5.26
354	**48014**	66	1	67	1.49
355	**48037**	7	1	8	12.50
356	**48039**	101	1	102	0.98
357	**48047**	367	1	368	0.27
358	**48054**	57	1	58	1.72
359	**48061**	2	1	3	33.33
360	**48065**	74	1	75	1.33
361	**48081**	184	1	185	0.54
362	**48096**	15	1	16	6.25
363	**48097**	91	1	92	1.09
364	**48105**	170	1	171	0.58
365	**48112**	3	1	4	25.00
366	**48117**	72	1	73	1.37
367	**48128**	157	1	158	0.63
368	**48130**	76	1	77	1.30
369	**48131**	81	1	82	1.22
370	**48134**	303	1	304	0.33
371	**48137**	17	1	18	5.56
372	**48145**	34	1	35	2.86
373	**48165**	87	1	88	1.14
374	**48167**	180	1	181	0.55
375	**48301**	96	1	97	1.03
376	**48302**	92	1	93	1.08
377	**48306**	130	1	131	0.76
378	**48316**	211	1	212	0.47
379	**48323**	136	1	137	0.73

	B	C	D	E	F
380	**48327**	240	1	241	0.41
381	**48328**	312	1	313	0.32
382	**48350**	71	1	72	1.39
383	**48353**	25	1	26	3.85
384	**48360**	90	1	91	1.10
385	**48367**	28	1	29	3.45
386	**48374**	211	1	212	0.47
387	**48375**	289	1	290	0.34
388	**48377**	294	1	295	0.34
389	**48383**	129	1	130	0.77
390	**48401**	12	1	13	7.69
391	**48416**	58	1	59	1.69
392	**48422**	92	1	93	1.08
393	**48441**	41	1	42	2.38
394	**48445**	12	1	13	7.69
395	**48450**	42	1	43	2.33
396	**48451**	121	1	122	0.82
397	**48460**	36	1	37	2.70
398	**48462**	98	1	99	1.01
399	**48463**	34	1	35	2.86
400	**48464**	20	1	21	4.76
401	**48471**	81	1	82	1.22
402	**48475**	18	1	19	5.26
403	**48611**	48	1	49	2.04
404	**48618**	42	1	43	2.33
405	**48621**	9	1	10	10.00
406	**48622**	80	1	81	1.23
407	**48626**	56	1	57	1.75
408	**48632**	55	1	56	1.79
409	**48636**	0	1	1	100.00
410	**48642**	185	1	186	0.54
411	**48655**	94	1	95	1.05
412	**48658**	58	1	59	1.69
413	**48661**	58	1	59	1.69
414	**48701**	30	1	31	3.23
415	**48707**	2	1	3	33.33
416	**48720**	10	1	11	9.09
417	**48724**	9	1	10	10.00
418	**48726**	90	1	91	1.10
419	**48727**	14	1	15	6.67
420	**48729**	16	1	17	5.88
421	**48731**	23	1	24	4.17

	B	C	D	E	F
422	**48732**	137	1	138	0.72
423	**48733**	25	1	26	3.85
424	**48737**	3	1	4	25.00
425	**48740**	12	1	13	7.69
426	**48741**	33	1	34	2.94
427	**48744**	62	1	63	1.59
428	**48760**	17	1	18	5.56
429	**48762**	3	1	4	25.00
430	**48768**	150	1	151	0.66
431	**48808**	44	1	45	2.22
432	**48817**	111	1	112	0.89
433	**48819**	23	1	24	4.17
434	**48820**	94	1	95	1.05
435	**48843**	263	1	264	0.38
436	**48849**	60	1	61	1.64
437	**48866**	69	1	70	1.43
438	**48873**	10	1	11	9.09
439	**48880**	100	1	101	0.99
440	**48881**	51	1	52	1.92
441	**48894**	16	1	17	5.88
442	**48896**	3	1	4	25.00
443	**49026**	22	1	23	4.35
444	**49030**	24	1	25	4.00
445	**49040**	27	1	28	3.57
446	**49045**	68	1	69	1.45
447	**49050**	22	1	23	4.35
448	**49053**	90	1	91	1.10
449	**49056**	78	1	79	1.27
450	**49060**	13	1	14	7.14
451	**49072**	34	1	35	2.86
452	**49076**	21	1	22	4.55
453	**49085**	81	1	82	1.22
454	**49087**	44	1	45	2.22
455	**49088**	30	1	31	3.23
456	**49089**	24	1	25	4.00
457	**49094**	56	1	57	1.75
458	**49096**	31	1	32	3.13
459	**49098**	58	1	59	1.69
460	**49102**	6	1	7	14.29
461	**49106**	26	1	27	3.70
462	**49112**	50	1	51	1.96
463	**49113**	16	1	17	5.88

	B	C	D	E	F
464	**49117**	22	1	23	4.35
465	**49130**	11	1	12	8.33
466	**49227**	26	1	27	3.70
467	**49230**	95	1	96	1.04
468	**49236**	27	1	28	3.57
469	**49238**	24	1	25	4.00
470	**49244**	0	1	1	100.00
471	**49245**	56	1	57	1.75
472	**49246**	39	1	40	2.50
473	**49248**	7	1	8	12.50
474	**49249**	40	1	41	2.44
475	**49253**	23	1	24	4.17
476	**49254**	44	1	45	2.22
477	**49255**	23	1	24	4.17
478	**49259**	35	1	36	2.78
479	**49266**	63	1	64	1.56
480	**49274**	63	1	64	1.56
481	**49283**	50	1	51	1.96
482	**49288**	37	1	38	2.63
483	**49302**	43	1	44	2.27
484	**49304**	49	1	50	2.00
485	**49305**	22	1	23	4.35
486	**49327**	92	1	93	1.08
487	**49328**	20	1	21	4.76
488	**49333**	95	1	96	1.04
489	**49336**	27	1	28	3.57
490	**49343**	63	1	64	1.56
491	**49345**	198	1	199	0.50
492	**49349**	64	1	65	1.54
493	**49405**	15	1	16	6.25
494	**49411**	18	1	19	5.26
495	**49412**	114	1	115	0.87
496	**49419**	69	1	70	1.43
497	**49421**	60	1	61	1.64
498	**49422**	2	1	3	33.33
499	**49428**	133	1	134	0.75
500	**49435**	25	1	26	3.85
501	**49436**	19	1	20	5.00
502	**49443**	0	1	1	100.00
503	**49446**	39	1	40	2.50
504	**49448**	49	1	50	2.00
505	**49450**	77	1	78	1.28

	B	C	D	E	F
506	**49460**	86	1	87	1.15
507	**49461**	82	1	83	1.20
508	**49534**	172	1	173	0.58
509	**49611**	8	1	9	11.11
510	**49617**	37	1	38	2.63
511	**49620**	52	1	53	1.89
512	**49621**	24	1	25	4.00
513	**49623**	14	1	15	6.67
514	**49625**	20	1	21	4.76
515	**49639**	41	1	42	2.38
516	**49645**	26	1	27	3.70
517	**49650**	64	1	65	1.54
518	**49651**	72	1	73	1.37
519	**49653**	25	1	26	3.85
520	**49659**	121	1	122	0.82
521	**49668**	45	1	46	2.17
522	**49676**	47	1	48	2.08
523	**49688**	28	1	29	3.45
524	**49690**	77	1	78	1.28
525	**49701**	13	1	14	7.14
526	**49712**	91	1	92	1.09
527	**49715**	43	1	44	2.27
528	**49738**	61	1	62	1.61
529	**49749**	35	1	36	2.78
530	**49765**	47	1	48	2.08
531	**49776**	17	1	18	5.56
532	**49780**	17	1	18	5.56
533	**49781**	67	1	68	1.47
534	**49795**	31	1	32	3.13
535	**49799**	23	1	24	4.17
536	**49814**	8	1	9	11.11
537	**49821**	9	1	10	10.00
538	**49848**	0	1	1	100.00
539	**49854**	77	1	78	1.28
540	**49876**	11	1	12	8.33
541	**49878**	27	1	28	3.57
542	**49885**	6	1	7	14.29
543	**49894**	6	1	7	14.29
544	**49895**	8	1	9	11.11
545	**49896**	27	1	28	3.57
546	**49901**	5	1	6	16.67
547	**49908**	56	1	57	1.75

	B	C	D	E	F
548	**49922**	11	1	12	8.33
549	**49930**	127	1	128	0.78
550	**49948**	4	1	5	20.00
551	**49950**	13	1	14	7.14
552	**49963**	18	1	19	5.26
553	**49971**	6	1	7	14.29
554	**40291**	2	0	2	0.00
555	**48003**	42	0	42	0.00
556	**48006**	45	0	45	0.00
557	**48009**	252	0	252	0.00
558	**48015**	112	0	112	0.00
559	**48017**	123	0	123	0.00
560	**48022**	23	0	23	0.00
561	**48023**	53	0	53	0.00
562	**48028**	3	0	3	0.00
563	**48032**	26	0	26	0.00
564	**48040**	101	0	101	0.00
565	**48042**	219	0	219	0.00
566	**48046**	2	0	2	0.00
567	**48048**	83	0	83	0.00
568	**48050**	12	0	12	0.00
569	**48051**	165	0	165	0.00
570	**48064**	38	0	38	0.00
571	**48069**	24	0	24	0.00
572	**48070**	60	0	60	0.00
573	**48074**	177	0	177	0.00
574	**48085**	189	0	189	0.00
575	**48088**	216	0	216	0.00
576	**48090**	2	0	2	0.00
577	**48094**	131	0	131	0.00
578	**48095**	32	0	32	0.00
579	**48098**	123	0	123	0.00
580	**48106**	2	0	2	0.00
581	**48107**	1	0	1	0.00
582	**48114**	99	0	99	0.00
583	**48116**	106	0	106	0.00
584	**48121**	7	0	7	0.00
585	**48123**	2	0	2	0.00
586	**48138**	70	0	70	0.00
587	**48139**	2	0	2	0.00
588	**48140**	29	0	29	0.00
589	**48143**	1	0	1	0.00

	B	C	D	E	F
590	**48144**	66	0	66	0.00
591	**48153**	2	0	2	0.00
592	**48157**	15	0	15	0.00
593	**48158**	39	0	39	0.00
594	**48159**	23	0	23	0.00
595	**48160**	84	0	84	0.00
596	**48164**	80	0	80	0.00
597	**48169**	102	0	102	0.00
598	**48173**	104	0	104	0.00
599	**48175**	2	0	2	0.00
600	**48177**	2	0	2	0.00
601	**48179**	37	0	37	0.00
602	**48189**	91	0	91	0.00
603	**48190**	2	0	2	0.00
604	**48191**	23	0	23	0.00
605	**48226**	43	0	43	0.00
606	**48231**	2	0	2	0.00
607	**48232**	2	0	2	0.00
608	**48243**	1	0	1	0.00
609	**48244**	3	0	3	0.00
610	**48264**	1	0	1	0.00
611	**48272**	1	0	1	0.00
612	**48277**	2	0	2	0.00
613	**48279**	1	0	1	0.00
614	**48280**	1	0	1	0.00
615	**48288**	1	0	1	0.00
616	**48308**	1	0	1	0.00
617	**48309**	147	0	147	0.00
618	**48311**	5	0	5	0.00
619	**48314**	224	0	224	0.00
620	**48315**	155	0	155	0.00
621	**48318**	1	0	1	0.00
622	**48320**	41	0	41	0.00
623	**48324**	124	0	124	0.00
624	**48325**	3	0	3	0.00
625	**48332**	1	0	1	0.00
626	**48333**	1	0	1	0.00
627	**48343**	1	0	1	0.00
628	**48346**	220	0	220	0.00
629	**48356**	51	0	51	0.00
630	**48357**	56	0	56	0.00
631	**48362**	119	0	119	0.00

	B	C	D	E	F
632	**48363**	40	0	40	0.00
633	**48370**	6	0	6	0.00
634	**48371**	175	0	175	0.00
635	**48376**	2	0	2	0.00
636	**48380**	33	0	33	0.00
637	**48381**	108	0	108	0.00
638	**48386**	151	0	151	0.00
639	**48387**	1	0	1	0.00
640	**48391**	1	0	1	0.00
641	**48410**	1	0	1	0.00
642	**48411**	6	0	6	0.00
643	**48412**	65	0	65	0.00
644	**48414**	29	0	29	0.00
645	**48415**	170	0	170	0.00
646	**48417**	47	0	47	0.00
647	**48418**	48	0	48	0.00
648	**48419**	31	0	31	0.00
649	**48421**	72	0	72	0.00
650	**48426**	9	0	9	0.00
651	**48427**	28	0	28	0.00
652	**48428**	22	0	22	0.00
653	**48432**	15	0	15	0.00
654	**48435**	29	0	29	0.00
655	**48437**	3	0	3	0.00
656	**48438**	57	0	57	0.00
657	**48449**	44	0	44	0.00
658	**48454**	23	0	23	0.00
659	**48456**	12	0	12	0.00
660	**48465**	3	0	3	0.00
661	**48466**	21	0	21	0.00
662	**48468**	7	0	7	0.00
663	**48469**	7	0	7	0.00
664	**48470**	5	0	5	0.00
665	**48472**	24	0	24	0.00
666	**48476**	10	0	10	0.00
667	**48501**	1	0	1	0.00
668	**48502**	10	0	10	0.00
669	**48529**	245	0	245	0.00
670	**48548**	1	0	1	0.00
671	**48605**	3	0	3	0.00
672	**48609**	119	0	119	0.00
673	**48610**	24	0	24	0.00

	B	C	D	E	F
674	**48612**	117	0	117	0.00
675	**48613**	13	0	13	0.00
676	**48614**	18	0	18	0.00
677	**48615**	38	0	38	0.00
678	**48617**	134	0	134	0.00
679	**48619**	2	0	2	0.00
680	**48624**	162	0	162	0.00
681	**48627**	2	0	2	0.00
682	**48628**	7	0	7	0.00
683	**48629**	79	0	79	0.00
684	**48633**	1	0	1	0.00
685	**48634**	32	0	32	0.00
686	**48635**	4	0	4	0.00
687	**48637**	41	0	41	0.00
688	**48641**	1	0	1	0.00
689	**48647**	16	0	16	0.00
690	**48649**	30	0	30	0.00
691	**48650**	70	0	70	0.00
692	**48651**	51	0	51	0.00
693	**48652**	12	0	12	0.00
694	**48653**	60	0	60	0.00
695	**48654**	8	0	8	0.00
696	**48656**	35	0	35	0.00
697	**48657**	40	0	40	0.00
698	**48659**	44	0	44	0.00
699	**48662**	12	0	12	0.00
700	**48703**	30	0	30	0.00
701	**48705**	1	0	1	0.00
702	**48714**	1	0	1	0.00
703	**48721**	3	0	3	0.00
704	**48722**	42	0	42	0.00
705	**48725**	24	0	24	0.00
706	**48730**	17	0	17	0.00
707	**48734**	43	0	43	0.00
708	**48735**	16	0	16	0.00
709	**48738**	3	0	3	0.00
710	**48739**	12	0	12	0.00
711	**48742**	9	0	9	0.00
712	**48745**	11	0	11	0.00
713	**48746**	114	0	114	0.00
714	**48747**	22	0	22	0.00
715	**48748**	8	0	8	0.00

	B	C	D	E	F
716	**48749**	18	0	18	0.00
717	**48754**	22	0	22	0.00
718	**48755**	28	0	28	0.00
719	**48756**	21	0	21	0.00
720	**48757**	59	0	59	0.00
721	**48758**	1	0	1	0.00
722	**48761**	4	0	4	0.00
723	**48763**	22	0	22	0.00
724	**48764**	2	0	2	0.00
725	**48765**	8	0	8	0.00
726	**48766**	16	0	16	0.00
727	**48767**	25	0	25	0.00
728	**48770**	7	0	7	0.00
729	**48804**	2	0	2	0.00
730	**48806**	22	0	22	0.00
731	**48807**	6	0	6	0.00
732	**48811**	52	0	52	0.00
733	**48812**	4	0	4	0.00
734	**48815**	28	0	28	0.00
735	**48816**	1	0	1	0.00
736	**48818**	25	0	25	0.00
737	**48821**	35	0	35	0.00
738	**48822**	12	0	12	0.00
739	**48829**	49	0	49	0.00
740	**48830**	1	0	1	0.00
741	**48831**	28	0	28	0.00
742	**48832**	9	0	9	0.00
743	**48833**	2	0	2	0.00
744	**48835**	9	0	9	0.00
745	**48841**	14	0	14	0.00
746	**48844**	3	0	3	0.00
747	**48845**	5	0	5	0.00
748	**48850**	42	0	42	0.00
749	**48851**	24	0	24	0.00
750	**48852**	1	0	1	0.00
751	**48853**	7	0	7	0.00
752	**48854**	230	0	230	0.00
753	**48855**	75	0	75	0.00
754	**48856**	13	0	13	0.00
755	**48857**	32	0	32	0.00
756	**48859**	1	0	1	0.00
757	**48861**	12	0	12	0.00

	B	C	D	E	F
758	**48862**	1	0	1	0.00
759	**48865**	33	0	33	0.00
760	**48870**	3	0	3	0.00
761	**48871**	11	0	11	0.00
762	**48874**	7	0	7	0.00
763	**48877**	31	0	31	0.00
764	**48878**	26	0	26	0.00
765	**48883**	78	0	78	0.00
766	**48884**	59	0	59	0.00
767	**48885**	8	0	8	0.00
768	**48886**	19	0	19	0.00
769	**48889**	12	0	12	0.00
770	**48890**	16	0	16	0.00
771	**48891**	30	0	30	0.00
772	**48892**	76	0	76	0.00
773	**48893**	51	0	51	0.00
774	**48895**	83	0	83	0.00
775	**48897**	9	0	9	0.00
776	**48901**	4	0	4	0.00
777	**48908**	1	0	1	0.00
778	**48916**	1	0	1	0.00
779	**48933**	27	0	27	0.00
780	**48937**	1	0	1	0.00
781	**49003**	6	0	6	0.00
782	**49005**	1	0	1	0.00
783	**49012**	26	0	26	0.00
784	**49016**	4	0	4	0.00
785	**49019**	4	0	4	0.00
786	**49021**	75	0	75	0.00
787	**49023**	9	0	9	0.00
788	**49027**	1	0	1	0.00
789	**49029**	17	0	17	0.00
790	**49033**	8	0	8	0.00
791	**49034**	17	0	17	0.00
792	**49041**	2	0	2	0.00
793	**49051**	19	0	19	0.00
794	**49052**	11	0	11	0.00
795	**49061**	12	0	12	0.00
796	**49063**	1	0	1	0.00
797	**49064**	39	0	39	0.00
798	**49066**	7	0	7	0.00
799	**49067**	34	0	34	0.00

	B	C	D	E	F
800	**49074**	1	0	1	0.00
801	**49075**	6	0	6	0.00
802	**49081**	2	0	2	0.00
803	**49092**	16	0	16	0.00
804	**49095**	14	0	14	0.00
805	**49097**	91	0	91	0.00
806	**49101**	20	0	20	0.00
807	**49104**	1	0	1	0.00
808	**49111**	58	0	58	0.00
809	**49115**	2	0	2	0.00
810	**49119**	1	0	1	0.00
811	**49125**	9	0	9	0.00
812	**49126**	28	0	28	0.00
813	**49129**	1	0	1	0.00
814	**49161**	1	0	1	0.00
815	**49204**	6	0	6	0.00
816	**49220**	33	0	33	0.00
817	**49239**	1	0	1	0.00
818	**49240**	78	0	78	0.00
819	**49252**	50	0	50	0.00
820	**49261**	4	0	4	0.00
821	**49262**	13	0	13	0.00
822	**49264**	20	0	20	0.00
823	**49267**	21	0	21	0.00
824	**49271**	39	0	39	0.00
825	**49272**	22	0	22	0.00
826	**49276**	5	0	5	0.00
827	**49279**	5	0	5	0.00
828	**49281**	1	0	1	0.00
829	**49282**	10	0	10	0.00
830	**49289**	2	0	2	0.00
831	**49301**	138	0	138	0.00
832	**49303**	9	0	9	0.00
833	**49306**	66	0	66	0.00
834	**49307**	151	0	151	0.00
835	**49309**	9	0	9	0.00
836	**49310**	19	0	19	0.00
837	**49312**	6	0	6	0.00
838	**49314**	1	0	1	0.00
839	**49317**	1	0	1	0.00
840	**49318**	32	0	32	0.00
841	**49320**	4	0	4	0.00

	B	C	D	E	F
842	**49322**	15	0	15	0.00
843	**49325**	10	0	10	0.00
844	**49326**	21	0	21	0.00
845	**49332**	19	0	19	0.00
846	**49337**	80	0	80	0.00
847	**49338**	20	0	20	0.00
848	**49339**	20	0	20	0.00
849	**49340**	29	0	29	0.00
850	**49342**	14	0	14	0.00
851	**49344**	37	0	37	0.00
852	**49346**	26	0	26	0.00
853	**49347**	8	0	8	0.00
854	**49348**	77	0	77	0.00
855	**49401**	82	0	82	0.00
856	**49402**	13	0	13	0.00
857	**49404**	71	0	71	0.00
858	**49406**	4	0	4	0.00
859	**49408**	130	0	130	0.00
860	**49415**	74	0	74	0.00
861	**49416**	2	0	2	0.00
862	**49449**	36	0	36	0.00
863	**49452**	25	0	25	0.00
864	**49453**	13	0	13	0.00
865	**49458**	2	0	2	0.00
866	**49459**	37	0	37	0.00
867	**49501**	4	0	4	0.00
868	**49510**	1	0	1	0.00
869	**49514**	2	0	2	0.00
870	**49518**	1	0	1	0.00
871	**49610**	1	0	1	0.00
872	**49612**	11	0	11	0.00
873	**49613**	12	0	12	0.00
874	**49614**	24	0	24	0.00
875	**49615**	34	0	34	0.00
876	**49616**	34	0	34	0.00
877	**49618**	3	0	3	0.00
878	**49622**	27	0	27	0.00
879	**49626**	5	0	5	0.00
880	**49627**	1	0	1	0.00
881	**49628**	5	0	5	0.00
882	**49629**	14	0	14	0.00
883	**49630**	7	0	7	0.00

	B	C	D	E	F
884	**49632**	12	0	12	0.00
885	**49633**	35	0	35	0.00
886	**49635**	41	0	41	0.00
887	**49636**	5	0	5	0.00
888	**49637**	75	0	75	0.00
889	**49638**	8	0	8	0.00
890	**49640**	21	0	21	0.00
891	**49642**	8	0	8	0.00
892	**49643**	116	0	116	0.00
893	**49644**	11	0	11	0.00
894	**49646**	101	0	101	0.00
895	**49648**	19	0	19	0.00
896	**49649**	115	0	115	0.00
897	**49654**	1	0	1	0.00
898	**49655**	27	0	27	0.00
899	**49656**	15	0	15	0.00
900	**49657**	32	0	32	0.00
901	**49663**	57	0	57	0.00
902	**49665**	44	0	44	0.00
903	**49666**	2	0	2	0.00
904	**49667**	1	0	1	0.00
905	**49670**	17	0	17	0.00
906	**49674**	4	0	4	0.00
907	**49675**	8	0	8	0.00
908	**49679**	12	0	12	0.00
909	**49680**	34	0	34	0.00
910	**49682**	63	0	63	0.00
911	**49683**	29	0	29	0.00
912	**49685**	28	0	28	0.00
913	**49689**	16	0	16	0.00
914	**49696**	18	0	18	0.00
915	**49705**	11	0	11	0.00
916	**49706**	79	0	79	0.00
917	**49709**	23	0	23	0.00
918	**49710**	3	0	3	0.00
919	**49713**	26	0	26	0.00
920	**49716**	2	0	2	0.00
921	**49718**	5	0	5	0.00
922	**49719**	9	0	9	0.00
923	**49720**	92	0	92	0.00
924	**49722**	3	0	3	0.00
925	**49724**	10	0	10	0.00

	B	C	D	E	F
926	**49725**	1	0	1	0.00
927	**49726**	3	0	3	0.00
928	**49727**	90	0	90	0.00
929	**49728**	2	0	2	0.00
930	**49729**	6	0	6	0.00
931	**49730**	22	0	22	0.00
932	**49733**	19	0	19	0.00
933	**49734**	8	0	8	0.00
934	**49735**	250	0	250	0.00
935	**49736**	2	0	2	0.00
936	**49740**	53	0	53	0.00
937	**49743**	5	0	5	0.00
938	**49744**	4	0	4	0.00
939	**49745**	16	0	16	0.00
940	**49746**	35	0	35	0.00
941	**49747**	12	0	12	0.00
942	**49748**	2	0	2	0.00
943	**49751**	17	0	17	0.00
944	**49752**	4	0	4	0.00
945	**49753**	18	0	18	0.00
946	**49755**	14	0	14	0.00
947	**49757**	3	0	3	0.00
948	**49759**	12	0	12	0.00
949	**49760**	8	0	8	0.00
950	**49762**	1	0	1	0.00
951	**49764**	8	0	8	0.00
952	**49766**	12	0	12	0.00
953	**49768**	1	0	1	0.00
954	**49769**	25	0	25	0.00
955	**49770**	175	0	175	0.00
956	**49774**	15	0	15	0.00
957	**49777**	5	0	5	0.00
958	**49779**	44	0	44	0.00
959	**49782**	5	0	5	0.00
960	**49788**	73	0	73	0.00
961	**49791**	5	0	5	0.00
962	**49796**	2	0	2	0.00
963	**49801**	139	0	139	0.00
964	**49802**	74	0	74	0.00
965	**49805**	4	0	4	0.00
966	**49806**	2	0	2	0.00
967	**49807**	21	0	21	0.00

	B	C	D	E	F
968	**49808**	3	0	3	0.00
969	**49812**	9	0	9	0.00
970	**49815**	7	0	7	0.00
971	**49816**	5	0	5	0.00
972	**49817**	5	0	5	0.00
973	**49818**	6	0	6	0.00
974	**49820**	4	0	4	0.00
975	**49827**	9	0	9	0.00
976	**49831**	15	0	15	0.00
977	**49833**	3	0	3	0.00
978	**49834**	4	0	4	0.00
979	**49835**	5	0	5	0.00
980	**49836**	9	0	9	0.00
981	**49838**	6	0	6	0.00
982	**49839**	4	0	4	0.00
983	**49840**	9	0	9	0.00
984	**49845**	1	0	1	0.00
985	**49852**	3	0	3	0.00
986	**49853**	10	0	10	0.00
987	**49861**	4	0	4	0.00
988	**49862**	54	0	54	0.00
989	**49863**	3	0	3	0.00
990	**49864**	1	0	1	0.00
991	**49868**	78	0	78	0.00
992	**49870**	49	0	49	0.00
993	**49871**	2	0	2	0.00
994	**49872**	3	0	3	0.00
995	**49873**	2	0	2	0.00
996	**49874**	10	0	10	0.00
997	**49880**	4	0	4	0.00
998	**49881**	3	0	3	0.00
999	**49883**	1	0	1	0.00
1000	**49884**	9	0	9	0.00
1001	**49886**	4	0	4	0.00
1002	**49887**	18	0	18	0.00
1003	**49891**	8	0	8	0.00
1004	**49892**	13	0	13	0.00
1005	**49893**	18	0	18	0.00
1006	**49902**	3	0	3	0.00
1007	**49903**	3	0	3	0.00
1008	**49905**	50	0	50	0.00
1009	**49911**	28	0	28	0.00

	B	C	D	E	F
1010	**49912**	11	0	11	0.00
1011	**49915**	12	0	12	0.00
1012	**49916**	39	0	39	0.00
1013	**49917**	2	0	2	0.00
1014	**49918**	1	0	1	0.00
1015	**49919**	1	0	1	0.00
1016	**49920**	50	0	50	0.00
1017	**49921**	7	0	7	0.00
1018	**49925**	2	0	2	0.00
1019	**49927**	2	0	2	0.00
1020	**49931**	109	0	109	0.00
1021	**49934**	14	0	14	0.00
1022	**49942**	1	0	1	0.00
1023	**49946**	71	0	71	0.00
1024	**49947**	3	0	3	0.00
1025	**49952**	3	0	3	0.00
1026	**49953**	19	0	19	0.00
1027	**49955**	9	0	9	0.00
1028	**49958**	14	0	14	0.00
1029	**49959**	4	0	4	0.00
1030	**49960**	3	0	3	0.00
1031	**49961**	1	0	1	0.00
1032	**49964**	2	0	2	0.00
1033	**49965**	4	0	4	0.00
1034	**49967**	1	0	1	0.00
1035	**49968**	10	0	10	0.00
1036	**49969**	23	0	23	0.00
1037	**49970**	3	0	3	0.00

	A	B	C	D	E	F
2		**Table of Patient_Zip_Code by PB2**				
3		**Patient_Zip_Code**	**PB2**			
4			**1) <5**	**2) >=5**	**Total**	**Incidence**
5	Detroit	**48206**	500	129	629	20.51
6	Dteroit/Hamtramck	**48211**	199	42	241	17.43
7	Detroit	**48214**	484	99	583	16.98
8	Detroit	**48204**	651	126	777	16.22
9	Nashville	**49073**	42	8	50	16.00
10	Detroit	**48202**	316	59	375	15.73
11	Hudson/Rollin	**49247**	72	13	85	15.29
12	Morenci/Seneca	**49256**	48	7	55	12.73
13	Detroit	**48213**	676	97	773	12.55
14	Detroit	**48238**	848	121	969	12.49
15	Adrian/Cadmus	**49221**	556	76	632	12.03
16	Highland Park/Detroit	**48203**	627	81	708	11.44
17	Grand Rapids	**49507**	1156	145	1301	11.15
18	Detroit/Grosse Pte/Grosse Pte park	**48215**	361	41	402	10.20
19	Detroit	**48205**	1328	148	1476	10.03
20	Detroit	**48216**	118	13	131	9.92
21	Muskegon	**49442**	734	74	808	9.16
22	Grand Rapids	**49504**	735	72	807	8.92
23	Detroit	**48208**	266	26	292	8.90
24	Jackson	**49203**	783	75	858	8.74
25	Detroit	**48210**	1373	129	1502	8.59
26	Albion	**49224**	139	13	152	8.55
27	Grand Rapids/East Grand Rapids	**49506**	396	37	433	8.55
28	East Lansing	**48224**	1399	128	1527	8.38
29	Detroit	**48212**	1414	127	1541	8.24
30	Menominee	**49858**	127	11	138	7.97
31	Kalamazoo	**49007**	223	19	242	7.85
32	Detroit	**48209**	1331	112	1443	7.76
33	Scottville	**49454**	73	6	79	7.59
34	Grand Rapids/Wyoming	**49503**	762	62	824	7.52
35	Detroit	**48207**	509	38	547	6.95
36	Detroit	**48227**	1305	97	1402	6.92
37	Ludington	**49431**	236	17	253	6.72
38	Farmington/Farmington Hills	**48335**	432	31	463	6.70
39	Paw Paw	**49079**	100	7	107	6.54
40		**48602**	723	50	773	6.47
41		**49441**	450	31	481	6.44
42		**49913**	133	9	142	6.34
43		**48444**	136	9	145	6.21

	A	B	C	D	E	F
44		**48234**	1000	65	1065	6.10
45		**49444**	512	33	545	6.06
46		**48708**	436	28	464	6.03
47		**48221**	865	55	920	5.98
48		**48503**	460	29	489	5.93
49		**49017**	333	20	353	5.67
50		**49001**	483	29	512	5.66
51		**49058**	154	9	163	5.52
52		**48193**	225	13	238	5.46
53		**49660**	156	9	165	5.45
54		**49202**	500	28	528	5.30
55		**48915**	292	16	308	5.19
56		**49849**	111	6	117	5.13
57		**49093**	320	17	337	5.04
58		**49423**	684	36	720	5.00
59		**48505**	567	29	596	4.87
60		**49505**	551	28	579	4.84
61		**49014**	399	20	419	4.77
62		**48846**	301	15	316	4.75
63		**49829**	224	11	235	4.68
64		**49201**	655	32	687	4.66
65		**48504**	631	30	661	4.54
66		**49068**	148	7	155	4.52
67		**49010**	242	11	253	4.35
68		**48912**	288	13	301	4.32
69		**48906**	646	29	675	4.30
70		**48060**	1228	55	1283	4.29
71		**48084**	134	6	140	4.29
72		**48228**	1942	86	2028	4.24
73		**48601**	1131	48	1179	4.07
74		**49036**	356	15	371	4.04
75		**49707**	193	8	201	3.98
76		**49090**	145	6	151	3.97
77		**49022**	729	30	759	3.95
78		**48867**	585	24	609	3.94
79		**48223**	708	28	736	3.80
80		**48043**	153	6	159	3.77
81		**48201**	363	14	377	3.71
82		**48809**	156	6	162	3.70
83		**49037**	579	22	601	3.66
84		**48030**	270	10	280	3.57
85		**49508**	800	29	829	3.50

	A	B	C	D	E	F
86		**48341**	304	11	315	3.49
87		**48219**	1420	51	1471	3.47
88		**48446**	345	12	357	3.36
89		**48235**	1193	41	1234	3.32
90		**48218**	262	9	271	3.32
91		**48917**	394	13	407	3.19
92		**48506**	518	17	535	3.18
93		**49242**	279	9	288	3.13
94		**48706**	519	16	535	2.99
95		**48229**	266	8	274	2.92
96		**48638**	200	6	206	2.91
97		**48430**	303	9	312	2.88
98		**49424**	681	20	701	2.85
99		**48813**	210	6	216	2.78
100		**49417**	426	12	438	2.74
101		**48091**	607	17	624	2.72
102		**49519**	466	13	479	2.71
103		**48236**	251	7	258	2.71
104		**49091**	360	10	370	2.70
105		**48108**	217	6	223	2.69
106		**48021**	519	14	533	2.63
107		**48823**	337	9	346	2.60
108		**48911**	1222	32	1254	2.55
109		**49548**	729	19	748	2.54
110		**48326**	250	6	256	2.34
111		**49015**	501	12	513	2.34
112		**48220**	251	6	257	2.33
113		**48185**	760	18	778	2.31
114		**48150**	256	6	262	2.29
115		**48126**	1451	34	1485	2.29
116		**48507**	736	17	753	2.26
117		**48089**	660	15	675	2.22
118		**48532**	377	8	385	2.08
119		**48910**	806	17	823	2.07
120		**48092**	340	7	347	2.02
121		**49546**	411	8	419	1.91
122		**49048**	517	10	527	1.90
123		**48187**	430	8	438	1.83
124		**48073**	325	6	331	1.81
125		**49509**	711	13	724	1.80
126		**48423**	385	7	392	1.79
127		**48197**	665	12	677	1.77

	A	B	C	D	E	F
128		**48183**	503	9	512	1.76
129		**48342**	517	9	526	1.71
130		**48858**	404	7	411	1.70
131		**48310**	648	11	659	1.67
132		**48180**	1400	23	1423	1.62
133		**48188**	430	7	437	1.60
134		**49684**	584	9	593	1.52
135		**48141**	715	11	726	1.52
136		**48186**	542	8	550	1.45
137		**49120**	481	7	488	1.43
138		**48146**	901	13	914	1.42
139		**48071**	421	6	427	1.41
140		**48075**	434	6	440	1.36
141		**48195**	441	6	447	1.34
142		**48066**	628	8	636	1.26
143		**48239**	648	8	656	1.22
144		**48439**	505	6	511	1.17
145		**48127**	744	8	752	1.06
146	Not sorted --number <6					
147		**48034**	254	5	259	1.93
148		**48083**	252	5	257	1.95
149		**48111**	573	5	578	0.87
150		**48217**	165	5	170	2.94
151		**48225**	260	5	265	1.89
152		**48237**	581	5	586	0.85
153		**48304**	95	5	100	5.00
154		**48329**	218	5	223	2.24
155		**48340**	763	5	768	0.65
156		**48393**	294	5	299	1.67
157		**48429**	110	5	115	4.35
158		**48827**	137	5	142	3.52
159		**48838**	220	5	225	2.22
160		**48888**	87	5	92	5.43
161		**49006**	273	5	278	1.80
162		**49099**	74	5	79	6.33
163		**49103**	139	5	144	3.47
164		**49331**	160	5	165	3.03
165		**49525**	265	5	270	1.85
166		**49631**	87	5	92	5.43
167		**48025**	120	4	124	3.23
168		**48033**	275	4	279	1.43
169		**48035**	409	4	413	0.97

	A	B	C	D	E	F
170		**48038**	379	4	383	1.04
171		**48076**	382	4	386	1.04
172		**48118**	65	4	69	5.80
173		**48120**	313	4	317	1.26
174		**48162**	323	4	327	1.22
175		**48174**	587	4	591	0.68
176		**48178**	308	4	312	1.28
177		**48240**	374	4	378	1.06
178		**48307**	336	4	340	1.18
179		**48313**	368	4	372	1.08
180		**48334**	184	4	188	2.13
181		**48336**	363	4	367	1.09
182		**48420**	295	4	299	1.34
183		**48442**	198	4	202	1.98
184		**48457**	136	4	140	2.86
185		**48458**	336	4	340	1.18
186		**48473**	291	4	295	1.36
187		**48723**	231	4	235	1.70
188		**48750**	73	4	77	5.19
189		**48836**	107	4	111	3.60
190		**48842**	245	4	249	1.61
191		**48872**	94	4	98	4.08
192		**49008**	169	4	173	2.31
193		**49009**	382	4	386	1.04
194		**49031**	46	4	50	8.00
195		**49047**	178	4	182	2.20
196		**49071**	76	4	80	5.00
197		**49107**	111	4	115	3.48
198		**49285**	77	4	81	4.94
199		**49286**	116	4	120	3.33
200		**49316**	156	4	160	2.50
201		**49319**	218	4	222	1.80
202		**49420**	178	4	182	2.20
203		**49445**	201	4	205	1.95
204		**49456**	245	4	249	1.61
205		**49457**	121	4	125	3.20
206		**49464**	259	4	263	1.52
207		**49512**	274	4	278	1.44
208		**49677**	105	4	109	3.67
209		**49721**	161	4	165	2.42
210		**48036**	261	3	264	1.14
211		**48059**	177	3	180	1.67

	A	B	C	D	E	F
212		**48067**	217	3	220	1.36
213		**48072**	168	3	171	1.75
214		**48080**	189	3	192	1.56
215		**48082**	114	3	117	2.56
216		**48101**	328	3	331	0.91
217		**48122**	295	3	298	1.01
218		**48124**	345	3	348	0.86
219		**48125**	378	3	381	0.79
220		**48133**	53	3	56	5.36
221		**48135**	307	3	310	0.97
222		**48166**	149	3	152	1.97
223		**48192**	350	3	353	0.85
224		**48230**	144	3	147	2.04
225		**48317**	336	3	339	0.88
226		**48382**	191	3	194	1.55
227		**48390**	260	3	263	1.14
228		**48413**	112	3	115	2.61
229		**48433**	292	3	295	1.02
230		**48461**	90	3	93	3.23
231		**48519**	118	3	121	2.48
232		**48603**	367	3	370	0.81
233		**48607**	26	3	29	10.34
234		**48616**	107	3	110	2.73
235		**48640**	163	3	166	1.81
236		**48837**	111	3	114	2.63
237		**48840**	101	3	104	2.88
238		**48860**	21	3	24	12.50
239		**48864**	136	3	139	2.16
240		**49024**	307	3	310	0.97
241		**49032**	32	3	35	8.57
242		**49042**	82	3	85	3.53
243		**49057**	119	3	122	2.46
244		**49078**	90	3	93	3.23
245		**49082**	86	3	89	3.37
246		**49128**	26	3	29	10.34
247		**49229**	31	3	34	8.82
248		**49234**	30	3	33	9.09
249		**49235**	26	3	29	10.34
250		**49241**	36	3	39	7.69
251		**49250**	102	3	105	2.86
252		**49251**	104	3	107	2.80
253		**49265**	35	3	38	7.89

	A	B	C	D	E	F
254		**49284**	41	3	44	6.82
255		**49329**	92	3	95	3.16
256		**49330**	108	3	111	2.70
257		**49403**	76	3	79	3.80
258		**49437**	71	3	74	4.05
259		**49837**	100	3	103	2.91
260		**49935**	63	3	66	4.55
261		**48001**	140	2	142	1.41
262		**48005**	37	2	39	5.13
263		**48026**	170	2	172	1.16
264		**48027**	48	2	50	4.00
265		**48041**	40	2	42	4.76
266		**48044**	428	2	430	0.47
267		**48045**	197	2	199	1.01
268		**48049**	61	2	63	3.17
269		**48062**	84	2	86	2.33
270		**48063**	42	2	44	4.55
271		**48079**	116	2	118	1.69
272		**48093**	271	2	273	0.73
273		**48103**	314	2	316	0.63
274		**48104**	110	2	112	1.79
275		**48152**	346	2	348	0.57
276		**48154**	312	2	314	0.64
277		**48161**	368	2	370	0.54
278		**48168**	147	2	149	1.34
279		**48170**	197	2	199	1.01
280		**48176**	94	2	96	2.08
281		**48182**	173	2	175	1.14
282		**48184**	267	2	269	0.74
283		**48198**	636	2	638	0.31
284		**48312**	360	2	362	0.55
285		**48322**	302	2	304	0.66
286		**48331**	200	2	202	0.99
287		**48348**	224	2	226	0.88
288		**48359**	94	2	96	2.08
289		**48436**	42	2	44	4.55
290		**48453**	72	2	74	2.70
291		**48455**	38	2	40	5.00
292		**48467**	13	2	15	13.33
293		**48509**	109	2	111	1.80
294		**48604**	146	2	148	1.35
295		**48623**	136	2	138	1.45

	A	B	C	D	E	F
296		**48625**	208	2	210	0.95
297		**48631**	41	2	43	4.65
298		**48759**	45	2	47	4.26
299		**48801**	175	2	177	1.13
300		**48834**	18	2	20	10.00
301		**48847**	71	2	73	2.74
302		**48848**	58	2	60	3.33
303		**48875**	106	2	108	1.85
304		**48876**	41	2	43	4.65
305		**48879**	164	2	166	1.20
306		**48909**	70	2	72	2.78
307		**49002**	201	2	203	0.99
308		**49004**	196	2	198	1.01
309		**49011**	29	2	31	6.45
310		**49013**	76	2	78	2.56
311		**49028**	97	2	99	2.02
312		**49038**	67	2	69	2.90
313		**49043**	28	2	30	6.67
314		**49046**	61	2	63	3.17
315		**49055**	56	2	58	3.45
316		**49065**	51	2	53	3.77
317		**49070**	22	2	24	8.33
318		**49080**	148	2	150	1.33
319		**49083**	56	2	58	3.45
320		**49127**	51	2	53	3.77
321		**49228**	39	2	41	4.88
322		**49232**	57	2	59	3.39
323		**49233**	28	2	30	6.67
324		**49237**	51	2	53	3.77
325		**49268**	4	2	6	33.33
326		**49269**	70	2	72	2.78
327		**49270**	52	2	54	3.70
328		**49277**	43	2	45	4.44
329		**49287**	10	2	12	16.67
330		**49315**	165	2	167	1.20
331		**49321**	295	2	297	0.67
332		**49323**	42	2	44	4.55
333		**49341**	270	2	272	0.74
334		**49410**	20	2	22	9.09
335		**49418**	236	2	238	0.84
336		**49425**	45	2	47	4.26
337		**49426**	207	2	209	0.96

	A	B	C	D	E	F
338		**49440**	26	2	28	7.14
339		**49451**	54	2	56	3.57
340		**49455**	118	2	120	1.67
341		**49544**	125	2	127	1.57
342		**49601**	214	2	216	0.93
343		**49619**	7	2	9	22.22
344		**49664**	17	2	19	10.53
345		**49686**	416	2	418	0.48
346		**49756**	29	2	31	6.45
347		**49783**	253	2	255	0.78
348		**49841**	93	2	95	2.11
349		**49847**	14	2	16	12.50
350		**49855**	176	2	178	1.12
351		**49866**	47	2	49	4.08
352		**49938**	84	2	86	2.33
353		**49945**	44	2	46	4.35
354		**48002**	18	1	19	5.26
355		**48014**	66	1	67	1.49
356		**48037**	7	1	8	12.50
357		**48039**	101	1	102	0.98
358		**48047**	367	1	368	0.27
359		**48054**	57	1	58	1.72
360		**48061**	2	1	3	33.33
361		**48065**	74	1	75	1.33
362		**48081**	184	1	185	0.54
363		**48096**	15	1	16	6.25
364		**48097**	91	1	92	1.09
365		**48105**	170	1	171	0.58
366		**48112**	3	1	4	25.00
367		**48117**	72	1	73	1.37
368		**48128**	157	1	158	0.63
369		**48130**	76	1	77	1.30
370		**48131**	81	1	82	1.22
371		**48134**	303	1	304	0.33
372		**48137**	17	1	18	5.56
373		**48145**	34	1	35	2.86
374		**48165**	87	1	88	1.14
375		**48167**	180	1	181	0.55
376		**48301**	96	1	97	1.03
377		**48302**	92	1	93	1.08
378		**48306**	130	1	131	0.76
379		**48316**	211	1	212	0.47

	A	B	C	D	E	F
380		**48323**	136	1	137	0.73
381		**48327**	240	1	241	0.41
382		**48328**	312	1	313	0.32
383		**48350**	71	1	72	1.39
384		**48353**	25	1	26	3.85
385		**48360**	90	1	91	1.10
386		**48367**	28	1	29	3.45
387		**48374**	211	1	212	0.47
388		**48375**	289	1	290	0.34
389		**48377**	294	1	295	0.34
390		**48383**	129	1	130	0.77
391		**48401**	12	1	13	7.69
392		**48416**	58	1	59	1.69
393		**48422**	92	1	93	1.08
394		**48441**	41	1	42	2.38
395		**48445**	12	1	13	7.69
396		**48450**	42	1	43	2.33
397		**48451**	121	1	122	0.82
398		**48460**	36	1	37	2.70
399		**48462**	98	1	99	1.01
400		**48463**	34	1	35	2.86
401		**48464**	20	1	21	4.76
402		**48471**	81	1	82	1.22
403		**48475**	18	1	19	5.26
404		**48611**	48	1	49	2.04
405		**48618**	42	1	43	2.33
406		**48621**	9	1	10	10.00
407		**48622**	80	1	81	1.23
408		**48626**	56	1	57	1.75
409		**48632**	55	1	56	1.79
410		**48636**	0	1	1	100.00
411		**48642**	185	1	186	0.54
412		**48655**	94	1	95	1.05
413		**48658**	58	1	59	1.69
414		**48661**	58	1	59	1.69
415		**48701**	30	1	31	3.23
416		**48707**	2	1	3	33.33
417		**48720**	10	1	11	9.09
418		**48724**	9	1	10	10.00
419		**48726**	90	1	91	1.10
420		**48727**	14	1	15	6.67
421		**48729**	16	1	17	5.88

	A	B	C	D	E	F
422		**48731**	23	1	24	4.17
423		**48732**	137	1	138	0.72
424		**48733**	25	1	26	3.85
425		**48737**	3	1	4	25.00
426		**48740**	12	1	13	7.69
427		**48741**	33	1	34	2.94
428		**48744**	62	1	63	1.59
429		**48760**	17	1	18	5.56
430		**48762**	3	1	4	25.00
431		**48768**	150	1	151	0.66
432		**48808**	44	1	45	2.22
433		**48817**	111	1	112	0.89
434		**48819**	23	1	24	4.17
435		**48820**	94	1	95	1.05
436		**48843**	263	1	264	0.38
437		**48849**	60	1	61	1.64
438		**48866**	69	1	70	1.43
439		**48873**	10	1	11	9.09
440		**48880**	100	1	101	0.99
441		**48881**	51	1	52	1.92
442		**48894**	16	1	17	5.88
443		**48896**	3	1	4	25.00
444		**49026**	22	1	23	4.35
445		**49030**	24	1	25	4.00
446		**49040**	27	1	28	3.57
447		**49045**	68	1	69	1.45
448		**49050**	22	1	23	4.35
449		**49053**	90	1	91	1.10
450		**49056**	78	1	79	1.27
451		**49060**	13	1	14	7.14
452		**49072**	34	1	35	2.86
453		**49076**	21	1	22	4.55
454		**49085**	81	1	82	1.22
455		**49087**	44	1	45	2.22
456		**49088**	30	1	31	3.23
457		**49089**	24	1	25	4.00
458		**49094**	56	1	57	1.75
459		**49096**	31	1	32	3.13
460		**49098**	58	1	59	1.69
461		**49102**	6	1	7	14.29
462		**49106**	26	1	27	3.70
463		**49112**	50	1	51	1.96

	A	B	C	D	E	F
464		**49113**	16	1	17	5.88
465		**49117**	22	1	23	4.35
466		**49130**	11	1	12	8.33
467		**49227**	26	1	27	3.70
468		**49230**	95	1	96	1.04
469		**49236**	27	1	28	3.57
470		**49238**	24	1	25	4.00
471		**49244**	0	1	1	100.00
472		**49245**	56	1	57	1.75
473		**49246**	39	1	40	2.50
474		**49248**	7	1	8	12.50
475		**49249**	40	1	41	2.44
476		**49253**	23	1	24	4.17
477		**49254**	44	1	45	2.22
478		**49255**	23	1	24	4.17
479		**49259**	35	1	36	2.78
480		**49266**	63	1	64	1.56
481		**49274**	63	1	64	1.56
482		**49283**	50	1	51	1.96
483		**49288**	37	1	38	2.63
484		**49302**	43	1	44	2.27
485		**49304**	49	1	50	2.00
486		**49305**	22	1	23	4.35
487		**49327**	92	1	93	1.08
488		**49328**	20	1	21	4.76
489		**49333**	95	1	96	1.04
490		**49336**	27	1	28	3.57
491		**49343**	63	1	64	1.56
492		**49345**	198	1	199	0.50
493		**49349**	64	1	65	1.54
494		**49405**	15	1	16	6.25
495		**49411**	18	1	19	5.26
496		**49412**	114	1	115	0.87
497		**49419**	69	1	70	1.43
498		**49421**	60	1	61	1.64
499		**49422**	2	1	3	33.33
500		**49428**	133	1	134	0.75
501		**49435**	25	1	26	3.85
502		**49436**	19	1	20	5.00
503		**49443**	0	1	1	100.00
504		**49446**	39	1	40	2.50
505		**49448**	49	1	50	2.00

	A	B	C	D	E	F
506		**49450**	77	1	78	1.28
507		**49460**	86	1	87	1.15
508		**49461**	82	1	83	1.20
509		**49534**	172	1	173	0.58
510		**49611**	8	1	9	11.11
511		**49617**	37	1	38	2.63
512		**49620**	52	1	53	1.89
513		**49621**	24	1	25	4.00
514		**49623**	14	1	15	6.67
515		**49625**	20	1	21	4.76
516		**49639**	41	1	42	2.38
517		**49645**	26	1	27	3.70
518		**49650**	64	1	65	1.54
519		**49651**	72	1	73	1.37
520		**49653**	25	1	26	3.85
521		**49659**	121	1	122	0.82
522		**49668**	45	1	46	2.17
523		**49676**	47	1	48	2.08
524		**49688**	28	1	29	3.45
525		**49690**	77	1	78	1.28
526		**49701**	13	1	14	7.14
527		**49712**	91	1	92	1.09
528		**49715**	43	1	44	2.27
529		**49738**	61	1	62	1.61
530		**49749**	35	1	36	2.78
531		**49765**	47	1	48	2.08
532		**49776**	17	1	18	5.56
533		**49780**	17	1	18	5.56
534		**49781**	67	1	68	1.47
535		**49795**	31	1	32	3.13
536		**49799**	23	1	24	4.17
537		**49814**	8	1	9	11.11
538		**49821**	9	1	10	10.00
539		**49848**	0	1	1	100.00
540		**49854**	77	1	78	1.28
541		**49876**	11	1	12	8.33
542		**49878**	27	1	28	3.57
543		**49885**	6	1	7	14.29
544		**49894**	6	1	7	14.29
545		**49895**	8	1	9	11.11
546		**49896**	27	1	28	3.57
547		**49901**	5	1	6	16.67

	A	B	C	D	E	F
548		**49908**	56	1	57	1.75
549		**49922**	11	1	12	8.33
550		**49930**	127	1	128	0.78
551		**49948**	4	1	5	20.00
552		**49950**	13	1	14	7.14
553		**49963**	18	1	19	5.26
554		**49971**	6	1	7	14.29
555		**40291**	2	0	2	0.00
556		**48003**	42	0	42	0.00
557		**48006**	45	0	45	0.00
558		**48009**	252	0	252	0.00
559		**48015**	112	0	112	0.00
560		**48017**	123	0	123	0.00
561		**48022**	23	0	23	0.00
562		**48023**	53	0	53	0.00
563		**48028**	3	0	3	0.00
564		**48032**	26	0	26	0.00
565		**48040**	101	0	101	0.00
566		**48042**	219	0	219	0.00
567		**48046**	2	0	2	0.00
568		**48048**	83	0	83	0.00
569		**48050**	12	0	12	0.00
570		**48051**	165	0	165	0.00
571		**48064**	38	0	38	0.00
572		**48069**	24	0	24	0.00
573		**48070**	60	0	60	0.00
574		**48074**	177	0	177	0.00
575		**48085**	189	0	189	0.00
576		**48088**	216	0	216	0.00
577		**48090**	2	0	2	0.00
578		**48094**	131	0	131	0.00
579		**48095**	32	0	32	0.00
580		**48098**	123	0	123	0.00
581		**48106**	2	0	2	0.00
582		**48107**	1	0	1	0.00
583		**48114**	99	0	99	0.00
584		**48116**	106	0	106	0.00
585		**48121**	7	0	7	0.00
586		**48123**	2	0	2	0.00
587		**48138**	70	0	70	0.00
588		**48139**	2	0	2	0.00
589		**48140**	29	0	29	0.00

	A	B	C	D	E	F
590		**48143**	1	0	1	0.00
591		**48144**	66	0	66	0.00
592		**48153**	2	0	2	0.00
593		**48157**	15	0	15	0.00
594		**48158**	39	0	39	0.00
595		**48159**	23	0	23	0.00
596		**48160**	84	0	84	0.00
597		**48164**	80	0	80	0.00
598		**48169**	102	0	102	0.00
599		**48173**	104	0	104	0.00
600		**48175**	2	0	2	0.00
601		**48177**	2	0	2	0.00
602		**48179**	37	0	37	0.00
603		**48189**	91	0	91	0.00
604		**48190**	2	0	2	0.00
605		**48191**	23	0	23	0.00
606		**48226**	43	0	43	0.00
607		**48231**	2	0	2	0.00
608		**48232**	2	0	2	0.00
609		**48243**	1	0	1	0.00
610		**48244**	3	0	3	0.00
611		**48264**	1	0	1	0.00
612		**48272**	1	0	1	0.00
613		**48277**	2	0	2	0.00
614		**48279**	1	0	1	0.00
615		**48280**	1	0	1	0.00
616		**48288**	1	0	1	0.00
617		**48308**	1	0	1	0.00
618		**48309**	147	0	147	0.00
619		**48311**	5	0	5	0.00
620		**48314**	224	0	224	0.00
621		**48315**	155	0	155	0.00
622		**48318**	1	0	1	0.00
623		**48320**	41	0	41	0.00
624		**48324**	124	0	124	0.00
625		**48325**	3	0	3	0.00
626		**48332**	1	0	1	0.00
627		**48333**	1	0	1	0.00
628		**48343**	1	0	1	0.00
629		**48346**	220	0	220	0.00
630		**48356**	51	0	51	0.00
631		**48357**	56	0	56	0.00

	A	B	C	D	E	F
632		**48362**	119	0	119	0.00
633		**48363**	40	0	40	0.00
634		**48370**	6	0	6	0.00
635		**48371**	175	0	175	0.00
636		**48376**	2	0	2	0.00
637		**48380**	33	0	33	0.00
638		**48381**	108	0	108	0.00
639		**48386**	151	0	151	0.00
640		**48387**	1	0	1	0.00
641		**48391**	1	0	1	0.00
642		**48410**	1	0	1	0.00
643		**48411**	6	0	6	0.00
644		**48412**	65	0	65	0.00
645		**48414**	29	0	29	0.00
646		**48415**	170	0	170	0.00
647		**48417**	47	0	47	0.00
648		**48418**	48	0	48	0.00
649		**48419**	31	0	31	0.00
650		**48421**	72	0	72	0.00
651		**48426**	9	0	9	0.00
652		**48427**	28	0	28	0.00
653		**48428**	22	0	22	0.00
654		**48432**	15	0	15	0.00
655		**48435**	29	0	29	0.00
656		**48437**	3	0	3	0.00
657		**48438**	57	0	57	0.00
658		**48449**	44	0	44	0.00
659		**48454**	23	0	23	0.00
660		**48456**	12	0	12	0.00
661		**48465**	3	0	3	0.00
662		**48466**	21	0	21	0.00
663		**48468**	7	0	7	0.00
664		**48469**	7	0	7	0.00
665		**48470**	5	0	5	0.00
666		**48472**	24	0	24	0.00
667		**48476**	10	0	10	0.00
668		**48501**	1	0	1	0.00
669		**48502**	10	0	10	0.00
670		**48529**	245	0	245	0.00
671		**48548**	1	0	1	0.00
672		**48605**	3	0	3	0.00
673		**48609**	119	0	119	0.00

	A	B	C	D	E	F
674		**48610**	24	0	24	0.00
675		**48612**	117	0	117	0.00
676		**48613**	13	0	13	0.00
677		**48614**	18	0	18	0.00
678		**48615**	38	0	38	0.00
679		**48617**	134	0	134	0.00
680		**48619**	2	0	2	0.00
681		**48624**	162	0	162	0.00
682		**48627**	2	0	2	0.00
683		**48628**	7	0	7	0.00
684		**48629**	79	0	79	0.00
685		**48633**	1	0	1	0.00
686		**48634**	32	0	32	0.00
687		**48635**	4	0	4	0.00
688		**48637**	41	0	41	0.00
689		**48641**	1	0	1	0.00
690		**48647**	16	0	16	0.00
691		**48649**	30	0	30	0.00
692		**48650**	70	0	70	0.00
693		**48651**	51	0	51	0.00
694		**48652**	12	0	12	0.00
695		**48653**	60	0	60	0.00
696		**48654**	8	0	8	0.00
697		**48656**	35	0	35	0.00
698		**48657**	40	0	40	0.00
699		**48659**	44	0	44	0.00
700		**48662**	12	0	12	0.00
701		**48703**	30	0	30	0.00
702		**48705**	1	0	1	0.00
703		**48714**	1	0	1	0.00
704		**48721**	3	0	3	0.00
705		**48722**	42	0	42	0.00
706		**48725**	24	0	24	0.00
707		**48730**	17	0	17	0.00
708		**48734**	43	0	43	0.00
709		**48735**	16	0	16	0.00
710		**48738**	3	0	3	0.00
711		**48739**	12	0	12	0.00
712		**48742**	9	0	9	0.00
713		**48745**	11	0	11	0.00
714		**48746**	114	0	114	0.00
715		**48747**	22	0	22	0.00

	A	B	C	D	E	F
716		**48748**	8	0	8	0.00
717		**48749**	18	0	18	0.00
718		**48754**	22	0	22	0.00
719		**48755**	28	0	28	0.00
720		**48756**	21	0	21	0.00
721		**48757**	59	0	59	0.00
722		**48758**	1	0	1	0.00
723		**48761**	4	0	4	0.00
724		**48763**	22	0	22	0.00
725		**48764**	2	0	2	0.00
726		**48765**	8	0	8	0.00
727		**48766**	16	0	16	0.00
728		**48767**	25	0	25	0.00
729		**48770**	7	0	7	0.00
730		**48804**	2	0	2	0.00
731		**48806**	22	0	22	0.00
732		**48807**	6	0	6	0.00
733		**48811**	52	0	52	0.00
734		**48812**	4	0	4	0.00
735		**48815**	28	0	28	0.00
736		**48816**	1	0	1	0.00
737		**48818**	25	0	25	0.00
738		**48821**	35	0	35	0.00
739		**48822**	12	0	12	0.00
740		**48829**	49	0	49	0.00
741		**48830**	1	0	1	0.00
742		**48831**	28	0	28	0.00
743		**48832**	9	0	9	0.00
744		**48833**	2	0	2	0.00
745		**48835**	9	0	9	0.00
746		**48841**	14	0	14	0.00
747		**48844**	3	0	3	0.00
748		**48845**	5	0	5	0.00
749		**48850**	42	0	42	0.00
750		**48851**	24	0	24	0.00
751		**48852**	1	0	1	0.00
752		**48853**	7	0	7	0.00
753		**48854**	230	0	230	0.00
754		**48855**	75	0	75	0.00
755		**48856**	13	0	13	0.00
756		**48857**	32	0	32	0.00
757		**48859**	1	0	1	0.00

	A	B	C	D	E	F
758		**48861**	12	0	12	0.00
759		**48862**	1	0	1	0.00
760		**48865**	33	0	33	0.00
761		**48870**	3	0	3	0.00
762		**48871**	11	0	11	0.00
763		**48874**	7	0	7	0.00
764		**48877**	31	0	31	0.00
765		**48878**	26	0	26	0.00
766		**48883**	78	0	78	0.00
767		**48884**	59	0	59	0.00
768		**48885**	8	0	8	0.00
769		**48886**	19	0	19	0.00
770		**48889**	12	0	12	0.00
771		**48890**	16	0	16	0.00
772		**48891**	30	0	30	0.00
773		**48892**	76	0	76	0.00
774		**48893**	51	0	51	0.00
775		**48895**	83	0	83	0.00
776		**48897**	9	0	9	0.00
777		**48901**	4	0	4	0.00
778		**48908**	1	0	1	0.00
779		**48916**	1	0	1	0.00
780		**48933**	27	0	27	0.00
781		**48937**	1	0	1	0.00
782		**49003**	6	0	6	0.00
783		**49005**	1	0	1	0.00
784		**49012**	26	0	26	0.00
785		**49016**	4	0	4	0.00
786		**49019**	4	0	4	0.00
787		**49021**	75	0	75	0.00
788		**49023**	9	0	9	0.00
789		**49027**	1	0	1	0.00
790		**49029**	17	0	17	0.00
791		**49033**	8	0	8	0.00
792		**49034**	17	0	17	0.00
793		**49041**	2	0	2	0.00
794		**49051**	19	0	19	0.00
795		**49052**	11	0	11	0.00
796		**49061**	12	0	12	0.00
797		**49063**	1	0	1	0.00
798		**49064**	39	0	39	0.00
799		**49066**	7	0	7	0.00

	A	B	C	D	E	F
800		**49067**	34	0	34	0.00
801		**49074**	1	0	1	0.00
802		**49075**	6	0	6	0.00
803		**49081**	2	0	2	0.00
804		**49092**	16	0	16	0.00
805		**49095**	14	0	14	0.00
806		**49097**	91	0	91	0.00
807		**49101**	20	0	20	0.00
808		**49104**	1	0	1	0.00
809		**49111**	58	0	58	0.00
810		**49115**	2	0	2	0.00
811		**49119**	1	0	1	0.00
812		**49125**	9	0	9	0.00
813		**49126**	28	0	28	0.00
814		**49129**	1	0	1	0.00
815		**49161**	1	0	1	0.00
816		**49204**	6	0	6	0.00
817		**49220**	33	0	33	0.00
818		**49239**	1	0	1	0.00
819		**49240**	78	0	78	0.00
820		**49252**	50	0	50	0.00
821		**49261**	4	0	4	0.00
822		**49262**	13	0	13	0.00
823		**49264**	20	0	20	0.00
824		**49267**	21	0	21	0.00
825		**49271**	39	0	39	0.00
826		**49272**	22	0	22	0.00
827		**49276**	5	0	5	0.00
828		**49279**	5	0	5	0.00
829		**49281**	1	0	1	0.00
830		**49282**	10	0	10	0.00
831		**49289**	2	0	2	0.00
832		**49301**	138	0	138	0.00
833		**49303**	9	0	9	0.00
834		**49306**	66	0	66	0.00
835		**49307**	151	0	151	0.00
836		**49309**	9	0	9	0.00
837		**49310**	19	0	19	0.00
838		**49312**	6	0	6	0.00
839		**49314**	1	0	1	0.00
840		**49317**	1	0	1	0.00
841		**49318**	32	0	32	0.00

	A	B	C	D	E	F
842		**49320**	4	0	4	0.00
843		**49322**	15	0	15	0.00
844		**49325**	10	0	10	0.00
845		**49326**	21	0	21	0.00
846		**49332**	19	0	19	0.00
847		**49337**	80	0	80	0.00
848		**49338**	20	0	20	0.00
849		**49339**	20	0	20	0.00
850		**49340**	29	0	29	0.00
851		**49342**	14	0	14	0.00
852		**49344**	37	0	37	0.00
853		**49346**	26	0	26	0.00
854		**49347**	8	0	8	0.00
855		**49348**	77	0	77	0.00
856		**49401**	82	0	82	0.00
857		**49402**	13	0	13	0.00
858		**49404**	71	0	71	0.00
859		**49406**	4	0	4	0.00
860		**49408**	130	0	130	0.00
861		**49415**	74	0	74	0.00
862		**49416**	2	0	2	0.00
863		**49449**	36	0	36	0.00
864		**49452**	25	0	25	0.00
865		**49453**	13	0	13	0.00
866		**49458**	2	0	2	0.00
867		**49459**	37	0	37	0.00
868		**49501**	4	0	4	0.00
869		**49510**	1	0	1	0.00
870		**49514**	2	0	2	0.00
871		**49518**	1	0	1	0.00
872		**49610**	1	0	1	0.00
873		**49612**	11	0	11	0.00
874		**49613**	12	0	12	0.00
875		**49614**	24	0	24	0.00
876		**49615**	34	0	34	0.00
877		**49616**	34	0	34	0.00
878		**49618**	3	0	3	0.00
879		**49622**	27	0	27	0.00
880		**49626**	5	0	5	0.00
881		**49627**	1	0	1	0.00
882		**49628**	5	0	5	0.00
883		**49629**	14	0	14	0.00

	A	B	C	D	E	F
884		**49630**	7	0	7	0.00
885		**49632**	12	0	12	0.00
886		**49633**	35	0	35	0.00
887		**49635**	41	0	41	0.00
888		**49636**	5	0	5	0.00
889		**49637**	75	0	75	0.00
890		**49638**	8	0	8	0.00
891		**49640**	21	0	21	0.00
892		**49642**	8	0	8	0.00
893		**49643**	116	0	116	0.00
894		**49644**	11	0	11	0.00
895		**49646**	101	0	101	0.00
896		**49648**	19	0	19	0.00
897		**49649**	115	0	115	0.00
898		**49654**	1	0	1	0.00
899		**49655**	27	0	27	0.00
900		**49656**	15	0	15	0.00
901		**49657**	32	0	32	0.00
902		**49663**	57	0	57	0.00
903		**49665**	44	0	44	0.00
904		**49666**	2	0	2	0.00
905		**49667**	1	0	1	0.00
906		**49670**	17	0	17	0.00
907		**49674**	4	0	4	0.00
908		**49675**	8	0	8	0.00
909		**49679**	12	0	12	0.00
910		**49680**	34	0	34	0.00
911		**49682**	63	0	63	0.00
912		**49683**	29	0	29	0.00
913		**49685**	28	0	28	0.00
914		**49689**	16	0	16	0.00
915		**49696**	18	0	18	0.00
916		**49705**	11	0	11	0.00
917		**49706**	79	0	79	0.00
918		**49709**	23	0	23	0.00
919		**49710**	3	0	3	0.00
920		**49713**	26	0	26	0.00
921		**49716**	2	0	2	0.00
922		**49718**	5	0	5	0.00
923		**49719**	9	0	9	0.00
924		**49720**	92	0	92	0.00
925		**49722**	3	0	3	0.00

	A	B	C	D	E	F
926		**49724**	10	0	10	0.00
927		**49725**	1	0	1	0.00
928		**49726**	3	0	3	0.00
929		**49727**	90	0	90	0.00
930		**49728**	2	0	2	0.00
931		**49729**	6	0	6	0.00
932		**49730**	22	0	22	0.00
933		**49733**	19	0	19	0.00
934		**49734**	8	0	8	0.00
935		**49735**	250	0	250	0.00
936		**49736**	2	0	2	0.00
937		**49740**	53	0	53	0.00
938		**49743**	5	0	5	0.00
939		**49744**	4	0	4	0.00
940		**49745**	16	0	16	0.00
941		**49746**	35	0	35	0.00
942		**49747**	12	0	12	0.00
943		**49748**	2	0	2	0.00
944		**49751**	17	0	17	0.00
945		**49752**	4	0	4	0.00
946		**49753**	18	0	18	0.00
947		**49755**	14	0	14	0.00
948		**49757**	3	0	3	0.00
949		**49759**	12	0	12	0.00
950		**49760**	8	0	8	0.00
951		**49762**	1	0	1	0.00
952		**49764**	8	0	8	0.00
953		**49766**	12	0	12	0.00
954		**49768**	1	0	1	0.00
955		**49769**	25	0	25	0.00
956		**49770**	175	0	175	0.00
957		**49774**	15	0	15	0.00
958		**49777**	5	0	5	0.00
959		**49779**	44	0	44	0.00
960		**49782**	5	0	5	0.00
961		**49788**	73	0	73	0.00
962		**49791**	5	0	5	0.00
963		**49796**	2	0	2	0.00
964		**49801**	139	0	139	0.00
965		**49802**	74	0	74	0.00
966		**49805**	4	0	4	0.00
967		**49806**	2	0	2	0.00

	A	B	C	D	E	F
968		**49807**	21	0	21	0.00
969		**49808**	3	0	3	0.00
970		**49812**	9	0	9	0.00
971		**49815**	7	0	7	0.00
972		**49816**	5	0	5	0.00
973		**49817**	5	0	5	0.00
974		**49818**	6	0	6	0.00
975		**49820**	4	0	4	0.00
976		**49827**	9	0	9	0.00
977		**49831**	15	0	15	0.00
978		**49833**	3	0	3	0.00
979		**49834**	4	0	4	0.00
980		**49835**	5	0	5	0.00
981		**49836**	9	0	9	0.00
982		**49838**	6	0	6	0.00
983		**49839**	4	0	4	0.00
984		**49840**	9	0	9	0.00
985		**49845**	1	0	1	0.00
986		**49852**	3	0	3	0.00
987		**49853**	10	0	10	0.00
988		**49861**	4	0	4	0.00
989		**49862**	54	0	54	0.00
990		**49863**	3	0	3	0.00
991		**49864**	1	0	1	0.00
992		**49868**	78	0	78	0.00
993		**49870**	49	0	49	0.00
994		**49871**	2	0	2	0.00
995		**49872**	3	0	3	0.00
996		**49873**	2	0	2	0.00
997		**49874**	10	0	10	0.00
998		**49880**	4	0	4	0.00
999		**49881**	3	0	3	0.00
1000		**49883**	1	0	1	0.00
1001		**49884**	9	0	9	0.00
1002		**49886**	4	0	4	0.00
1003		**49887**	18	0	18	0.00
1004		**49891**	8	0	8	0.00
1005		**49892**	13	0	13	0.00
1006		**49893**	18	0	18	0.00
1007		**49902**	3	0	3	0.00
1008		**49903**	3	0	3	0.00
1009		**49905**	50	0	50	0.00

	A	B	C	D	E	F
1010		**49911**	28	0	28	0.00
1011		**49912**	11	0	11	0.00
1012		**49915**	12	0	12	0.00
1013		**49916**	39	0	39	0.00
1014		**49917**	2	0	2	0.00
1015		**49918**	1	0	1	0.00
1016		**49919**	1	0	1	0.00
1017		**49920**	50	0	50	0.00
1018		**49921**	7	0	7	0.00
1019		**49925**	2	0	2	0.00
1020		**49927**	2	0	2	0.00
1021		**49931**	109	0	109	0.00
1022		**49934**	14	0	14	0.00
1023		**49942**	1	0	1	0.00
1024		**49946**	71	0	71	0.00
1025		**49947**	3	0	3	0.00
1026		**49952**	3	0	3	0.00
1027		**49953**	19	0	19	0.00
1028		**49955**	9	0	9	0.00
1029		**49958**	14	0	14	0.00
1030		**49959**	4	0	4	0.00
1031		**49960**	3	0	3	0.00
1032		**49961**	1	0	1	0.00
1033		**49964**	2	0	2	0.00
1034		**49965**	4	0	4	0.00
1035		**49967**	1	0	1	0.00
1036		**49968**	10	0	10	0.00
1037		**49969**	23	0	23	0.00
1038		**49970**	3	0	3	0.00

	A	B	C	D	E	F	G	H
1	**Children Tested for Lead Poisoning -- Calendar Year 2014**							
2	**All ZIP Codes in Michigan**							
3								
4	**Children less than Six Years of Age**							
5				Children Tested			Children Tested, by Highest Blood Lead Level (BLL)	
6	ZIP	%Pre-1950 Housing	Children less than Six Years of Age	Number of Children Tested	% Tested		< 5 ug/dL	
7	48001	25.7	660	145	22.0		143	
8	48002	25.8	219	19	8.7		18	
9	48003	24.1	388	42	10.8		42	
10	48005	32.5	294	39	13.3		37	
11	48006	28.1	295	45	15.3		45	
12	48009	39.8	1,586	253	16.0		253	
13	48014	36.9	321	69	21.5		68	
14	48015	33.4	516	108	20.9		108	
15	48017	20.9	761	123	16.2		123	
16	48021	31.4	2,569	536	20.9		521	
17	48022	21.7	174	23	13.2		23	
18	48023	16.7	330	53	16.1		53	
19	48025	14.5	907	124	13.7		120	
20	48026	7.3	811	171	21.1		169	
21	48027	29.1	213	50	23.5		48	
22	48028	32.0	26	3	11.5		3	
23	48030	36.7	1,280	285	22.3		275	
24	48032	19.7	156	26	16.7		26	
25	48033	*	821	276	33.6		272	
26	48034	7.1	809	258	31.9		253	
27	48035	5.5	2,662	416	15.6		411	
28	48036	4.7	1,465	268	18.3		265	
29	48038	0.9	2,497	374	15.0		370	
30	48039	41.7	464	101	21.8		100	
31	48040	11.3	675	101	15.0		101	
32	48041	28.0	270	42	15.6		40	
33	48042	6.2	2,366	221	9.3		221	
34	48043	40.4	1,180	158	13.4		152	
35	48044	1.6	4,252	434	10.2		432	
36	48045	11.5	1,392	197	14.2		195	
37	48047	7.8	3,062	367	12.0		366	
38	48048	15.6	767	84	11.0		84	
39	48049	14.2	335	64	19.1		62	
40	48050	33.0	80	11	13.8		11	
41	48051	5.1	1,208	165	13.7		165	
42	48054	24.9	369	58	15.7		57	
43	48059	19.4	976	182	18.6		179	
44	48060	44.7	3,627	1291	35.6		1236	

	I	J	K	L	M	N	O	P	Q	R	S	T	U
1													
2													
3													
4													
5													
6	5 to 9 ug/dL, not confirmed by venous	>= 10 ug/dL, not confirmed by venous		Confirmed 5-9 ug/dL (venous only)	Confirmed 10-14 ug/dL (venous only)	Confirmed 15-44 ug/dL (venous only)	Confirmed ≥45 ug/dL (venous only)		Total confirmed ≥ 5 µg/dL	% with confirmed BLL >= 5 ug/dL		Total ≥ 5 µg/dL, confirmed & unconfirmed*	% with BLL >= 5 ug/dL, confirmed & unconfirmed*
7	2	0		0	0	0	0		0	0.0		2	1.4
8	0	0		1	0	0	0		1	5.3		1	5.3
9	0	0		0	0	0	0		0	0.0		0	0.0
10	1	0		1	0	0	0		1	2.6		2	5.1
11	0	0		0	0	0	0		0	0.0		0	0.0
12	0	0		0	0	0	0		0	0.0		0	0.0
13	1	0		0	0	0	0		0	0.0		1	1.4
14	0	0		0	0	0	0		0	0.0		0	0.0
15	0	0		0	0	0	0		0	0.0		0	0.0
16	5	1		7	0	0	0		7	1.3		13	2.4
17	0	0		0	0	0	0		0	0.0		0	0.0
18	0	0		0	0	0	0		0	0.0		0	0.0
19	4	0		0	0	0	0		0	0.0		4	3.2
20	2	0		0	0	0	0		0	0.0		2	1.2
21	0	1		0	1	1	0		2	4.0		3	6.0
22	0	0		0	0	0	0		0	0.0		0	0.0
23	5	0		5	0	0	0		5	1.8		10	3.5
24	0	0		0	0	0	0		0	0.0		0	0.0
25	3	0		1	0	0	0		1	0.4		4	1.4
26	3	0		2	0	0	0		2	0.8		5	1.9
27	1	0		2	1	1	0		4	1.0		5	1.2
28	2	0		1	0	0	0		1	0.4		3	1.1
29	2	0		2	0	0	0		2	0.5		4	1.1
30	0	0		0	0	0	0		0	0.0		0	0.0
31	0	0		0	0	0	0		0	0.0		0	0.0
32	1	1		0	0	0	0		0	0.0		2	4.8
33	0	0		0	0	0	0		0	0.0		0	0.0
34	3	0		0	0	0	1		1	0.6		4	2.5
35	1	0		1	0	0	0		1	0.2		2	0.5
36	1	0		1	0	0	0		1	0.5		2	1.0
37	1	0		0	0	0	0		0	0.0		1	0.3
38	0	0		0	0	0	0		0	0.0		0	0.0
39	2	0		0	0	0	0		0	0.0		2	3.1
40	0	0		0	0	0	0		0	0.0		0	0.0
41	0	0		0	0	0	0		0	0.0		0	0.0
42	1	0		0	0	0	0		0	0.0		1	1.7
43	3	0		0	0	0	0		0	0.0		3	1.6
44	31	5		14	3	3	0		20	1.5		56	4.3

	A	B	C	D	E	F	G	H
45	48062	28.7	654	87	13.3		85	
46	48063	12.3	258	44	17.1		42	
47	48064	25.1	256	40	15.6		40	
48	48065	25.4	661	80	12.1		78	
49	48066	16.0	3,565	634	17.8		625	
50	48067	53.6	1,647	221	13.4		218	
51	48069	79.6	179	24	13.4		24	
52	48070	55.2	512	60	11.7		60	
53	48071	11.6	2,166	429	19.8		423	
54	48072	55.2	1,147	173	15.1		170	
55	48073	24.7	2,178	327	15.0		321	
56	48074	23.4	688	176	25.6		176	
57	48075	12.8	1,302	442	33.9		437	
58	48076	9.4	1,390	387	27.8		383	
59	48079	26.0	756	122	16.1		120	
60	48080	19.2	1,365	195	14.3		192	
61	48081	15.0	1,123	185	16.5		184	
62	48082	10.2	1,038	118	11.4		115	
63	48083	7.5	1,706	256	15.0		251	
64	48084	3.0	1,055	137	13.0		131	
65	48085	*	1,489	189	12.7		189	
66	48088	*	1,359	216	15.9		215	
67	48089	23.9	2,861	681	23.8		665	
68	48091	19.1	2,642	634	24.0		617	
69	48092	8.7	1,645	348	21.2		341	
70	48093	3.4	1,363	273	20.0		271	
71	48094	5.6	1,386	130	9.4		130	
72	48095	8.9	263	31	11.8		31	
73	48096	19.6	193	17	8.8		16	
74	48097	41.2	385	92	23.9		91	
75	48098	4.4	919	124	13.5		124	
76	48101	25.6	1,725	329	19.1		326	
77	48103	21.9	3,584	320	8.9		318	
78	48104	36.7	1,281	112	8.7		110	
79	48105	7.3	2,014	171	8.5		170	
80	48108	5.0	2,009	222	11.1		216	
81	48111	11.1	3,276	592	18.1		587	
82	48114	5.0	1,142	100	8.8		100	
83	48116	11.8	1,640	105	6.4		105	
84	48117	21.4	610	73	12.0		72	
85	48118	27.7	729	72	9.9		68	
86	48120	34.3	986	329	33.4		325	
87	48122	39.7	875	301	34.4		298	
88	48124	46.1	2,197	345	15.7		342	
89	48125	26.7	1,596	381	23.9		378	
90	48126	54.1	5,545	1526	27.5		1491	
91	48127	12.1	2,999	748	24.9		739	
92	48128	53.0	822	153	18.6		152	

	I	J	K	L	M	N	O	P	Q	R	S	T	U
45	2	0		0	0	0	0		0	0.0		2	2.3
46	2	0		0	0	0	0		0	0.0		2	4.5
47	0	0		0	0	0	0		0	0.0		0	0.0
48	2	0		0	0	0	0		0	0.0		2	2.5
49	7	0		2	0	0	0		2	0.3		9	1.4
50	3	0		0	0	0	0		0	0.0		3	1.4
51	0	0		0	0	0	0		0	0.0		0	0.0
52	0	0		0	0	0	0		0	0.0		0	0.0
53	4	0		1	1	1	0		3	0.7		7	1.6
54	1	0		2	0	0	0		2	1.2		3	1.7
55	4	0		1	0	0	0		1	0.3		5	1.5
56	0	0		0	0	0	0		0	0.0		0	0.0
57	3	0		2	0	0	0		2	0.5		5	1.1
58	1	0		2	1	1	0		4	1.0		5	1.3
59	1	0		0	1	1	0		2	1.6		3	2.5
60	2	0		1	0	0	0		1	0.5		3	1.5
61	1	0		0	0	0	0		0	0.0		1	0.5
62	0	0		3	0	0	0		3	2.5		3	2.5
63	1	1		2	1	1	0		4	1.6		6	2.3
64	3	0		3	0	0	0		3	2.2		6	4.4
65	0	0		0	0	0	0		0	0.0		0	0.0
66	1	0		0	0	0	0		0	0.0		1	0.5
67	9	3		4	0	0	0		4	0.6		16	2.3
68	11	0		5	0	0	0		5	0.8		16	2.5
69	5	1		1	0	0	0		1	0.3		7	2.0
70	0	0		1	1	1	0		3	1.1		3	1.1
71	0	0		0	0	0	0		0	0.0		0	0.0
72	0	0		0	0	0	0		0	0.0		0	0.0
73	1	0		0	0	0	0		0	0.0		1	5.9
74	1	0		0	0	0	0		0	0.0		1	1.1
75	0	0		0	0	0	0		0	0.0		0	0.0
76	3	0		0	0	0	0		0	0.0		3	0.9
77	0	1		1	0	0	0		1	0.3		2	0.6
78	0	0		1	0	0	0		1	0.9		1	0.9
79	1	0		0	0	0	0		0	0.0		1	0.6
80	4	0		2	0	0	0		2	0.9		6	2.7
81	3	1		1	0	0	0		1	0.2		5	0.8
82	0	0		0	0	0	0		0	0.0		0	0.0
83	0	0		0	0	0	0		0	0.0		0	0.0
84	0	0		1	0	0	0		1	1.4		1	1.4
85	1	0		3	0	0	0		3	4.2		4	5.6
86	1	0		3	0	0	0		3	0.9		4	1.2
87	2	0		1	0	0	0		1	0.3		3	1.0
88	0	0		3	0	0	0		3	0.9		3	0.9
89	2	0		0	0	0	0		0	0.0		2	0.5
90	6	0		24	5	5	0		34	2.2		40	2.6
91	2	0		5	1	1	0		7	0.9		9	1.2
92	1	0		0	0	0	0		0	0.0		1	0.7

	A	B	C	D	E	F	G	H
93	48130	20.9	1,138	77	6.8		76	
94	48131	35.7	524	82	15.6		81	
95	48133	26.5	372	57	15.3		55	
96	48134	13.1	1,773	308	17.4		307	
97	48135	17.6	1,813	307	16.9		304	
98	48137	24.9	299	18	6.0		17	
99	48138	19.1	421	69	16.4		69	
100	48139	31.0	7	2	28.6		2	
101	48140	36.2	174	29	16.7		29	
102	48141	19.0	2,226	743	33.4		732	
103	48143	21.7	3	2	66.7		2	
104	48144	12.4	562	68	12.1		68	
105	48145	33.6	209	36	17.2		35	
106	48146	35.2	3,089	942	30.5		926	
107	48150	13.8	1,770	265	15.0		259	
108	48152	9.3	1,686	349	20.7		347	
109	48154	7.0	1,865	315	16.9		313	
110	48157	45.8	109	15	13.8		15	
111	48158	36.1	401	39	9.7		39	
112	48159	48.2	189	23	12.2		23	
113	48160	32.2	911	89	9.8		89	
114	48161	38.7	2,040	373	18.3		371	
115	48162	28.5	2,211	329	14.9		325	
116	48164	26.3	545	77	14.1		77	
117	48165	6.1	520	89	17.1		88	
118	48166	21.0	968	151	15.6		148	
119	48167	8.9	1,240	184	14.8		183	
120	48168	*	1,566	154	9.8		151	
121	48169	15.4	1,258	104	8.3		104	
122	48170	15.7	2,512	201	8.0		199	
123	48173	18.2	913	103	11.3		102	
124	48174	15.8	2,538	602	23.7		598	
125	48176	12.2	1,298	95	7.3		93	
126	48178	7.9	2,225	311	14.0		307	
127	48179	32.7	191	35	18.3		35	
128	48180	13.8	5,287	1450	27.4		1427	
129	48182	17.3	1,358	180	13.3		178	
130	48183	9.3	2,717	505	18.6		496	
131	48184	30.4	1,249	272	21.8		270	
132	48185	4.7	3,395	791	23.3		772	
133	48186	17.9	2,943	558	19.0		549	
134	48187	2.0	3,703	438	11.8		430	
135	48188	2.6	3,692	433	11.7		426	
136	48189	15.7	966	91	9.4		91	
137	48190	70.3	5	2	40.0		2	
138	48191	30.7	290	24	8.3		24	
139	48192	37.1	1,683	360	21.4		357	
140	48193	*	943	235	24.9		224	

	I	J	K	L	M	N	O	P	Q	R	S	T	U
93	0	0		0	1	1	0		2	2.6		2	2.6
94	0	0		0	1	1	0		2	2.4		2	2.4
95	2	0		0	0	0	0		0	0.0		2	3.5
96	1	0		0	0	0	0		0	0.0		1	0.3
97	3	0		0	0	0	0		0	0.0		3	1.0
98	0	0		1	0	0	0		1	5.6		1	5.6
99	0	0		0	0	0	0		0	0.0		0	0.0
100	0	0		0	0	0	0		0	0.0		0	0.0
101	0	0		0	0	0	0		0	0.0		0	0.0
102	2	0		6	1	1	0		8	1.1		10	1.3
103	0	0		0	0	0	0		0	0.0		0	0.0
104	0	0		0	0	0	0		0	0.0		0	0.0
105	1	0		0	0	0	0		0	0.0		1	2.8
106	4	2		9	1	1	0		11	1.2		17	1.8
107	6	0		0	0	0	0		0	0.0		6	2.3
108	2	0		0	0	0	0		0	0.0		2	0.6
109	2	0		0	0	0	0		0	0.0		2	0.6
110	0	0		0	0	0	0		0	0.0		0	0.0
111	0	0		0	0	0	0		0	0.0		0	0.0
112	0	0		0	0	0	0		0	0.0		0	0.0
113	0	0		0	0	0	0		0	0.0		0	0.0
114	1	1		0	0	0	0		0	0.0		2	0.5
115	4	0		0	0	0	0		0	0.0		4	1.2
116	0	0		0	0	0	0		0	0.0		0	0.0
117	1	0		0	0	0	0		0	0.0		1	1.1
118	3	0		0	0	0	0		0	0.0		3	2.0
119	1	0		0	0	0	0		0	0.0		1	0.5
120	2	0		1	0	0	0		1	0.6		3	1.9
121	0	0		0	0	0	0		0	0.0		0	0.0
122	1	0		1	0	0	0		1	0.5		2	1.0
123	1	0		0	0	0	0		0	0.0		1	1.0
124	4	0		0	0	0	0		0	0.0		4	0.7
125	2	0		0	0	0	0		0	0.0		2	2.1
126	4	0		0	0	0	0		0	0.0		4	1.3
127	0	0		0	0	0	0		0	0.0		0	0.0
128	9	0		11	2	2	0		15	1.0		24	1.7
129	2	0		0	0	0	0		0	0.0		2	1.1
130	8	0		1	0	0	0		1	0.2		9	1.8
131	2	0		0	0	0	0		0	0.0		2	0.7
132	12	1		5	1	1	0		7	0.9		20	2.5
133	6	0		3	0	0	0		3	0.5		9	1.6
134	6	0		1	1	1	0		3	0.7		9	2.1
135	4	0		2	1	1	0		4	0.9		8	1.8
136	0	0		0	0	0	0		0	0.0		0	0.0
137	0	0		0	0	0	0		0	0.0		0	0.0
138	0	0		0	0	0	0		0	0.0		0	0.0
139	3	0		0	0	0	0		0	0.0		3	0.8
140	4	0		5	2	2	0		9	3.8		13	5.5

	A	B	C	D	E	F	G	H
141	48195	14.7	1,789	447	25.0		441	
142	48197	17.0	5,049	686	13.6		674	
143	48198	14.0	3,614	643	17.8		641	
144	48201	51.0	666	389	58.4		375	
145	48202	68.5	955	391	40.9		330	
146	48203	61.4	2,195	734	33.4		647	
147	48204	67.2	2,271	801	35.3		669	
148	48205	48.2	4,233	1540	36.4		1385	
149	48206	78.1	1,665	644	38.7		512	
150	48207	34.7	1,326	561	42.3		523	
151	48208	64.7	854	301	35.2		274	
152	48209	76.0	4,220	1497	35.5		1381	
153	48210	68.1	3,933	1559	39.6		1423	
154	48211	72.1	694	252	36.3		209	
155	48212	70.6	4,007	1584	39.5		1456	
156	48213	62.5	2,368	808	34.1		707	
157	48214	71.0	1,516	613	40.4		511	
158	48215	55.5	1,083	425	39.2		383	
159	48216	71.5	506	131	25.9		118	
160	48217	56.1	643	177	27.5		172	
161	48218	62.1	752	274	36.4		265	
162	48219	34.4	3,543	1524	43.0		1471	
163	48220	59.7	1,469	259	17.6		253	
164	48221	63.5	2,476	942	38.0		886	
165	48223	39.5	2,141	752	35.1		722	
166	48224	57.9	4,024	1591	39.5		1460	
167	48225	29.5	1,086	267	24.6		262	
168	48226	49.4	113	43	38.1		43	
169	48227	53.5	3,524	1432	40.6		1336	
170	48228	39.5	5,037	2070	41.1		1982	
171	48229	47.3	831	283	34.1		274	
172	48230	71.4	977	146	14.9		143	
173	48234	47.2	3,005	1124	37.4		1055	
174	48235	44.9	3,103	1255	40.4		1213	
175	48236	43.3	1,836	261	14.2		254	
176	48237	16.0	2,214	600	27.1		594	
177	48238	71.7	2,584	995	38.5		869	
178	48239	23.1	2,707	657	24.3		648	
179	48240	29.4	1,345	384	28.6		380	
180	48301	7.3	773	97	12.5		96	
181	48302	5.5	703	91	12.9		90	
182	48304	6.0	714	101	14.1		96	
183	48306	3.9	1,671	132	7.9		131	
184	48307	10.9	3,184	343	10.8		338	
185	48309	5.4	1,728	149	8.6		149	
186	48310	2.1	3,062	667	21.8		655	
187	48312	1.9	2,125	364	17.1		362	
188	48313	1.8	2,168	363	16.7		359	

	I	J	K	L	M	N	O	P	Q	R	S	T	U
141	5	1		0	0	0	0		0	0.0		6	1.3
142	6	1		3	0	0	0		3	0.4		10	1.5
143	1	0		0	1	1	0		2	0.3		3	0.5
144	2	1		8	2	2	0		12	3.1		15	3.9
145	9	2		35	7	7	0		49	12.5		60	15.3
146	8	2		57	14	14	0		85	11.6		95	12.9
147	21	3		77	15	15	0		107	13.4		131	16.4
148	11	1		114	19	19	0		152	9.9		164	10.6
149	16	7		80	16	16	1		113	17.5		136	21.1
150	1	1		28	6	6	0		40	7.1		42	7.5
151	5	0		17	1	1	0		19	6.3		24	8.0
152	14	0		88	11	11	0		110	7.3		124	8.3
153	19	1		88	15	15	0		118	7.6		138	8.9
154	6	1		30	5	5	0		40	15.9		47	18.7
155	31	3		76	12	12	0		100	6.3		134	8.5
156	7	1		69	15	15	1		100	12.4		108	13.4
157	9	4		64	15	15	0		94	15.3		107	17.5
158	4	0		30	4	4	0		38	8.9		42	9.9
159	6	0		3	2	2	0		7	5.3		13	9.9
160	1	0		3	1	1	0		5	2.8		6	3.4
161	2	1		5	1	1	0		7	2.6		10	3.6
162	13	1		32	5	5	0		42	2.8		56	3.7
163	1	1		3	1	1	0		5	1.9		7	2.7
164	13	2		33	6	6	0		45	4.8		60	6.4
165	6	0		16	4	4	0		24	3.2		30	4.0
166	12	2		88	18	18	1		125	7.9		139	8.7
167	1	2		2	0	0	0		2	0.7		5	1.9
168	0	0		0	0	0	0		0	0.0		0	0.0
169	20	2		57	12	12	0		81	5.7		103	7.2
170	19	6		52	8	8	0		68	3.3		93	4.5
171	5	0		4	0	0	0		4	1.4		9	3.2
172	2	0		1	0	0	0		1	0.7		3	2.1
173	13	1		46	2	2	0		50	4.4		64	5.7
174	11	1		19	6	6	0		31	2.5		43	3.4
175	3	0		0	1	1	0		2	0.8		5	1.9
176	2	1		1	1	1	0		3	0.5		6	1.0
177	34	13		62	9	9	1		81	8.1		128	12.9
178	8	0		1	0	0	0		1	0.2		9	1.4
179	3	0		0	0	0	0		0	0.0		3	0.8
180	1	0		0	0	0	0		0	0.0		1	1.0
181	0	0		0	0	0	0		0	0.0		0	0.0
182	1	0		4	0	0	0		4	4.0		5	5.0
183	0	0		1	0	0	0		1	0.8		1	0.8
184	3	0		2	0	0	0		2	0.6		5	1.5
185	0	0		0	0	0	0		0	0.0		0	0.0
186	7	1		3	0	0	1		4	0.6		12	1.8
187	2	0		0	0	0	0		0	0.0		2	0.5
188	2	0		2	0	0	0		2	0.6		4	1.1

	A	B	C	D	E	F	G	H
189	48314	4.2	1,250	222	17.8		222	
190	48315	1.8	1,400	156	11.1		156	
191	48316	2.7	1,578	209	13.2		208	
192	48317	8.4	2,167	341	15.7		338	
193	48320	41.4	382	41	10.7		41	
194	48322	0.9	1,837	298	16.2		296	
195	48323	6.6	932	137	14.7		136	
196	48324	12.6	1,121	124	11.1		124	
197	48326	10.6	1,623	259	16.0		253	
198	48327	11.0	1,699	246	14.5		245	
199	48328	22.0	2,051	316	15.4		315	
200	48329	19.4	1,737	232	13.4		227	
201	48331	1.2	1,188	199	16.8		197	
202	48334	3.9	1,064	190	17.9		186	
203	48335	4.0	1,628	475	29.2		442	
204	48336	15.7	1,720	374	21.7		369	
205	48340	21.4	2,845	774	27.2		768	
206	48341	46.4	1,267	318	25.1		307	
207	48342	42.3	1,854	539	29.1		529	
208	48346	8.4	1,505	233	15.5		233	
209	48348	5.8	1,560	232	14.9		230	
210	48350	10.6	430	75	17.4		74	
211	48353	8.1	427	26	6.1		25	
212	48356	19.4	509	51	10.0		51	
213	48357	7.9	535	56	10.5		56	
214	48359	6.4	730	96	13.2		94	
215	48360	3.6	878	96	10.9		95	
216	48362	24.4	1,096	121	11.0		121	
217	48363	13.0	259	41	15.8		41	
218	48367	19.1	282	31	11.0		30	
219	48370	18.4	68	7	10.3		7	
220	48371	15.5	1,883	178	9.5		178	
221	48374	1.3	966	211	21.8		210	
222	48375	1.0	1,507	291	19.3		290	
223	48377	5.7	1,257	292	23.2		291	
224	48380	7.4	484	32	6.6		32	
225	48381	13.6	816	107	13.1		107	
226	48382	12.4	1,599	194	12.1		191	
227	48383	8.8	939	133	14.2		132	
228	48386	14.1	1,069	150	14.0		150	
229	48390	9.9	1,512	262	17.3		259	
230	48393	2.4	1,346	306	22.7		301	
231	48401	34.3	92	13	14.1		12	
232	48412	27.7	346	64	18.5		64	
233	48413	35.9	520	115	22.1		112	
234	48414	40.4	153	29	19.0		29	
235	48415	17.4	612	170	27.8		170	
236	48416	37.6	383	59	15.4		58	

	I	J	K	L	M	N	O	P	Q	R	S	T	U
189	0	0		0	0	0	0		0	0.0		0	0.0
190	0	0		0	0	0	0		0	0.0		0	0.0
191	0	0		1	0	0	0		1	0.5		1	0.5
192	2	0		0	0	0	0		0	0.0		2	0.6
193	0	0		0	0	0	0		0	0.0		0	0.0
194	1	1		0	0	0	0		0	0.0		2	0.7
195	0	0		0	0	0	0		0	0.0		0	0.0
196	0	0		0	0	0	0		0	0.0		0	0.0
197	1	1		1	1	1	0		3	1.2		5	1.9
198	1	0		0	0	0	0		0	0.0		1	0.4
199	0	1		0	0	0	0		0	0.0		1	0.3
200	1	0		3	1	1	0		5	2.2		6	2.6
201	2	0		0	0	0	0		0	0.0		2	1.0
202	2	0		2	0	0	0		2	1.1		4	2.1
203	13	1		10	5	5	0		20	4.2		34	7.2
204	4	0		1	0	0	0		1	0.3		5	1.3
205	1	0		4	1	1	0		6	0.8		7	0.9
206	1	0		6	3	3	0		12	3.8		13	4.1
207	1	0		5	2	2	0		9	1.7		10	1.9
208	0	0		0	0	0	0		0	0.0		0	0.0
209	1	0		1	0	0	0		1	0.4		2	0.9
210	0	1		0	0	0	0		0	0.0		1	1.3
211	1	0		0	0	0	0		0	0.0		1	3.8
212	0	0		0	0	0	0		0	0.0		0	0.0
213	0	0		0	0	0	0		0	0.0		0	0.0
214	2	0		0	0	0	0		0	0.0		2	2.1
215	1	0		0	0	0	0		0	0.0		1	1.0
216	0	0		0	0	0	0		0	0.0		0	0.0
217	0	0		0	0	0	0		0	0.0		0	0.0
218	1	0		0	0	0	0		0	0.0		1	3.2
219	0	0		0	0	0	0		0	0.0		0	0.0
220	0	0		0	0	0	0		0	0.0		0	0.0
221	1	0		0	0	0	0		0	0.0		1	0.5
222	0	0		1	0	0	0		1	0.3		1	0.3
223	0	0		1	0	0	0		1	0.3		1	0.3
224	0	0		0	0	0	0		0	0.0		0	0.0
225	0	0		0	0	0	0		0	0.0		0	0.0
226	3	0		0	0	0	0		0	0.0		3	1.5
227	1	0		0	0	0	0		0	0.0		1	0.8
228	0	0		0	0	0	0		0	0.0		0	0.0
229	3	0		0	0	0	0		0	0.0		3	1.1
230	2	0		2	1	1	0		4	1.3		6	2.0
231	1	0		0	0	0	0		0	0.0		1	7.7
232	0	0		0	0	0	0		0	0.0		0	0.0
233	3	0		0	0	0	0		0	0.0		3	2.6
234	0	0		0	0	0	0		0	0.0		0	0.0
235	0	0		0	0	0	0		0	0.0		0	0.0
236	1	0		0	0	0	0		0	0.0		1	1.7

	A	B	C	D	E	F	G	H
237	48417	20.6	193	48	24.9		48	
238	48418	27.6	307	49	16.0		49	
239	48419	35.4	190	31	16.3		31	
240	48420	19.3	1,488	307	20.6		303	
241	48421	20.4	394	72	18.3		72	
242	48422	33.1	465	93	20.0		92	
243	48423	10.5	2,349	398	16.9		391	
244	48426	39.6	83	9	10.8		9	
245	48427	38.6	203	30	14.8		30	
246	48428	19.7	277	22	7.9		22	
247	48429	29.7	581	115	19.8		110	
248	48430	17.2	2,532	319	12.6		310	
249	48432	45.3	33	15	45.5		15	
250	48433	14.4	1,657	299	18.0		296	
251	48434	44.6	4	0	0.0		0	
252	48435	24.8	159	30	18.9		30	
253	48436	19.9	233	45	19.3		43	
254	48437	36.4	31	3	9.7		3	
255	48438	16.7	401	59	14.7		59	
256	48439	6.7	3,877	522	13.5		516	
257	48440	100.0	15	0	0.0		0	
258	48441	42.0	252	42	16.7		41	
259	48442	18.5	1,529	211	13.8		207	
260	48444	29.0	731	145	19.8		136	
261	48445	34.3	90	13	14.4		12	
262	48446	20.0	1,938	360	18.6		348	
263	48449	17.1	206	44	21.4		44	
264	48450	28.9	229	44	19.2		43	
265	48451	16.3	1,105	125	11.3		124	
266	48453	37.6	393	74	18.8		72	
267	48454	34.5	88	23	26.1		23	
268	48455	16.9	443	40	9.0		38	
269	48456	51.6	65	12	18.5		12	
270	48457	21.7	551	142	25.8		138	
271	48458	18.5	1,640	353	21.5		349	
272	48460	34.9	146	38	26.0		37	
273	48461	21.5	635	93	14.6		90	
274	48462	14.2	765	103	13.5		102	
275	48463	21.5	250	35	14.0		34	
276	48464	27.8	124	21	16.9		20	
277	48465	33.9	41	3	7.3		3	
278	48466	41.0	103	21	20.4		21	
279	48467	22.4	95	15	15.8		13	
280	48468	31.1	58	7	12.1		7	
281	48469	24.8	65	7	10.8		7	
282	48470	44.7	53	5	9.4		5	
283	48471	29.7	389	82	21.1		81	
284	48472	49.5	156	24	15.4		24	

	I	J	K	L	M	N	O	P	Q	R	S	T	U
237	0	0		0	0	0	0		0	0.0		0	0.0
238	0	0		0	0	0	0		0	0.0		0	0.0
239	0	0		0	0	0	0		0	0.0		0	0.0
240	3	1		0	0	0	0		0	0.0		4	1.3
241	0	0		0	0	0	0		0	0.0		0	0.0
242	1	0		0	0	0	0		0	0.0		1	1.1
243	5	1		1	0	0	0		1	0.3		7	1.8
244	0	0		0	0	0	0		0	0.0		0	0.0
245	0	0		0	0	0	0		0	0.0		0	0.0
246	0	0		0	0	0	0		0	0.0		0	0.0
247	1	0		3	1	1	0		5	4.3		6	5.2
248	8	1		0	0	0	0		0	0.0		9	2.8
249	0	0		0	0	0	0		0	0.0		0	0.0
250	3	0		0	0	0	0		0	0.0		3	1.0
251	0	0		0	0	0	0		0	---		0	---
252	0	0		0	0	0	0		0	0.0		0	0.0
253	0	1		1	0	0	0		1	2.2		2	4.4
254	0	0		0	0	0	0		0	0.0		0	0.0
255	0	0		0	0	0	0		0	0.0		0	0.0
256	6	0		0	0	0	0		0	0.0		6	1.1
257	0	0		0	0	0	0		0	---		0	---
258	1	0		0	0	0	0		0	0.0		1	2.4
259	3	0		1	0	0	0		1	0.5		4	1.9
260	6	1		1	0	0	0		1	0.7		8	5.5
261	1	0		0	0	0	0		0	0.0		1	7.7
262	9	1		2	0	0	0		2	0.6		12	3.3
263	0	0		0	0	0	0		0	0.0		0	0.0
264	1	0		0	0	0	0		0	0.0		1	2.3
265	1	0		0	0	0	0		0	0.0		1	0.8
266	0	0		1	1	1	0		3	4.1		3	4.1
267	0	0		0	0	0	0		0	0.0		0	0.0
268	1	1		0	0	0	0		0	0.0		2	5.0
269	0	0		0	0	0	0		0	0.0		0	0.0
270	3	0		1	0	0	0		1	0.7		4	2.8
271	1	0		2	1	1	0		4	1.1		5	1.4
272	1	0		0	0	0	0		0	0.0		1	2.6
273	3	0		0	0	0	0		0	0.0		3	3.2
274	0	0		1	0	0	0		1	1.0		1	1.0
275	1	0		0	0	0	0		0	0.0		1	2.9
276	1	0		0	0	0	0		0	0.0		1	4.8
277	0	0		0	0	0	0		0	0.0		0	0.0
278	0	0		0	0	0	0		0	0.0		0	0.0
279	1	0		1	0	0	0		1	6.7		2	13.3
280	0	0		0	0	0	0		0	0.0		0	0.0
281	0	0		0	0	0	0		0	0.0		0	0.0
282	0	0		0	0	0	0		0	0.0		0	0.0
283	1	0		0	0	0	0		0	0.0		1	1.2
284	0	0		0	0	0	0		0	0.0		0	0.0

	A	B	C	D	E	F	G	H
285	48473	14.1	1,482	299	20.2		295	
286	48475	39.9	185	19	10.3		18	
287	48476	59.8	35	10	28.6		10	
288	48502	69.8	25	10	40.0		10	
289	48503	49.1	2,111	502	23.8		473	
290	48504	31.2	2,733	672	24.6		642	
291	48505	38.2	2,419	604	25.0		575	
292	48506	31.2	2,604	550	21.1		533	
293	48507	20.9	2,913	764	26.2		747	
294	48509	20.0	551	111	20.1		109	
295	48519	14.9	490	126	25.7		123	
296	48529	30.0	908	251	27.6		251	
297	48532	14.5	1,322	393	29.7		385	
298	48601	36.4	3,543	1184	33.4		1136	
299	48602	59.9	2,819	776	27.5		725	
300	48603	7.6	1,627	372	22.9		369	
301	48604	26.7	675	149	22.1		147	
302	48607	74.4	85	30	35.3		27	
303	48609	12.9	634	120	18.9		120	
304	48610	7.9	138	25	18.1		25	
305	48611	21.9	460	49	10.7		48	
306	48612	11.6	528	118	22.3		118	
307	48613	24.9	93	13	14.0		13	
308	48614	25.3	113	18	15.9		18	
309	48615	40.3	236	38	16.1		38	
310	48616	31.2	521	110	21.1		107	
311	48617	23.9	778	136	17.5		136	
312	48618	29.3	358	43	12.0		42	
313	48619	37.2	17	2	11.8		2	
314	48620	10.4	*	0	---		0	
315	48621	15.6	78	10	12.8		9	
316	48622	13.1	437	81	18.5		80	
317	48623	18.6	935	138	14.8		136	
318	48624	15.8	959	162	16.9		162	
319	48625	10.2	809	208	25.7		206	
320	48626	22.7	333	57	17.1		56	
321	48627	26.8	6	2	33.3		2	
322	48628	14.3	106	7	6.6		7	
323	48629	15.7	380	79	20.8		79	
324	48630	49.4	2	0	0.0		0	
325	48631	27.2	284	43	15.1		41	
326	48632	13.8	301	57	18.9		56	
327	48633	22.7	4	1	25.0		1	
328	48634	25.2	256	31	12.1		31	
329	48635	23.4	70	4	5.7		4	
330	48636	19.1	42	1	2.4		0	
331	48637	35.3	213	41	19.2		41	
332	48638	*	805	208	25.8		202	

	I	J	K	L	M	N	O	P	Q	R	S	T	U
285	4	0		0	0	0	0		0	0.0		4	1.3
286	0	0		0	1	1	0		2	10.5		2	10.5
287	0	0		0	0	0	0		0	0.0		0	0.0
288	0	0		0	0	0	0		0	0.0		0	0.0
289	9	3		11	4	4	0		19	3.8		31	6.2
290	16	1		12	1	1	0		14	2.1		31	4.6
291	11	1		14	1	1	0		16	2.6		28	4.6
292	8	1		7	1	1	0		9	1.6		18	3.3
293	12	0		3	1	1	0		5	0.7		17	2.2
294	1	0		1	0	0	0		1	0.9		2	1.8
295	3	0		0	0	0	0		0	0.0		3	2.4
296	0	0		0	0	0	0		0	0.0		0	0.0
297	4	1		3	0	0	0		3	0.8		8	2.0
298	27	3		13	3	3	0		19	1.6		49	4.1
299	31	4		11	3	3	0		17	2.2		52	6.7
300	2	1		0	0	0	0		0	0.0		3	0.8
301	2	0		0	0	0	0		0	0.0		2	1.3
302	1	0		0	1	1	0		2	6.7		3	10.0
303	0	0		0	0	0	0		0	0.0		0	0.0
304	0	0		0	0	0	0		0	0.0		0	0.0
305	0	0		1	0	0	0		1	2.0		1	2.0
306	0	0		0	0	0	0		0	0.0		0	0.0
307	0	0		0	0	0	0		0	0.0		0	0.0
308	0	0		0	0	0	0		0	0.0		0	0.0
309	0	0		0	0	0	0		0	0.0		0	0.0
310	2	0		0	0	0	0		0	0.0		2	1.8
311	0	0		0	0	0	0		0	0.0		0	0.0
312	0	0		0	1	1	0		2	4.7		2	4.7
313	0	0		0	0	0	0		0	0.0		0	0.0
314	0	0		0	0	0	0		0	---		0	---
315	0	1		0	0	0	0		0	0.0		1	10.0
316	1	0		0	0	0	0		0	0.0		1	1.2
317	2	0		0	0	0	0		0	0.0		2	1.4
318	0	0		0	0	0	0		0	0.0		0	0.0
319	2	0		0	0	0	0		0	0.0		2	1.0
320	1	0		0	0	0	0		0	0.0		1	1.8
321	0	0		0	0	0	0		0	0.0		0	0.0
322	0	0		0	0	0	0		0	0.0		0	0.0
323	0	0		0	0	0	0		0	0.0		0	0.0
324	0	0		0	0	0	0		0	---		0	---
325	2	0		0	0	0	0		0	0.0		2	4.7
326	1	0		0	0	0	0		0	0.0		1	1.8
327	0	0		0	0	0	0		0	0.0		0	0.0
328	0	0		0	0	0	0		0	0.0		0	0.0
329	0	0		0	0	0	0		0	0.0		0	0.0
330	1	0		0	0	0	0		0	0.0		1	100.0
331	0	0		0	0	0	0		0	0.0		0	0.0
332	5	0		1	0	0	0		1	0.5		6	2.9

	A	B	C	D	E	F	G	H
333	48640	21.4	2,199	170	7.7		167	
334	48642	11.3	2,359	191	8.1		190	
335	48647	23.2	335	16	4.8		16	
336	48649	35.6	81	30	37.0		30	
337	48650	21.6	475	70	14.7		70	
338	48651	13.8	220	51	23.2		51	
339	48652	13.6	86	12	14.0		12	
340	48653	18.1	520	60	11.5		60	
341	48654	15.2	127	8	6.3		8	
342	48655	29.5	419	97	23.2		96	
343	48656	10.8	170	35	20.6		35	
344	48657	10.5	449	40	8.9		40	
345	48658	24.3	350	59	16.9		58	
346	48659	24.7	197	44	22.3		44	
347	48661	19.7	659	59	9.0		58	
348	48662	44.8	103	12	11.7		12	
349	48701	47.5	131	31	23.7		30	
350	48703	21.1	151	29	19.2		29	
351	48705	19.5	12	1	8.3		1	
352	48706	33.5	2,707	546	20.2		529	
353	48708	59.1	2,246	472	21.0		444	
354	48720	57.8	40	11	27.5		10	
355	48721	15.0	17	3	17.6		3	
356	48722	17.1	214	42	19.6		42	
357	48723	31.4	809	238	29.4		234	
358	48724	47.5	26	10	38.5		9	
359	48725	14.8	105	24	22.9		24	
360	48726	37.7	474	90	19.0		89	
361	48727	33.2	84	15	17.9		14	
362	48728	24.5	7	0	0.0		0	
363	48729	33.3	111	17	15.3		16	
364	48730	29.3	212	17	8.0		17	
365	48731	44.5	125	24	19.2		23	
366	48732	22.5	700	140	20.0		139	
367	48733	46.4	120	26	21.7		25	
368	48734	20.2	396	44	11.1		44	
369	48735	48.0	88	16	18.2		16	
370	48737	19.2	38	4	10.5		3	
371	48738	22.6	47	3	6.4		3	
372	48739	19.0	173	12	6.9		12	
373	48740	24.2	109	13	11.9		12	
374	48741	32.3	152	35	23.0		34	
375	48742	19.9	55	9	16.4		9	
376	48743	26.1	1	0	0.0		0	
377	48744	30.3	291	63	21.6		62	
378	48745	21.4	51	11	21.6		11	
379	48746	22.1	532	115	21.6		115	
380	48747	44.3	94	22	23.4		22	

	I	J	K	L	M	N	O	P	Q	R	S	T	U
333	2	0		1	0	0	0		1	0.6		3	1.8
334	0	0		1	0	0	0		1	0.5		1	0.5
335	0	0		0	0	0	0		0	0.0		0	0.0
336	0	0		0	0	0	0		0	0.0		0	0.0
337	0	0		0	0	0	0		0	0.0		0	0.0
338	0	0		0	0	0	0		0	0.0		0	0.0
339	0	0		0	0	0	0		0	0.0		0	0.0
340	0	0		0	0	0	0		0	0.0		0	0.0
341	0	0		0	0	0	0		0	0.0		0	0.0
342	1	0		0	0	0	0		0	0.0		1	1.0
343	0	0		0	0	0	0		0	0.0		0	0.0
344	0	0		0	0	0	0		0	0.0		0	0.0
345	1	0		0	0	0	0		0	0.0		1	1.7
346	0	0		0	0	0	0		0	0.0		0	0.0
347	0	0		1	0	0	0		1	1.7		1	1.7
348	0	0		0	0	0	0		0	0.0		0	0.0
349	1	0		0	0	0	0		0	0.0		1	3.2
350	0	0		0	0	0	0		0	0.0		0	0.0
351	0	0		0	0	0	0		0	0.0		0	0.0
352	12	1		1	1	1	0		3	0.5		16	2.9
353	15	1		8	2	2	1		13	2.8		29	6.1
354	0	0		1	0	0	0		1	9.1		1	9.1
355	0	0		0	0	0	0		0	0.0		0	0.0
356	0	0		0	0	0	0		0	0.0		0	0.0
357	3	0		0	1	1	0		2	0.8		5	2.1
358	1	0		0	0	0	0		0	0.0		1	10.0
359	0	0		0	0	0	0		0	0.0		0	0.0
360	1	0		0	0	0	0		0	0.0		1	1.1
361	0	0		0	1	1	0		2	13.3		2	13.3
362	0	0		0	0	0	0		0	---		0	---
363	1	0		0	0	0	0		0	0.0		1	5.9
364	0	0		0	0	0	0		0	0.0		0	0.0
365	1	0		0	0	0	0		0	0.0		1	4.2
366	1	0		0	0	0	0		0	0.0		1	0.7
367	1	0		0	0	0	0		0	0.0		1	3.8
368	0	0		0	0	0	0		0	0.0		0	0.0
369	0	0		0	0	0	0		0	0.0		0	0.0
370	1	0		0	0	0	0		0	0.0		1	25.0
371	0	0		0	0	0	0		0	0.0		0	0.0
372	0	0		0	0	0	0		0	0.0		0	0.0
373	1	0		0	0	0	0		0	0.0		1	7.7
374	1	0		0	0	0	0		0	0.0		1	2.9
375	0	0		0	0	0	0		0	0.0		0	0.0
376	0	0		0	0	0	0		0	---		0	---
377	1	0		0	0	0	0		0	0.0		1	1.6
378	0	0		0	0	0	0		0	0.0		0	0.0
379	0	0		0	0	0	0		0	0.0		0	0.0
380	0	0		0	0	0	0		0	0.0		0	0.0

	A	B	C	D	E	F	G	H
381	48748	16.8	66	8	12.1		8	
382	48749	15.4	57	18	31.6		18	
383	48750	14.0	475	77	16.2		73	
384	48754	50.0	62	22	35.5		22	
385	48755	27.3	153	30	19.6		30	
386	48756	14.5	322	21	6.5		21	
387	48757	30.8	239	60	25.1		60	
388	48759	43.8	209	47	22.5		45	
389	48760	23.3	119	18	15.1		17	
390	48761	18.4	27	4	14.8		4	
391	48762	25.6	39	4	10.3		3	
392	48763	25.3	232	22	9.5		22	
393	48765	27.6	34	8	23.5		8	
394	48766	22.9	64	17	26.6		17	
395	48767	59.1	151	24	15.9		24	
396	48768	30.5	634	150	23.7		149	
397	48770	27.8	99	7	7.1		7	
398	48801	36.0	965	177	18.3		175	
399	48804	*	*	2	---		2	
400	48806	44.2	95	23	24.2		23	
401	48807	37.0	61	6	9.8		6	
402	48808	19.9	391	45	11.5		44	
403	48809	35.7	862	165	19.1		159	
404	48811	49.8	290	52	17.9		52	
405	48813	36.7	1,515	216	14.3		210	
406	48815	41.4	210	28	13.3		28	
407	48817	35.4	442	116	26.2		115	
408	48818	32.0	180	25	13.9		25	
409	48819	34.4	207	24	11.6		23	
410	48820	15.5	1,215	97	8.0		96	
411	48821	19.2	268	35	13.1		35	
412	48822	33.4	152	12	7.9		12	
413	48823	13.8	2,121	348	16.4		339	
414	48827	30.7	1,134	142	12.5		137	
415	48829	34.9	229	50	21.8		50	
416	48830	44.4	*	1	---		1	
417	48831	52.7	241	28	11.6		28	
418	48832	24.1	89	9	10.1		9	
419	48834	32.8	147	20	13.6		18	
420	48835	45.2	253	10	4.0		10	
421	48836	26.2	1,158	111	9.6		107	
422	48837	27.3	1,248	115	9.2		112	
423	48838	24.4	1,485	227	15.3		222	
424	48840	8.5	669	104	15.5		101	
425	48841	54.9	50	14	28.0		14	
426	48842	11.4	1,582	252	15.9		248	
427	48843	15.8	3,324	268	8.1		267	
428	48845	53.1	60	5	8.3		5	

	I	J	K	L	M	N	O	P	Q	R	S	T	U
381	0	0		0	0	0	0		0	0.0		0	0.0
382	0	0		0	0	0	0		0	0.0		0	0.0
383	3	0		1	0	0	0		1	1.3		4	5.2
384	0	0		0	0	0	0		0	0.0		0	0.0
385	0	0		0	0	0	0		0	0.0		0	0.0
386	0	0		0	0	0	0		0	0.0		0	0.0
387	0	0		0	0	0	0		0	0.0		0	0.0
388	2	0		0	0	0	0		0	0.0		2	4.3
389	1	0		0	0	0	0		0	0.0		1	5.6
390	0	0		0	0	0	0		0	0.0		0	0.0
391	1	0		0	0	0	0		0	0.0		1	25.0
392	0	0		0	0	0	0		0	0.0		0	0.0
393	0	0		0	0	0	0		0	0.0		0	0.0
394	0	0		0	0	0	0		0	0.0		0	0.0
395	0	0		0	0	0	0		0	0.0		0	0.0
396	1	0		0	0	0	0		0	0.0		1	0.7
397	0	0		0	0	0	0		0	0.0		0	0.0
398	1	0		1	0	0	0		1	0.6		2	1.1
399	0	0		0	0	0	0		0	0.0		0	0.0
400	0	0		0	0	0	0		0	0.0		0	0.0
401	0	0		0	0	0	0		0	0.0		0	0.0
402	0	0		1	0	0	0		1	2.2		1	2.2
403	3	0		2	0	0	0		2	1.2		5	3.0
404	0	0		0	0	0	0		0	0.0		0	0.0
405	4	1		1	0	0	0		1	0.5		6	2.8
406	0	0		0	0	0	0		0	0.0		0	0.0
407	1	0		0	0	0	0		0	0.0		1	0.9
408	0	0		0	0	0	0		0	0.0		0	0.0
409	0	0		0	0	0	0		0	0.0		0	0.0
410	0	0		1	0	0	0		1	1.0		1	1.0
411	0	0		0	0	0	0		0	0.0		0	0.0
412	0	0		0	0	0	0		0	0.0		0	0.0
413	8	0		1	0	0	0		1	0.3		9	2.6
414	5	0		0	0	0	0		0	0.0		5	3.5
415	0	0		0	0	0	0		0	0.0		0	0.0
416	0	0		0	0	0	0		0	0.0		0	0.0
417	0	0		0	0	0	0		0	0.0		0	0.0
418	0	0		0	0	0	0		0	0.0		0	0.0
419	1	0		0	1	1	0		2	10.0		3	15.0
420	0	0		0	0	0	0		0	0.0		0	0.0
421	1	0		2	1	1	0		4	3.6		5	4.5
422	3	0		0	0	0	0		0	0.0		3	2.6
423	4	0		1	0	0	0		1	0.4		5	2.2
424	2	0		1	0	0	0		1	1.0		3	2.9
425	0	0		0	0	0	0		0	0.0		0	0.0
426	4	0		0	0	0	0		0	0.0		4	1.6
427	0	0		1	0	0	0		1	0.4		1	0.4
428	0	0		0	0	0	0		0	0.0		0	0.0

	A	B	C	D	E	F	G	H
429	48846	42.1	1,373	317	23.1		302	
430	48847	47.3	395	74	18.7		72	
431	48848	22.5	523	59	11.3		57	
432	48849	44.5	441	61	13.8		60	
433	48850	30.6	336	42	12.5		42	
434	48851	31.6	185	27	14.6		27	
435	48852	79.1	15	1	6.7		1	
436	48853	61.1	59	7	11.9		7	
437	48854	27.7	1,174	233	19.8		233	
438	48855	*	1,087	76	7.0		76	
439	48856	61.4	76	13	17.1		13	
440	48857	31.8	184	32	17.4		32	
441	48858	17.0	2,693	419	15.6		412	
442	48860	42.0	106	24	22.6		21	
443	48861	41.3	114	12	10.5		12	
444	48864	6.4	1,210	140	11.6		137	
445	48865	29.3	122	33	27.0		33	
446	48866	43.5	367	70	19.1		69	
447	48867	42.9	2,012	616	30.6		592	
448	48870	*	11	3	27.3		3	
449	48871	31.4	126	11	8.7		11	
450	48872	25.6	574	98	17.1		94	
451	48873	46.0	133	11	8.3		10	
452	48874	79.0	22	6	27.3		6	
453	48875	35.1	869	111	12.8		109	
454	48876	18.0	374	43	11.5		41	
455	48877	22.9	166	31	18.7		31	
456	48878	35.9	155	26	16.8		26	
457	48879	38.6	1,387	166	12.0		164	
458	48880	35.1	566	101	17.8		100	
459	48881	31.3	422	52	12.3		51	
460	48883	25.1	567	78	13.8		78	
461	48884	30.5	304	59	19.4		59	
462	48885	36.5	66	8	12.1		8	
463	48886	23.2	151	20	13.2		20	
464	48888	26.2	426	93	21.8		88	
465	48889	35.3	77	12	15.6		12	
466	48890	42.3	164	16	9.8		16	
467	48891	24.1	199	30	15.1		30	
468	48892	33.3	330	77	23.3		77	
469	48893	10.3	421	52	12.4		52	
470	48894	39.4	188	18	9.6		17	
471	48895	26.0	750	84	11.2		84	
472	48896	44.9	23	4	17.4		3	
473	48897	55.5	99	9	9.1		9	
474	48906	39.6	2,458	679	27.6		650	
475	48910	37.7	3,059	827	27.0		810	
476	48911	8.3	3,773	1257	33.3		1223	

	I	J	K	L	M	N	O	P	Q	R	S	T	U
429	12	1		2	0	0	0		2	0.6		15	4.7
430	2	0		0	0	0	0		0	0.0		2	2.7
431	1	0		0	1	1	0		2	3.4		3	5.1
432	1	0		0	0	0	0		0	0.0		1	1.6
433	0	0		0	0	0	0		0	0.0		0	0.0
434	0	0		0	0	0	0		0	0.0		0	0.0
435	0	0		0	0	0	0		0	0.0		0	0.0
436	0	0		0	0	0	0		0	0.0		0	0.0
437	0	0		0	0	0	0		0	0.0		0	0.0
438	0	0		0	0	0	0		0	0.0		0	0.0
439	0	0		0	0	0	0		0	0.0		0	0.0
440	0	0		0	0	0	0		0	0.0		0	0.0
441	7	0		0	0	0	0		0	0.0		7	1.7
442	3	0		0	0	0	0		0	0.0		3	12.5
443	0	0		0	0	0	0		0	0.0		0	0.0
444	2	0		1	0	0	0		1	0.7		3	2.1
445	0	0		0	0	0	0		0	0.0		0	0.0
446	0	0		1	0	0	0		1	1.4		1	1.4
447	13	2		9	0	0	0		9	1.5		24	3.9
448	0	0		0	0	0	0		0	0.0		0	0.0
449	0	0		0	0	0	0		0	0.0		0	0.0
450	2	0		2	0	0	0		2	2.0		4	4.1
451	1	0		0	0	0	0		0	0.0		1	9.1
452	0	0		0	0	0	0		0	0.0		0	0.0
453	0	0		2	0	0	0		2	1.8		2	1.8
454	1	1		0	0	0	0		0	0.0		2	4.7
455	0	0		0	0	0	0		0	0.0		0	0.0
456	0	0		0	0	0	0		0	0.0		0	0.0
457	0	0		2	0	0	0		2	1.2		2	1.2
458	1	0		0	0	0	0		0	0.0		1	1.0
459	0	1		0	0	0	0		0	0.0		1	1.9
460	0	0		0	0	0	0		0	0.0		0	0.0
461	0	0		0	0	0	0		0	0.0		0	0.0
462	0	0		0	0	0	0		0	0.0		0	0.0
463	0	0		0	0	0	0		0	0.0		0	0.0
464	2	0		3	0	0	0		3	3.2		5	5.4
465	0	0		0	0	0	0		0	0.0		0	0.0
466	0	0		0	0	0	0		0	0.0		0	0.0
467	0	0		0	0	0	0		0	0.0		0	0.0
468	0	0		0	0	0	0		0	0.0		0	0.0
469	0	0		0	0	0	0		0	0.0		0	0.0
470	0	0		1	0	0	0		1	5.6		1	5.6
471	0	0		0	0	0	0		0	0.0		0	0.0
472	0	0		1	0	0	0		1	25.0		1	25.0
473	0	0		0	0	0	0		0	0.0		0	0.0
474	20	1		3	4	4	0		11	1.6		32	4.7
475	9	2		4	2	2	0		8	1.0		19	2.3
476	22	1		6	3	3	0		12	1.0		35	2.8

	A	B	C	D	E	F	G	H
477	48912	48.3	1,219	301	24.7		288	
478	48915	61.2	889	309	34.8		293	
479	48917	9.6	2,040	409	20.0		396	
480	48933	42.8	118	27	22.9		27	
481	49001	44.5	2,232	515	23.1		485	
482	49002	13.4	1,531	205	13.4		203	
483	49004	22.5	1,203	199	16.5		197	
484	49006	15.1	1,359	276	20.3		271	
485	49007	61.2	838	245	29.2		226	
486	49008	32.6	1,019	174	17.1		170	
487	49009	7.5	2,965	390	13.2		386	
488	49010	31.7	1,339	258	19.3		247	
489	49011	43.1	142	31	21.8		29	
490	49012	32.0	165	27	16.4		27	
491	49013	33.1	487	79	16.2		77	
492	49014	32.3	1,652	419	25.4		399	
493	49015	30.1	2,230	519	23.3		507	
494	49017	39.0	1,430	353	24.7		333	
495	49021	36.5	443	77	17.4		77	
496	49022	34.2	3,136	773	24.6		742	
497	49024	4.5	2,295	312	13.6		309	
498	49026	33.1	153	23	15.0		22	
499	49027	70.5	15	1	6.7		1	
500	49028	38.9	562	99	17.6		97	
501	49029	48.3	104	17	16.3		17	
502	49030	44.3	269	26	9.7		25	
503	49031	32.0	547	51	9.3		46	
504	49032	39.4	230	35	15.2		32	
505	49033	33.4	82	9	11.0		9	
506	49034	39.6	141	17	12.1		17	
507	49036	32.0	1,739	374	21.5		359	
508	49037	*	2,157	612	28.4		590	
509	49038	30.2	618	71	11.5		69	
510	49040	37.0	266	28	10.5		27	
511	49042	41.1	394	84	21.3		81	
512	49043	31.0	212	30	14.2		28	
513	49045	39.3	429	70	16.3		69	
514	49046	25.1	428	62	14.5		60	
515	49047	36.8	1,165	187	16.1		183	
516	49048	*	2,350	535	22.8		524	
517	49050	26.1	85	23	27.1		22	
518	49051	30.1	160	19	11.9		19	
519	49052	53.0	70	11	15.7		11	
520	49053	24.7	553	90	16.3		89	
521	49055	21.8	402	58	14.4		56	
522	49056	28.4	312	82	26.3		81	
523	49057	35.1	674	123	18.2		120	
524	49058	34.4	1,432	163	11.4		154	

	I	J	K	L	M	N	O	P	Q	R	S	T	U
477	8	0		4	0	0	0		4	1.3		12	4.0
478	13	0		2	1	1	0		4	1.3		17	5.5
479	8	0		3	1	1	0		5	1.2		13	3.2
480	0	0		0	0	0	0		0	0.0		0	0.0
481	16	3		9	0	0	1		10	1.9		29	5.6
482	2	0		0	0	0	0		0	0.0		2	1.0
483	0	1		1	0	0	0		1	0.5		2	1.0
484	3	1		1	0	0	0		1	0.4		5	1.8
485	11	1		3	3	3	0		9	3.7		21	8.6
486	2	0		2	0	0	0		2	1.1		4	2.3
487	2	0		1	1	1	0		3	0.8		5	1.3
488	11	0		0	0	0	0		0	0.0		11	4.3
489	1	0		0	0	0	0		0	0.0		1	3.2
490	0	0		0	0	0	0		0	0.0		0	0.0
491	0	0		1	0	0	0		1	1.3		1	1.3
492	6	0		10	3	3	0		16	3.8		22	5.3
493	6	0		6	0	0	0		6	1.2		12	2.3
494	7	0		9	3	3	0		15	4.2		22	6.2
495	0	0		0	0	0	0		0	0.0		0	0.0
496	9	3		13	3	3	0		19	2.5		31	4.0
497	3	0		0	0	0	0		0	0.0		3	1.0
498	1	0		0	0	0	0		0	0.0		1	4.3
499	0	0		0	0	0	0		0	0.0		0	0.0
500	2	0		0	0	0	0		0	0.0		2	2.0
501	0	0		0	0	0	0		0	0.0		0	0.0
502	0	0		0	1	1	0		2	7.7		2	7.7
503	3	0		2	0	0	0		2	3.9		5	9.8
504	2	0		1	0	0	0		1	2.9		3	8.6
505	0	0		0	0	0	0		0	0.0		0	0.0
506	0	0		0	0	0	0		0	0.0		0	0.0
507	10	1		1	3	3	0		7	1.9		18	4.8
508	4	0		15	0	0	0		15	2.5		19	3.1
509	1	0		1	0	0	0		1	1.4		2	2.8
510	0	0		1	0	0	0		1	3.6		1	3.6
511	2	0		0	1	1	0		2	2.4		4	4.8
512	0	1		0	0	0	0		0	0.0		1	3.3
513	1	0		0	0	0	0		0	0.0		1	1.4
514	2	0		0	0	0	0		0	0.0		2	3.2
515	2	1		1	0	0	0		1	0.5		4	2.1
516	6	1		4	0	0	0		4	0.7		11	2.1
517	1	0		0	0	0	0		0	0.0		1	4.3
518	0	0		0	0	0	0		0	0.0		0	0.0
519	0	0		0	0	0	0		0	0.0		0	0.0
520	1	0		0	0	0	0		0	0.0		1	1.1
521	1	0		1	0	0	0		1	1.7		2	3.4
522	0	1		0	0	0	0		0	0.0		1	1.2
523	1	0		2	0	0	0		2	1.6		3	2.4
524	7	0		1	1	1	0		3	1.8		10	6.1

	A	B	C	D	E	F	G	H
525	49060	40.1	88	14	15.9		13	
526	49061	35.5	107	12	11.2		12	
527	49064	33.3	276	39	14.1		39	
528	49065	22.9	449	54	12.0		52	
529	49066	62.9	63	7	11.1		7	
530	49067	40.8	298	35	11.7		35	
531	49068	38.6	972	157	16.2		150	
532	49070	34.4	210	24	11.4		22	
533	49071	11.4	720	80	11.1		76	
534	49072	37.4	230	34	14.8		33	
535	49073	45.8	383	51	13.3		42	
536	49075	12.5	11	7	63.6		7	
537	49076	36.9	278	22	7.9		21	
538	49078	35.8	612	95	15.5		92	
539	49079	29.5	1,056	109	10.3		102	
540	49080	25.4	1,168	154	13.2		152	
541	49082	39.0	602	88	14.6		85	
542	49083	20.3	452	59	13.1		57	
543	49085	28.8	1,430	82	5.7		81	
544	49087	26.0	431	45	10.4		44	
545	49088	31.4	270	31	11.5		30	
546	49089	41.7	142	25	17.6		24	
547	49090	33.2	954	154	16.1		148	
548	49091	33.0	1,880	370	19.7		360	
549	49092	50.9	145	16	11.0		16	
550	49093	33.8	1,480	340	23.0		323	
551	49094	45.3	295	57	19.3		56	
552	49095	24.4	108	14	13.0		14	
553	49096	44.5	262	32	12.2		31	
554	49097	30.6	757	92	12.2		92	
555	49098	38.6	461	61	13.2		60	
556	49099	26.0	351	80	22.8		75	
557	49101	29.0	208	20	9.6		20	
558	49102	42.3	91	7	7.7		6	
559	49103	24.2	751	144	19.2		139	
560	49106	18.3	272	27	9.9		26	
561	49107	35.6	731	115	15.7		111	
562	49111	34.8	225	59	26.2		59	
563	49112	21.0	730	51	7.0		50	
564	49113	44.5	127	17	13.4		16	
565	49115	42.5	7	2	28.6		2	
566	49116	59.5	14	0	0.0		0	
567	49117	30.2	197	24	12.2		23	
568	49119	64.3	11	1	9.1		1	
569	49120	33.8	2,812	487	17.3		480	
570	49125	52.7	96	9	9.4		9	
571	49126	26.9	95	28	29.5		28	
572	49127	13.0	714	54	7.6		52	

	I	J	K	L	M	N	O	P	Q	R	S	T	U
525	0	0		1	0	0	0		1	7.1		1	7.1
526	0	0		0	0	0	0		0	0.0		0	0.0
527	0	0		0	0	0	0		0	0.0		0	0.0
528	0	0		2	0	0	0		2	3.7		2	3.7
529	0	0		0	0	0	0		0	0.0		0	0.0
530	0	0		0	0	0	0		0	0.0		0	0.0
531	1	0		5	1	1	0		7	4.5		8	5.1
532	2	0		0	0	0	0		0	0.0		2	8.3
533	2	0		2	0	0	0		2	2.5		4	5.0
534	1	0		0	0	0	0		0	0.0		1	2.9
535	8	0		1	0	0	0		1	2.0		9	17.6
536	0	0		0	0	0	0		0	0.0		0	0.0
537	1	0		0	0	0	0		0	0.0		1	4.5
538	1	0		2	0	0	0		2	2.1		3	3.2
539	0	0		6	1	1	0		8	7.3		8	7.3
540	1	1		0	0	0	0		0	0.0		2	1.3
541	3	0		0	0	0	0		0	0.0		3	3.4
542	1	0		1	0	0	0		1	1.7		2	3.4
543	0	0		1	0	0	0		1	1.2		1	1.2
544	0	0		1	0	0	0		1	2.2		1	2.2
545	1	0		0	0	0	0		0	0.0		1	3.2
546	1	0		0	0	0	0		0	0.0		1	4.0
547	3	0		3	0	0	0		3	1.9		6	3.9
548	7	1		1	0	0	0		1	0.3		9	2.4
549	0	0		0	0	0	0		0	0.0		0	0.0
550	10	3		4	0	0	0		4	1.2		17	5.0
551	1	0		0	0	0	0		0	0.0		1	1.8
552	0	0		0	0	0	0		0	0.0		0	0.0
553	0	1		0	0	0	0		0	0.0		1	3.1
554	0	0		0	0	0	0		0	0.0		0	0.0
555	0	0		1	0	0	0		1	1.6		1	1.6
556	5	0		0	0	0	0		0	0.0		5	6.3
557	0	0		0	0	0	0		0	0.0		0	0.0
558	1	0		0	0	0	0		0	0.0		1	14.3
559	3	0		1	0	0	0		1	0.7		4	2.8
560	0	0		0	0	0	0		0	0.0		0	0.0
561	1	1		1	1	1	0		3	2.6		5	4.3
562	0	0		0	0	0	0		0	0.0		0	0.0
563	0	0		0	1	1	0		2	3.9		2	3.9
564	1	0		0	0	0	0		0	0.0		1	5.9
565	0	0		0	0	0	0		0	0.0		0	0.0
566	0	0		0	0	0	0		0	---		0	---
567	1	0		0	0	0	0		0	0.0		1	4.2
568	0	0		0	0	0	0		0	0.0		0	0.0
569	5	1		1	0	0	0		1	0.2		7	1.4
570	0	0		0	0	0	0		0	0.0		0	0.0
571	0	0		0	0	0	0		0	0.0		0	0.0
572	2	0		0	0	0	0		0	0.0		2	3.7

	A	B	C	D	E	F	G	H
573	49128	42.8	212	29	13.7		26	
574	49129	53.1	27	1	3.7		1	
575	49130	19.9	83	12	14.5		11	
576	49201	26.9	2,651	693	26.1		661	
577	49202	46.2	1,986	536	27.0		508	
578	49203	46.1	3,407	858	25.2		783	
579	49220	33.9	145	33	22.8		33	
580	49221	37.2	2,982	638	21.4		560	
581	49224	45.8	1,065	153	14.4		139	
582	49227	45.3	95	27	28.4		26	
583	49228	55.7	392	45	11.5		43	
584	49229	49.3	181	35	19.3		32	
585	49230	22.4	506	96	19.0		95	
586	49232	35.9	289	59	20.4		57	
587	49233	28.1	174	30	17.2		28	
588	49234	38.3	119	32	26.9		29	
589	49235	49.6	151	28	18.5		25	
590	49236	35.8	312	28	9.0		27	
591	49237	36.9	196	53	27.0		51	
592	49238	54.6	153	26	17.0		25	
593	49240	27.8	587	79	13.5		79	
594	49241	32.1	196	39	19.9		36	
595	49242	40.9	1,032	289	28.0		280	
596	49245	40.9	393	58	14.8		57	
597	49246	23.7	151	40	26.5		39	
598	49247	49.3	405	85	21.0		72	
599	49248	76.0	58	8	13.8		7	
600	49249	18.5	236	41	17.4		40	
601	49250	37.4	475	107	22.5		104	
602	49251	33.5	428	108	25.2		105	
603	49252	42.4	208	50	24.0		50	
604	49253	36.1	162	25	15.4		24	
605	49254	49.6	171	45	26.3		44	
606	49255	53.1	227	24	10.6		23	
607	49256	54.8	318	55	17.3		48	
608	49259	26.7	170	36	21.2		35	
609	49261	---	---	4	---		4	
610	49262	54.2	71	13	18.3		13	
611	49263	53.3	6	0	0.0		0	
612	49264	28.9	135	20	14.8		20	
613	49265	28.1	307	39	12.7		36	
614	49266	37.8	226	64	28.3		63	
615	49267	39.6	247	22	8.9		22	
616	49268	62.6	82	7	8.5		5	
617	49269	28.4	418	73	17.5		71	
618	49270	28.9	347	54	15.6		52	
619	49271	54.7	137	39	28.5		39	
620	49272	33.9	141	22	15.6		22	

	I	J	K	L	M	N	O	P	Q	R	S	T	U
573	1	0		2	0	0	0		2	6.9		3	10.3
574	0	0		0	0	0	0		0	0.0		0	0.0
575	1	0		0	0	0	0		0	0.0		1	8.3
576	21	3		6	1	1	0		8	1.2		32	4.6
577	19	4		5	0	0	0		5	0.9		28	5.2
578	52	6		13	1	1	0		15	1.7		73	8.5
579	0	0		0	0	0	0		0	0.0		0	0.0
580	52	8		14	1	1	0		16	2.5		76	11.9
581	9	0		5	0	0	0		5	3.3		14	9.2
582	1	0		0	0	0	0		0	0.0		1	3.7
583	0	1		1	0	0	0		1	2.2		2	4.4
584	3	0		0	0	0	0		0	0.0		3	8.6
585	1	0		0	0	0	0		0	0.0		1	1.0
586	1	0		1	0	0	0		1	1.7		2	3.4
587	2	0		0	0	0	0		0	0.0		2	6.7
588	0	1		1	1	1	0		3	9.4		4	12.5
589	2	1		0	0	0	0		0	0.0		3	10.7
590	1	0		0	0	0	0		0	0.0		1	3.6
591	2	0		0	0	0	0		0	0.0		2	3.8
592	1	0		0	0	0	0		0	0.0		1	3.8
593	0	0		0	0	0	0		0	0.0		0	0.0
594	2	0		1	0	0	0		1	2.6		3	7.7
595	7	1		1	0	0	0		1	0.3		9	3.1
596	1	0		0	0	0	0		0	0.0		1	1.7
597	1	0		0	0	0	0		0	0.0		1	2.5
598	2	3		6	1	1	0		8	9.4		13	15.3
599	0	1		0	0	0	0		0	0.0		1	12.5
600	1	0		0	0	0	0		0	0.0		1	2.4
601	3	0		0	0	0	0		0	0.0		3	2.8
602	3	0		0	0	0	0		0	0.0		3	2.8
603	0	0		0	0	0	0		0	0.0		0	0.0
604	0	1		0	0	0	0		0	0.0		1	4.0
605	1	0		0	0	0	0		0	0.0		1	2.2
606	1	0		0	0	0	0		0	0.0		1	4.2
607	7	0		0	0	0	0		0	0.0		7	12.7
608	0	0		1	0	0	0		1	2.8		1	2.8
609	0	0		0	0	0	0		0	0.0		0	0.0
610	0	0		0	0	0	0		0	0.0		0	0.0
611	0	0		0	0	0	0		0	---		0	---
612	0	0		0	0	0	0		0	0.0		0	0.0
613	2	1		0	0	0	0		0	0.0		3	7.7
614	1	0		0	0	0	0		0	0.0		1	1.6
615	0	0		0	0	0	0		0	0.0		0	0.0
616	2	0		0	0	0	0		0	0.0		2	28.6
617	2	0		0	0	0	0		0	0.0		2	2.7
618	2	0		0	0	0	0		0	0.0		2	3.7
619	0	0		0	0	0	0		0	0.0		0	0.0
620	0	0		0	0	0	0		0	0.0		0	0.0

	A	B	C	D	E	F	G	H
621	49274	40.3	317	65	20.5		64	
622	49276	66.0	58	5	8.6		5	
623	49277	23.9	237	44	18.6		42	
624	49279	57.6	59	5	8.5		5	
625	49282	6.9	11	10	90.9		10	
626	49283	15.6	187	52	27.8		51	
627	49284	40.4	225	44	19.6		41	
628	49285	34.9	395	81	20.5		77	
629	49286	26.5	1,016	119	11.7		115	
630	49287	29.8	153	13	8.5		11	
631	49288	64.2	116	38	32.8		37	
632	49289	64.9	9	2	22.2		2	
633	49301	13.7	1,477	139	9.4		139	
634	49302	21.0	570	45	7.9		44	
635	49303	30.7	107	9	8.4		9	
636	49304	13.8	230	50	21.7		49	
637	49305	22.0	151	23	15.2		22	
638	49306	9.9	651	66	10.1		66	
639	49307	25.6	1,132	151	13.3		151	
640	49309	15.8	75	9	12.0		9	
641	49310	33.7	251	19	7.6		19	
642	49312	3.2	14	6	42.9		6	
643	49315	17.7	1,597	168	10.5		166	
644	49316	16.7	1,763	160	9.1		156	
645	49318	42.0	106	32	30.2		32	
646	49319	17.1	1,478	222	15.0		218	
647	49320	---	---	4	---		4	
648	49321	8.9	1,462	298	20.4		296	
649	49322	40.4	101	15	14.9		15	
650	49323	13.8	876	44	5.0		42	
651	49325	37.9	161	10	6.2		10	
652	49326	14.4	258	21	8.1		21	
653	49327	22.4	756	94	12.4		93	
654	49328	39.7	312	21	6.7		20	
655	49329	17.8	729	95	13.0		92	
656	49330	30.4	524	113	21.6		110	
657	49331	21.6	1,332	166	12.5		161	
658	49332	22.1	158	19	12.0		19	
659	49333	21.6	1,037	95	9.2		94	
660	49335	71.8	27	0	0.0		0	
661	49336	26.1	367	28	7.6		27	
662	49337	20.6	848	80	9.4		80	
663	49338	14.4	130	20	15.4		20	
664	49339	32.5	178	21	11.8		21	
665	49340	29.0	184	30	16.3		30	
666	49341	14.3	2,878	272	9.5		270	
667	49342	23.3	124	14	11.3		14	
668	49343	22.4	456	64	14.0		63	

	I	J	K	L	M	N	O	P	Q	R	S	T	U
621	0	0		1	0	0	0		1	1.5		1	1.5
622	0	0		0	0	0	0		0	0.0		0	0.0
623	2	0		0	0	0	0		0	0.0		2	4.5
624	0	0		0	0	0	0		0	0.0		0	0.0
625	0	0		0	0	0	0		0	0.0		0	0.0
626	1	0		0	0	0	0		0	0.0		1	1.9
627	2	0		1	0	0	0		1	2.3		3	6.8
628	2	1		1	0	0	0		1	1.2		4	4.9
629	3	0		0	1	1	0		2	1.7		5	4.2
630	2	0		0	0	0	0		0	0.0		2	15.4
631	0	1		0	0	0	0		0	0.0		1	2.6
632	0	0		0	0	0	0		0	0.0		0	0.0
633	0	0		0	0	0	0		0	0.0		0	0.0
634	1	0		0	0	0	0		0	0.0		1	2.2
635	0	0		0	0	0	0		0	0.0		0	0.0
636	1	0		0	0	0	0		0	0.0		1	2.0
637	0	0		0	0	0	0		0	0.0		0	0.0
638	0	0		0	0	0	0		0	0.0		0	0.0
639	0	0		0	0	0	0		0	0.0		0	0.0
640	0	0		0	0	0	0		0	0.0		0	0.0
641	0	0		0	0	0	0		0	0.0		0	0.0
642	0	0		0	0	0	0		0	0.0		0	0.0
643	2	0		0	0	0	0		0	0.0		2	1.2
644	2	0		1	0	0	0		1	0.6		3	1.9
645	0	0		0	0	0	0		0	0.0		0	0.0
646	3	0		1	0	0	0		1	0.5		4	1.8
647	0	0		0	0	0	0		0	0.0		0	0.0
648	2	0		0	0	0	0		0	0.0		2	0.7
649	0	0		0	0	0	0		0	0.0		0	0.0
650	1	0		1	0	0	0		1	2.3		2	4.5
651	0	0		0	0	0	0		0	0.0		0	0.0
652	0	0		0	0	0	0		0	0.0		0	0.0
653	1	0		0	0	0	0		0	0.0		1	1.1
654	1	0		0	0	0	0		0	0.0		1	4.8
655	2	0		0	0	0	0		0	0.0		2	2.1
656	3	0		0	0	0	0		0	0.0		3	2.7
657	5	0		0	0	0	0		0	0.0		5	3.0
658	0	0		0	0	0	0		0	0.0		0	0.0
659	1	0		0	0	0	0		0	0.0		1	1.1
660	0	0		0	0	0	0		0	---		0	---
661	0	0		0	0	0	0		0	0.0		0	0.0
662	0	0		0	0	0	0		0	0.0		0	0.0
663	0	0		0	0	0	0		0	0.0		0	0.0
664	0	0		0	0	0	0		0	0.0		0	0.0
665	0	0		0	0	0	0		0	0.0		0	0.0
666	2	0		0	0	0	0		0	0.0		2	0.7
667	0	0		0	0	0	0		0	0.0		0	0.0
668	1	0		0	0	0	0		0	0.0		1	1.6

	A	B	C	D	E	F	G	H
669	49344	23.0	240	37	15.4		37	
670	49345	27.3	1,084	199	18.4		198	
671	49346	7.4	342	26	7.6		26	
672	49347	29.8	69	8	11.6		8	
673	49348	21.9	1,036	77	7.4		77	
674	49349	20.2	604	65	10.8		64	
675	49401	10.7	1,205	82	6.8		82	
676	49402	11.6	64	14	21.9		14	
677	49403	41.1	154	82	53.2		79	
678	49404	28.6	688	72	10.5		72	
679	49405	34.4	97	16	16.5		15	
680	49406	38.5	35	4	11.4		4	
681	49408	24.4	702	131	18.7		131	
682	49410	16.0	137	22	16.1		20	
683	49411	26.5	71	19	26.8		18	
684	49412	31.3	833	117	14.0		116	
685	49415	19.3	399	74	18.5		74	
686	49417	23.4	2,175	441	20.3		429	
687	49418	13.8	2,255	239	10.6		237	
688	49419	21.6	704	70	9.9		69	
689	49420	36.9	571	188	32.9		184	
690	49421	23.3	427	61	14.3		60	
691	49423	30.3	3,733	729	19.5		693	
692	49424	8.1	4,073	705	17.3		684	
693	49425	23.7	277	47	17.0		45	
694	49426	12.3	3,187	210	6.6		208	
695	49428	3.9	2,046	134	6.5		133	
696	49431	36.8	1,208	256	21.2		239	
697	49435	27.6	243	27	11.1		26	
698	49436	15.3	102	21	20.6		20	
699	49437	24.4	480	75	15.6		72	
700	49440	65.3	74	29	39.2		27	
701	49441	33.8	2,587	486	18.8		453	
702	49442	29.0	3,726	814	21.8		740	
703	49444	42.2	2,571	546	21.2		513	
704	49445	22.1	1,429	206	14.4		202	
705	49446	29.4	210	41	19.5		40	
706	49448	24.7	250	50	20.0		49	
707	49449	29.5	121	36	29.8		36	
708	49450	23.0	378	83	22.0		82	
709	49451	20.9	474	57	12.0		55	
710	49452	18.8	180	26	14.4		26	
711	49453	38.3	154	13	8.4		13	
712	49454	33.2	325	79	24.3		73	
713	49455	31.0	441	122	27.7		120	
714	49456	18.9	1,223	250	20.4		246	
715	49457	17.9	934	125	13.4		121	
716	49458	15.3	5	2	40.0		2	

	I	J	K	L	M	N	O	P	Q	R	S	T	U
669	0	0		0	0	0	0		0	0.0		0	0.0
670	0	0		1	0	0	0		1	0.5		1	0.5
671	0	0		0	0	0	0		0	0.0		0	0.0
672	0	0		0	0	0	0		0	0.0		0	0.0
673	0	0		0	0	0	0		0	0.0		0	0.0
674	1	0		0	0	0	0		0	0.0		1	1.5
675	0	0		0	0	0	0		0	0.0		0	0.0
676	0	0		0	0	0	0		0	0.0		0	0.0
677	2	0		1	0	0	0		1	1.2		3	3.7
678	0	0		0	0	0	0		0	0.0		0	0.0
679	1	0		0	0	0	0		0	0.0		1	6.3
680	0	0		0	0	0	0		0	0.0		0	0.0
681	0	0		0	0	0	0		0	0.0		0	0.0
682	1	0		1	0	0	0		1	4.5		2	9.1
683	1	0		0	0	0	0		0	0.0		1	5.3
684	0	1		0	0	0	0		0	0.0		1	0.9
685	0	0		0	0	0	0		0	0.0		0	0.0
686	6	0		6	0	0	0		6	1.4		12	2.7
687	1	0		1	0	0	0		1	0.4		2	0.8
688	1	0		0	0	0	0		0	0.0		1	1.4
689	2	0		0	2	2	0		4	2.1		6	3.2
690	1	0		0	0	0	0		0	0.0		1	1.6
691	30	2		3	1	1	0		5	0.7		37	5.1
692	15	3		3	0	0	0		3	0.4		21	3.0
693	1	1		0	0	0	0		0	0.0		2	4.3
694	1	0		1	0	0	0		1	0.5		2	1.0
695	1	0		0	0	0	0		0	0.0		1	0.7
696	16	0		1	0	0	0		1	0.4		17	6.6
697	1	0		0	0	0	0		0	0.0		1	3.7
698	1	0		0	0	0	0		0	0.0		1	4.8
699	1	0		2	0	0	0		2	2.7		3	4.0
700	1	0		1	0	0	0		1	3.4		2	6.9
701	14	2		13	4	4	0		21	4.3		37	7.6
702	27	6		30	5	5	0		40	4.9		73	9.0
703	16	3		14	0	0	0		14	2.6		33	6.0
704	2	1		1	0	0	0		1	0.5		4	1.9
705	1	0		0	0	0	0		0	0.0		1	2.4
706	1	0		0	0	0	0		0	0.0		1	2.0
707	0	0		0	0	0	0		0	0.0		0	0.0
708	1	0		0	0	0	0		0	0.0		1	1.2
709	1	0		1	0	0	0		1	1.8		2	3.5
710	0	0		0	0	0	0		0	0.0		0	0.0
711	0	0		0	0	0	0		0	0.0		0	0.0
712	6	0		0	0	0	0		0	0.0		6	7.6
713	1	0		0	1	1	0		2	1.6		3	2.5
714	4	0		0	0	0	0		0	0.0		4	1.6
715	2	0		1	1	1	0		3	2.4		5	4.0
716	0	0		0	0	0	0		0	0.0		0	0.0

	A	B	C	D	E	F	G	H
717	49459	16.9	134	37	27.6		37	
718	49460	14.6	594	88	14.8		87	
719	49461	23.0	560	82	14.6		81	
720	49464	22.3	2,549	269	10.6		265	
721	49503	66.1	3,180	829	26.1		765	
722	49504	58.0	3,696	812	22.0		739	
723	49505	37.8	2,933	581	19.8		553	
724	49506	48.2	2,563	434	16.9		396	
725	49507	58.0	4,361	1309	30.0		1164	
726	49508	3.3	3,459	838	24.2		808	
727	49509	20.6	2,864	726	25.3		713	
728	49512	1.5	1,364	278	20.4		274	
729	49519	*	2,553	480	18.8		467	
730	49525	13.3	1,865	271	14.5		266	
731	49534	*	1,559	174	11.2		173	
732	49544	11.2	662	128	19.3		126	
733	49546	3.7	2,165	418	19.3		410	
734	49548	20.2	2,898	750	25.9		732	
735	49601	29.6	1,744	216	12.4		214	
736	49611	29.1	16	9	56.3		8	
737	49612	23.6	62	11	17.7		11	
738	49613	48.2	30	12	40.0		12	
739	49614	31.9	161	24	14.9		24	
740	49615	19.9	211	34	16.1		34	
741	49616	23.3	134	34	25.4		34	
742	49617	24.6	154	38	24.7		37	
743	49618	16.3	54	3	5.6		3	
744	49619	26.3	65	9	13.8		7	
745	49620	20.8	215	53	24.7		52	
746	49621	16.8	173	26	15.0		25	
747	49622	32.2	129	27	20.9		27	
748	49623	18.8	96	15	15.6		14	
749	49625	33.2	80	21	26.3		20	
750	49626	66.7	29	6	20.7		6	
751	49627	30.7	4	1	25.0		1	
752	49628	62.6	16	5	31.3		5	
753	49629	30.7	101	14	13.9		14	
754	49630	27.3	57	7	12.3		7	
755	49631	24.3	481	93	19.3		88	
756	49632	20.0	75	13	17.3		13	
757	49633	19.9	220	35	15.9		35	
758	49634	66.7	10	0	0.0		0	
759	49635	40.1	144	41	28.5		41	
760	49636	14.6	9	5	55.6		5	
761	49637	13.4	288	77	26.7		77	
762	49638	10.8	35	9	25.7		9	
763	49639	16.7	196	42	21.4		41	
764	49640	28.1	90	21	23.3		21	

	I	J	K	L	M	N	O	P	Q	R	S	T	U
717	0	0		0	0	0	0		0	0.0		0	0.0
718	1	0		0	0	0	0		0	0.0		1	1.1
719	0	0		1	0	0	0		1	1.2		1	1.2
720	3	0		1	0	0	0		1	0.4		4	1.5
721	41	1		14	3	3	0		20	2.4		62	7.5
722	43	1		18	7	7	0		32	3.9		76	9.4
723	18	0		7	2	2	0		11	1.9		29	5.0
724	28	2		7	0	0	0		7	1.6		37	8.5
725	100	3		25	8	8	0		41	3.1		144	11.0
726	26	0		2	0	0	0		2	0.2		28	3.3
727	10	0		2	1	1	0		4	0.6		14	1.9
728	4	0		0	0	0	0		0	0.0		4	1.4
729	9	1		3	0	0	0		3	0.6		13	2.7
730	5	0		0	0	0	0		0	0.0		5	1.8
731	1	0		0	0	0	0		0	0.0		1	0.6
732	2	0		0	0	0	0		0	0.0		2	1.6
733	4	0		4	0	0	0		4	1.0		8	1.9
734	11	0		3	1	1	0		5	0.7		16	2.1
735	0	0		0	0	0	0		0	0.0		0	0.0
736	0	0		1	0	0	0		1	11.1		1	11.1
737	0	0		0	0	0	0		0	0.0		0	0.0
738	0	0		0	0	0	0		0	0.0		0	0.0
739	0	0		0	0	0	0		0	0.0		0	0.0
740	0	0		0	0	0	0		0	0.0		0	0.0
741	0	0		0	0	0	0		0	0.0		0	0.0
742	1	0		0	0	0	0		0	0.0		1	2.6
743	0	0		0	0	0	0		0	0.0		0	0.0
744	2	0		0	0	0	0		0	0.0		2	22.2
745	1	0		0	0	0	0		0	0.0		1	1.9
746	1	0		0	0	0	0		0	0.0		1	3.8
747	0	0		0	0	0	0		0	0.0		0	0.0
748	1	0		0	0	0	0		0	0.0		1	6.7
749	1	0		0	0	0	0		0	0.0		1	4.8
750	0	0		0	0	0	0		0	0.0		0	0.0
751	0	0		0	0	0	0		0	0.0		0	0.0
752	0	0		0	0	0	0		0	0.0		0	0.0
753	0	0		0	0	0	0		0	0.0		0	0.0
754	0	0		0	0	0	0		0	0.0		0	0.0
755	1	0		2	0	0	0		2	2.2		3	3.2
756	0	0		0	0	0	0		0	0.0		0	0.0
757	0	0		0	0	0	0		0	0.0		0	0.0
758	0	0		0	0	0	0		0	---		0	---
759	0	0		0	0	0	0		0	0.0		0	0.0
760	0	0		0	0	0	0		0	0.0		0	0.0
761	0	0		0	0	0	0		0	0.0		0	0.0
762	0	0		0	0	0	0		0	0.0		0	0.0
763	1	0		0	0	0	0		0	0.0		1	2.4
764	0	0		0	0	0	0		0	0.0		0	0.0

	A	B	C	D	E	F	G	H
765	49642	23.3	64	8	12.5		8	
766	49643	9.4	505	120	23.8		120	
767	49644	8.3	61	11	18.0		11	
768	49645	28.4	97	27	27.8		26	
769	49646	13.7	653	101	15.5		101	
770	49648	13.5	96	19	19.8		19	
771	49649	16.7	536	115	21.5		115	
772	49650	10.5	292	65	22.3		64	
773	49651	16.8	524	73	13.9		72	
774	49653	29.6	113	25	22.1		24	
775	49654	36.7	12	1	8.3		1	
776	49655	19.2	241	28	11.6		28	
777	49656	26.0	79	16	20.3		16	
778	49657	33.9	301	32	10.6		32	
779	49659	16.5	555	122	22.0		121	
780	49660	43.1	740	165	22.3		156	
781	49663	23.9	511	57	11.2		57	
782	49664	23.8	90	19	21.1		17	
783	49665	26.7	374	44	11.8		44	
784	49666	30.0	9	2	22.2		2	
785	49667	23.5	28	1	3.6		1	
786	49668	16.7	281	48	17.1		47	
787	49670	30.3	64	17	26.6		17	
788	49675	37.7	32	8	25.0		8	
789	49676	21.1	204	49	24.0		48	
790	49677	27.3	473	115	24.3		111	
791	49679	14.7	79	12	15.2		12	
792	49680	20.7	160	34	21.3		34	
793	49682	20.6	274	64	23.4		64	
794	49683	17.5	120	28	23.3		28	
795	49684	19.1	2,634	599	22.7		590	
796	49685	*	*	30	---		30	
797	49686	17.6	2,091	423	20.2		421	
798	49688	26.3	169	29	17.2		28	
799	49689	16.8	62	16	25.8		16	
800	49690	12.2	301	77	25.6		76	
801	49696	---	---	18	---		18	
802	49701	25.7	54	14	25.9		13	
803	49705	18.2	68	11	16.2		11	
804	49706	17.5	322	79	24.5		79	
805	49707	30.2	1,376	204	14.8		196	
806	49709	20.1	155	23	14.8		23	
807	49710	25.2	15	3	20.0		3	
808	49712	23.9	574	92	16.0		91	
809	49713	23.0	156	26	16.7		26	
810	49715	18.6	239	44	18.4		43	
811	49716	13.0	37	2	5.4		2	
812	49718	33.7	29	5	17.2		5	

	I	J	K	L	M	N	O	P	Q	R	S	T	U
765	0	0		0	0	0	0		0	0.0		0	0.0
766	0	0		0	0	0	0		0	0.0		0	0.0
767	0	0		0	0	0	0		0	0.0		0	0.0
768	1	0		0	0	0	0		0	0.0		1	3.7
769	0	0		0	0	0	0		0	0.0		0	0.0
770	0	0		0	0	0	0		0	0.0		0	0.0
771	0	0		0	0	0	0		0	0.0		0	0.0
772	1	0		0	0	0	0		0	0.0		1	1.5
773	0	0		0	1	1	0		2	2.7		2	2.7
774	1	0		0	0	0	0		0	0.0		1	4.0
775	0	0		0	0	0	0		0	0.0		0	0.0
776	0	0		0	0	0	0		0	0.0		0	0.0
777	0	0		0	0	0	0		0	0.0		0	0.0
778	0	0		0	0	0	0		0	0.0		0	0.0
779	0	0		1	0	0	0		1	0.8		1	0.8
780	6	0		1	0	0	0		1	0.6		7	4.2
781	0	0		0	0	0	0		0	0.0		0	0.0
782	1	1		0	0	0	0		0	0.0		2	10.5
783	0	0		0	0	0	0		0	0.0		0	0.0
784	0	0		0	0	0	0		0	0.0		0	0.0
785	0	0		0	0	0	0		0	0.0		0	0.0
786	1	0		0	0	0	0		0	0.0		1	2.1
787	0	0		0	0	0	0		0	0.0		0	0.0
788	0	0		0	0	0	0		0	0.0		0	0.0
789	1	0		0	0	0	0		0	0.0		1	2.0
790	2	0		0	2	2	0		4	3.5		6	5.2
791	0	0		0	0	0	0		0	0.0		0	0.0
792	0	0		0	0	0	0		0	0.0		0	0.0
793	0	0		0	0	0	0		0	0.0		0	0.0
794	0	0		0	0	0	0		0	0.0		0	0.0
795	5	2		2	0	0	0		2	0.3		9	1.5
796	0	0		0	0	0	0		0	0.0		0	0.0
797	0	1		1	0	0	0		1	0.2		2	0.5
798	1	0		0	0	0	0		0	0.0		1	3.4
799	0	0		0	0	0	0		0	0.0		0	0.0
800	1	0		0	0	0	0		0	0.0		1	1.3
801	0	0		0	0	0	0		0	0.0		0	0.0
802	1	0		0	0	0	0		0	0.0		1	7.1
803	0	0		0	0	0	0		0	0.0		0	0.0
804	0	0		0	0	0	0		0	0.0		0	0.0
805	6	1		1	0	0	0		1	0.5		8	3.9
806	0	0		0	0	0	0		0	0.0		0	0.0
807	0	0		0	0	0	0		0	0.0		0	0.0
808	1	0		0	0	0	0		0	0.0		1	1.1
809	0	0		0	0	0	0		0	0.0		0	0.0
810	0	0		1	0	0	0		1	2.3		1	2.3
811	0	0		0	0	0	0		0	0.0		0	0.0
812	0	0		0	0	0	0		0	0.0		0	0.0

	A	B	C	D	E	F	G	H
813	49719	22.8	65	9	13.8		9	
814	49720	27.2	506	93	18.4		93	
815	49721	26.8	831	165	19.9		161	
816	49722	47.2	12	3	25.0		3	
817	49724	23.8	75	10	13.3		10	
818	49725	19.9	14	1	7.1		1	
819	49726	14.0	36	3	8.3		3	
820	49727	25.0	474	90	19.0		90	
821	49728	18.5	15	2	13.3		2	
822	49729	33.2	78	6	7.7		6	
823	49730	14.6	148	23	15.5		23	
824	49733	15.6	116	19	16.4		19	
825	49735	11.2	1,421	252	17.7		252	
826	49736	20.5	22	2	9.1		2	
827	49738	21.8	567	62	10.9		61	
828	49740	24.2	295	53	18.0		53	
829	49743	34.9	34	5	14.7		5	
830	49744	30.9	51	4	7.8		4	
831	49745	50.7	46	16	34.8		16	
832	49746	18.9	202	35	17.3		35	
833	49747	21.0	84	12	14.3		12	
834	49748	24.9	4	2	50.0		2	
835	49749	14.8	241	36	14.9		35	
836	49751	17.7	110	18	16.4		18	
837	49752	9.0	34	4	11.8		4	
838	49753	20.7	120	18	15.0		18	
839	49755	26.2	124	14	11.3		14	
840	49756	10.8	153	32	20.9		30	
841	49757	53.8	31	3	9.7		3	
842	49759	14.0	90	14	15.6		14	
843	49760	25.4	32	8	25.0		8	
844	49762	22.1	21	1	4.8		1	
845	49764	29.3	10	8	80.0		8	
846	49765	26.8	271	49	18.1		48	
847	49766	24.7	161	12	7.5		12	
848	49768	10.9	19	1	5.3		1	
849	49769	30.3	127	25	19.7		25	
850	49770	31.6	1,118	176	15.7		176	
851	49774	26.6	115	15	13.0		15	
852	49775	29.3	3	0	0.0		0	
853	49776	31.0	122	18	14.8		17	
854	49777	17.7	45	5	11.1		5	
855	49779	38.1	198	44	22.2		44	
856	49780	23.6	137	20	14.6		19	
857	49781	28.1	260	69	26.5		68	
858	49782	18.2	16	5	31.3		5	
859	49783	39.7	1,374	262	19.1		260	
860	49788	15.6	293	73	24.9		73	

	I	J	K	L	M	N	O	P	Q	R	S	T	U
813	0	0		0	0	0	0		0	0.0		0	0.0
814	0	0		0	0	0	0		0	0.0		0	0.0
815	3	0		1	0	0	0		1	0.6		4	2.4
816	0	0		0	0	0	0		0	0.0		0	0.0
817	0	0		0	0	0	0		0	0.0		0	0.0
818	0	0		0	0	0	0		0	0.0		0	0.0
819	0	0		0	0	0	0		0	0.0		0	0.0
820	0	0		0	0	0	0		0	0.0		0	0.0
821	0	0		0	0	0	0		0	0.0		0	0.0
822	0	0		0	0	0	0		0	0.0		0	0.0
823	0	0		0	0	0	0		0	0.0		0	0.0
824	0	0		0	0	0	0		0	0.0		0	0.0
825	0	0		0	0	0	0		0	0.0		0	0.0
826	0	0		0	0	0	0		0	0.0		0	0.0
827	1	0		0	0	0	0		0	0.0		1	1.6
828	0	0		0	0	0	0		0	0.0		0	0.0
829	0	0		0	0	0	0		0	0.0		0	0.0
830	0	0		0	0	0	0		0	0.0		0	0.0
831	0	0		0	0	0	0		0	0.0		0	0.0
832	0	0		0	0	0	0		0	0.0		0	0.0
833	0	0		0	0	0	0		0	0.0		0	0.0
834	0	0		0	0	0	0		0	0.0		0	0.0
835	1	0		0	0	0	0		0	0.0		1	2.8
836	0	0		0	0	0	0		0	0.0		0	0.0
837	0	0		0	0	0	0		0	0.0		0	0.0
838	0	0		0	0	0	0		0	0.0		0	0.0
839	0	0		0	0	0	0		0	0.0		0	0.0
840	2	0		0	0	0	0		0	0.0		2	6.3
841	0	0		0	0	0	0		0	0.0		0	0.0
842	0	0		0	0	0	0		0	0.0		0	0.0
843	0	0		0	0	0	0		0	0.0		0	0.0
844	0	0		0	0	0	0		0	0.0		0	0.0
845	0	0		0	0	0	0		0	0.0		0	0.0
846	1	0		0	0	0	0		0	0.0		1	2.0
847	0	0		0	0	0	0		0	0.0		0	0.0
848	0	0		0	0	0	0		0	0.0		0	0.0
849	0	0		0	0	0	0		0	0.0		0	0.0
850	0	0		0	0	0	0		0	0.0		0	0.0
851	0	0		0	0	0	0		0	0.0		0	0.0
852	0	0		0	0	0	0		0	---		0	---
853	1	0		0	0	0	0		0	0.0		1	5.6
854	0	0		0	0	0	0		0	0.0		0	0.0
855	0	0		0	0	0	0		0	0.0		0	0.0
856	0	0		1	0	0	0		1	5.0		1	5.0
857	1	0		0	0	0	0		0	0.0		1	1.4
858	0	0		0	0	0	0		0	0.0		0	0.0
859	1	0		1	0	0	0		1	0.4		2	0.8
860	0	0		0	0	0	0		0	0.0		0	0.0

	A	B	C	D	E	F	G	H
861	49791	70.0	17	5	29.4		5	
862	49792	22.2	*	1	---		1	
863	49793	33.8	8	0	0.0		0	
864	49795	16.3	125	33	26.4		32	
865	49796	47.6	10	2	20.0		2	
866	49799	14.5	140	27	19.3		26	
867	49801	42.2	675	139	20.6		139	
868	49802	43.1	391	74	18.9		74	
869	49805	75.0	24	4	16.7		4	
870	49806	34.3	21	2	9.5		2	
871	49807	27.6	230	21	9.1		21	
872	49808	26.4	9	3	33.3		3	
873	49812	37.5	51	9	17.6		9	
874	49814	30.5	87	9	10.3		8	
875	49815	37.5	29	7	24.1		7	
876	49816	37.6	30	5	16.7		5	
877	49817	29.8	33	5	15.2		5	
878	49818	24.7	57	6	10.5		6	
879	49820	23.7	16	4	25.0		4	
880	49821	36.6	101	11	10.9		10	
881	49822	15.4	14	0	0.0		0	
882	49825	35.5	20	0	0.0		0	
883	49826	22.2	5	0	0.0		0	
884	49827	31.1	66	9	13.6		9	
885	49829	46.0	1,228	236	19.2		225	
886	49831	57.1	49	15	30.6		15	
887	49833	17.6	17	3	17.6		3	
888	49834	32.4	24	4	16.7		4	
889	49835	32.0	47	5	10.6		5	
890	49836	31.1	38	9	23.7		9	
891	49837	34.7	650	103	15.8		100	
892	49838	21.2	21	6	28.6		6	
893	49839	33.3	6	4	66.7		4	
894	49840	19.1	41	9	22.0		9	
895	49841	12.4	583	95	16.3		93	
896	49847	45.3	52	16	30.8		14	
897	49848	43.8	6	1	16.7		0	
898	49849	48.5	921	118	12.8		112	
899	49852	71.8	9	3	33.3		3	
900	49853	23.4	66	10	15.2		10	
901	49854	37.7	378	78	20.6		77	
902	49855	30.7	1,591	179	11.3		177	
903	49858	43.4	703	140	19.9		129	
904	49861	34.0	18	4	22.2		4	
905	49862	35.8	246	54	22.0		54	
906	49863	57.8	9	3	33.3		3	
907	49866	40.2	654	49	7.5		47	
908	49868	32.9	301	78	25.9		78	

	I	J	K	L	M	N	O	P	Q	R	S	T	U
861	0	0		0	0	0	0		0	0.0		0	0.0
862	0	0		0	0	0	0		0	0.0		0	0.0
863	0	0		0	0	0	0		0	---		0	---
864	1	0		0	0	0	0		0	0.0		1	3.0
865	0	0		0	0	0	0		0	0.0		0	0.0
866	1	0		0	0	0	0		0	0.0		1	3.7
867	0	0		0	0	0	0		0	0.0		0	0.0
868	0	0		0	0	0	0		0	0.0		0	0.0
869	0	0		0	0	0	0		0	0.0		0	0.0
870	0	0		0	0	0	0		0	0.0		0	0.0
871	0	0		0	0	0	0		0	0.0		0	0.0
872	0	0		0	0	0	0		0	0.0		0	0.0
873	0	0		0	0	0	0		0	0.0		0	0.0
874	1	0		0	0	0	0		0	0.0		1	11.1
875	0	0		0	0	0	0		0	0.0		0	0.0
876	0	0		0	0	0	0		0	0.0		0	0.0
877	0	0		0	0	0	0		0	0.0		0	0.0
878	0	0		0	0	0	0		0	0.0		0	0.0
879	0	0		0	0	0	0		0	0.0		0	0.0
880	0	0		1	0	0	0		1	9.1		1	9.1
881	0	0		0	0	0	0		0	---		0	---
882	0	0		0	0	0	0		0	---		0	---
883	0	0		0	0	0	0		0	---		0	---
884	0	0		0	0	0	0		0	0.0		0	0.0
885	10	0		0	0	0	0		0	0.0		10	4.2
886	0	0		0	0	0	0		0	0.0		0	0.0
887	0	0		0	0	0	0		0	0.0		0	0.0
888	0	0		0	0	0	0		0	0.0		0	0.0
889	0	0		0	0	0	0		0	0.0		0	0.0
890	0	0		0	0	0	0		0	0.0		0	0.0
891	2	0		1	0	0	0		1	1.0		3	2.9
892	0	0		0	0	0	0		0	0.0		0	0.0
893	0	0		0	0	0	0		0	0.0		0	0.0
894	0	0		0	0	0	0		0	0.0		0	0.0
895	1	0		1	0	0	0		1	1.1		2	2.1
896	1	0		0	0	0	0		0	0.0		1	6.3
897	1	0		0	0	0	0		0	0.0		1	100.0
898	0	1		5	0	0	0		5	4.2		6	5.1
899	0	0		0	0	0	0		0	0.0		0	0.0
900	0	0		0	0	0	0		0	0.0		0	0.0
901	0	0		1	0	0	0		1	1.3		1	1.3
902	0	1		1	0	0	0		1	0.6		2	1.1
903	8	1		2	0	0	0		2	1.4		11	7.9
904	0	0		0	0	0	0		0	0.0		0	0.0
905	0	0		0	0	0	0		0	0.0		0	0.0
906	0	0		0	0	0	0		0	0.0		0	0.0
907	1	0		1	0	0	0		1	2.0		2	4.1
908	0	0		0	0	0	0		0	0.0		0	0.0

	A	B	C	D	E	F	G	H
909	49870	51.6	229	49	21.4		49	
910	49871	60.8	37	2	5.4		2	
911	49872	58.8	12	3	25.0		3	
912	49873	27.1	11	2	18.2		2	
913	49874	29.4	49	10	20.4		10	
914	49876	22.0	84	12	14.3		11	
915	49877	52.8	4	0	0.0		0	
916	49878	27.4	157	29	18.5		28	
917	49879	36.0	69	0	0.0		0	
918	49880	36.8	49	4	8.2		4	
919	49881	24.1	13	3	23.1		3	
920	49883	28.3	6	1	16.7		1	
921	49884	15.9	33	9	27.3		9	
922	49885	22.5	124	8	6.5		7	
923	49886	40.8	24	4	16.7		4	
924	49887	36.4	116	18	15.5		18	
925	49891	37.6	53	8	15.1		8	
926	49892	34.1	86	13	15.1		13	
927	49893	26.1	85	17	20.0		17	
928	49894	39.5	34	7	20.6		6	
929	49895	18.4	37	9	24.3		8	
930	49896	27.8	159	28	17.6		27	
931	49901	85.8	19	6	31.6		5	
932	49902	69.2	3	3	100.0		3	
933	49903	67.0	6	3	50.0		3	
934	49905	56.0	254	50	19.7		50	
935	49908	30.5	181	57	31.5		56	
936	49910	33.4	13	0	0.0		0	
937	49911	58.8	171	28	16.4		28	
938	49912	50.6	44	11	25.0		11	
939	49913	75.6	603	142	23.5		133	
940	49915	69.3	58	12	20.7		12	
941	49916	37.0	196	40	20.4		40	
942	49917	84.8	15	2	13.3		2	
943	49918	69.3	2	1	50.0		1	
944	49919	36.9	15	1	6.7		1	
945	49920	41.6	185	50	27.0		50	
946	49921	57.9	18	7	38.9		7	
947	49922	35.5	92	12	13.0		11	
948	49925	43.0	12	2	16.7		2	
949	49927	53.4	34	2	5.9		2	
950	49929	70.2	16	0	0.0		0	
951	49930	56.5	571	127	22.2		126	
952	49931	38.0	410	109	26.6		109	
953	49934	88.8	43	14	32.6		14	
954	49935	42.8	330	66	20.0		63	
955	49938	63.6	486	86	17.7		84	
956	49942	89.0	17	1	5.9		1	

	I	J	K	L	M	N	O	P	Q	R	S	T	U
909	0	0		0	0	0	0		0	0.0		0	0.0
910	0	0		0	0	0	0		0	0.0		0	0.0
911	0	0		0	0	0	0		0	0.0		0	0.0
912	0	0		0	0	0	0		0	0.0		0	0.0
913	0	0		0	0	0	0		0	0.0		0	0.0
914	0	0		1	0	0	0		1	8.3		1	8.3
915	0	0		0	0	0	0		0	---		0	---
916	1	0		0	0	0	0		0	0.0		1	3.4
917	0	0		0	0	0	0		0	---		0	---
918	0	0		0	0	0	0		0	0.0		0	0.0
919	0	0		0	0	0	0		0	0.0		0	0.0
920	0	0		0	0	0	0		0	0.0		0	0.0
921	0	0		0	0	0	0		0	0.0		0	0.0
922	1	0		0	0	0	0		0	0.0		1	12.5
923	0	0		0	0	0	0		0	0.0		0	0.0
924	0	0		0	0	0	0		0	0.0		0	0.0
925	0	0		0	0	0	0		0	0.0		0	0.0
926	0	0		0	0	0	0		0	0.0		0	0.0
927	0	0		0	0	0	0		0	0.0		0	0.0
928	1	0		0	0	0	0		0	0.0		1	14.3
929	0	0		0	1	1	0		2	22.2		2	22.2
930	1	0		0	0	0	0		0	0.0		1	3.6
931	1	0		0	0	0	0		0	0.0		1	16.7
932	0	0		0	0	0	0		0	0.0		0	0.0
933	0	0		0	0	0	0		0	0.0		0	0.0
934	0	0		0	0	0	0		0	0.0		0	0.0
935	1	0		0	0	0	0		0	0.0		1	1.8
936	0	0		0	0	0	0		0	---		0	---
937	0	0		0	0	0	0		0	0.0		0	0.0
938	0	0		0	0	0	0		0	0.0		0	0.0
939	4	0		3	1	1	0		5	3.5		9	6.3
940	0	0		0	0	0	0		0	0.0		0	0.0
941	0	0		0	0	0	0		0	0.0		0	0.0
942	0	0		0	0	0	0		0	0.0		0	0.0
943	0	0		0	0	0	0		0	0.0		0	0.0
944	0	0		0	0	0	0		0	0.0		0	0.0
945	0	0		0	0	0	0		0	0.0		0	0.0
946	0	0		0	0	0	0		0	0.0		0	0.0
947	0	0		1	0	0	0		1	8.3		1	8.3
948	0	0		0	0	0	0		0	0.0		0	0.0
949	0	0		0	0	0	0		0	0.0		0	0.0
950	0	0		0	0	0	0		0	---		0	---
951	1	0		0	0	0	0		0	0.0		1	0.8
952	0	0		0	0	0	0		0	0.0		0	0.0
953	0	0		0	0	0	0		0	0.0		0	0.0
954	3	0		0	0	0	0		0	0.0		3	4.5
955	2	0		0	0	0	0		0	0.0		2	2.3
956	0	0		0	0	0	0		0	0.0		0	0.0

	A	B	C	D	E	F	G	H
957	49945	49.1	168	46	27.4		44	
958	49946	33.9	286	72	25.2		72	
959	49947	33.3	30	3	10.0		3	
960	49948	58.7	27	5	18.5		4	
961	49950	52.7	60	14	23.3		13	
962	49952	29.5	9	3	33.3		3	
963	49953	43.8	121	19	15.7		19	
964	49955	85.9	23	9	39.1		9	
965	49958	43.3	78	14	17.9		14	
966	49959	74.0	12	4	33.3		4	
967	49960	66.2	11	3	27.3		3	
968	49961	44.1	2	1	50.0		1	
969	49962	42.0	4	0	0.0		0	
970	49963	61.5	91	19	20.9		18	
971	49965	39.1	11	4	36.4		4	
972	49967	48.9	24	1	4.2		1	
973	49968	53.6	122	10	8.2		10	
974	49969	20.8	78	23	29.5		23	
975	49970	59.4	7	3	42.9		3	
976	49971	8.4	25	7	28.0		6	
977	Po Box or Unknown	---	---	68	---		67	
978	Total	27.0	710,976	143,123	20.1		136,152	0
979								
980	*No census data available							
981	Sources: US Census Bureau, Census 2010 (ZIP Populations) and Census 2000 (Pre-1950 Housing)							
982	MDCH Data Warehouse (children tested and elevated levels).							

	I	J	K	L	M	N	O	P	Q	R	S	T	U
957	0	0		0	1	1	0		2	4.3		2	4.3
958	0	0		0	0	0	0		0	0.0		0	0.0
959	0	0		0	0	0	0		0	0.0		0	0.0
960	1	0		0	0	0	0		0	0.0		1	20.0
961	1	0		0	0	0	0		0	0.0		1	7.1
962	0	0		0	0	0	0		0	0.0		0	0.0
963	0	0		0	0	0	0		0	0.0		0	0.0
964	0	0		0	0	0	0		0	0.0		0	0.0
965	0	0		0	0	0	0		0	0.0		0	0.0
966	0	0		0	0	0	0		0	0.0		0	0.0
967	0	0		0	0	0	0		0	0.0		0	0.0
968	0	0		0	0	0	0		0	0.0		0	0.0
969	0	0		0	0	0	0		0	---		0	---
970	1	0		0	0	0	0		0	0.0		1	5.3
971	0	0		0	0	0	0		0	0.0		0	0.0
972	0	0		0	0	0	0		0	0.0		0	0.0
973	0	0		0	0	0	0		0	0.0		0	0.0
974	0	0		0	0	0	0		0	0.0		0	0.0
975	0	0		0	0	0	0		0	0.0		0	0.0
976	1	0		0	0	0	0		0	0.0		1	14.3
977	0	0		1	0	0	0	1	2	2.9		1	1.5
978	2,119	212	0	2,050	387	277	8	1	2,723	1.9		5,053	3.5
979													
980													
981													
982													July 21, 2015

From: Stanbury, Martha (DHHS)
Sent: Thursday, December 10, 2015 2:34 PM
To: Mona Hanna-Attisha
Cc: Dykema, Linda D. (DHHS);Scott, Robert L. (DHHS)
Subject: DUA amendment lead/flint
Attachments: amendment DUA hannaattisha 12.10.15.docx

I have put your request into a document for your signature. Please review and let me know if you would like any changes. Once I have your OK and signature I will forward through our chain of command to our legal department for review and approval. Thanks.

Martha Stanbury, MSPH
Division of Environmental Health
Michigan Department of Health and Human Services
PO Box 30195, Lansing, MI 48909
517-335-8364
stanburym@michigan.gov

Amendment to
Data Use and Non-Disclosure Agreement (DUA) Concerning
Protected Health Information or Other Confidential Information
for Project Titled:
"Analysis of Pediatric Blood Lead levels in Flint Michigan" (Data Recipient: Mona Hanna-Attisha, MD)

This Agreement is amended to expand the data request as follows:

1) Provide data since September 15, 2015(end date specified in signed DUA) to present and then updated every two weeks until the expiration of the approved Institutional Review Board in both institutions.
2) Provide data to include all Genesee county children less than 72 months at the time of testing.

All other conditions of the approved DUA remain in effect.

I, the data recipient have read, understand, and agree to the above amendments

DATA RECIPIENT SIGNATURE

Mona Hanna-Attisha, MD, MPH Director, Pediatric Residency Program, Hurley Children's Hospital
Name of Responsible Data Recipient Title

_____
Signature of Data Recipient Date

MDHHS SIGNATURES:

MDHHS SPONSOR

Robert Scott Departmental Specialist
Name of Responsible MDHHS Sponsor Title

_____
Signature of Responsible MDHHS Sponsor Date

MDHHS RESPONSIBLE PARTY

Linda Dykema Director, Division of Environmental Health
Name Title

_____
Signature Date

From: Peeler, Nancy (DHHS)
Sent: Thursday, December 10, 2015 4:22 PM
To: Travis, Rashmi (DHHS)
Cc: Dykema, Linda D. (DHHS);Moran, Susan (DHHS)
Subject: case management for children in Flint/Genesee older than age 5.
Attachments: REVISED GCHD Contract.Flint water 11.18.15.docx

Importance: High

Hi Rashmi, in response to your inquiry:

- The list being send to GCHD for case management was originally developed based on instructions we received from Administration; Bob and I were asked to include 0-5 year olds with an EBL >=5, living in the identified high risk zip codes (I believe it is zip codes 01-07, but Bob can confirm that detail). To my knowledge, those are still the parameters for the list that is being used.
- We estimated the number of children potentially needing case management, and requested an amount of special 'Flint water' CM funding, based on the size of this list.
- We support the focus on the youngest children because of the disproportionate impact lead exposure has on their growth, learning, and development. This impact starts to decrease dramatically around age 6 because of change in behavior, change in growth and development, etc.
- The current 'Flint water' contract language does speak to providing services to children on the list (see attached).
- In response to an inquiry from the GCHD CM Supervisor about a child with and EBL of 4, we did agree that there will be unusual circumstances that they encounter, for children not on the list, in which they should use their discretion about providing CM under the 'Flint water' contract. I sent them an email to this effect, which I forwarded to you earlier today.

- Simultaneous to the above activity, the Surveillance staff continue to send GCHD a weekly list of ALL elevated BLLs in the entire county, as required by PH Code.
- Children with EBLs older than age 5 are included on that regular weekly list.
- Medicaid Policy is in effect for GCHD (any health department) to bill for 2 'Nursing Assessment' visits (e.g. what we call Case Management) for any child with an EBL >= 5.
- Therefore, the components are already in place for GCHD to provide and bill for CM for older children (in fact all ages of children, throughout the entire county). The difference is that the activity wouldn't be part of the 'Flint water' contract.
- An issue could be if they identify an older child for whom they feel CM is critical, who is not enrolled in Medicaid.

I hope the above information is helpful – please let me know what questions you have. I'm not sure there is a problem or barrier, but if one is identified, I'm confident we can figure out a good way to deal with it!

Nancy

CHILDHOOD LEAD POISONING PREVENTION PROGRAM
Child Elevated Lead Case Management
SPECIAL REQUIREMENTS - REVISED
(Genesse County Health Department)

Purpose:

Grantee activities funded by the Department are expected to be focused on case management and intervention activities for children < age 6 identified with confirmed elevated blood lead levels (≥ 5 ug/dL) since April 2014 and ongoing through FY2016. These funds are intended to augment, not replace, services billable to Medicaid. This is one time funding.

Funding requirements:

1. Funds may be used only for the following purposes:
   a. Administrative support and data entry documentation/reporting for any services rendered under this contract.
   b. For children insured by Medicaid, testing, nursing visits and case management services beyond those billable to Medicaid.
   c. For children not insured by Medicaid, testing and all nursing visits and other case management services provided.
   d. Funds may be used to provide Case Management services to residents of the City of Flint or Genesee County, for children who live in a home using City of Flint water, or who attend school, childcare or often spend time with a caregiver in the City of Flint.

Grantee Requirements:

1. Regular and ongoing Supervision will be provided by GCHD to all nurses providing services under this contract, with additional support available from the CLPPP Nurse as needed.
2. The CLPPP Case Management protocol will be utilized to assure comprehensive services.
3. All nurses providing services funded through this contract must participate in Lead Poisoning Prevention Case Management training prior to providing such services. Training will be coordinated and delivered jointly by CLPPP and GCHD Lead Nurse.
4. All nurses providing services funded through this contract must participate in training to use the Healthy Homes and Lead Poisoning Surveillance System (HHLPSS) to appropriately document services rendered.
5. Grantee must bill Medicaid for services rendered to Medicaid-insured children, for the maximum amount possible. For specific information on Medicaid covered services, please refer to the Medicaid Provider Manual.
6. In providing case management services related to elevated blood lead levels dating back to April 2014, Grantee will utilize lists provided by CLPPP and contact and offer a full complement of case management services to:
   a. Families of all children with capillary results of ≥ **5 ug/dL** that have not yet been confirmed by venous blood draw.
   b. Families of all children with venous results ≥ **5 ug/dL** that are due for follow-up testing to monitor their lead levels.

7. Each child in the jurisdiction with a new blood lead level ≥ **5 ug/dL** will be offered a full complement of case management services. Refer to Medicaid policy for an explanation of required services.
8. To the maximum extent allowed by law, nurses providing services funded through this contract will coordinate activities with EBL Investigators assigned to the same cases, including joint, coordinated home visits and exchange of information that supports each to carry out their duties in carrying out this public health activity.

Required Reporting:

1. On a weekly basis, Grantee will document all family contacts, case management activities, communications and Medicaid billing in the Healthy Homes and Lead Poisoning Surveillance System (HHLPSS), in a manner prescribed by the Department CLPPP.
2. Grantee must participate in a minimum of weekly review and status conference calls as scheduled by the Department CLPPP.

Metrics for Contract Monitoring

Contract monitoring will be based on data recorded in the Healthy Homes and Lead Poisoning Surveillance System (HHLPSS), Medicaid Claims data from the MDHHS data warehouse, and via weekly review and status calls.E

1. Number and percentage of target children with elevated blood lead levels of ≥ **5 ug/dL** for whom contact has been attempted.
2. Number and percentage of target children with elevated blood lead levels of ≥ **5 ug/dL** that are successfully contacted and offered case management services.
3. Number and percentage of target children receiving case management services.
4. Number and percentage of target children receiving case management services residing in the City of Flint.
5. Number of Medicaid claims filed for children enrolled in Medicaid who receive testing or nursing assessment visits.

Prohibited expenditures:

1. Billable services for children insured by Medicaid.
2. Purchase of or distribution of water filters.
3. Childhood Lead Poisoning Prevention funds may not be used to fund other local public health operations.

From: Stanbury, Martha (DHHS)
Sent: Thursday, December 10, 2015 5:38 PM
To: Dykema, Linda D. (DHHS)
Cc: Scott, Robert L. (DHHS)
Subject: FW: PDF map of flint
Attachments: fint 121015.pdf

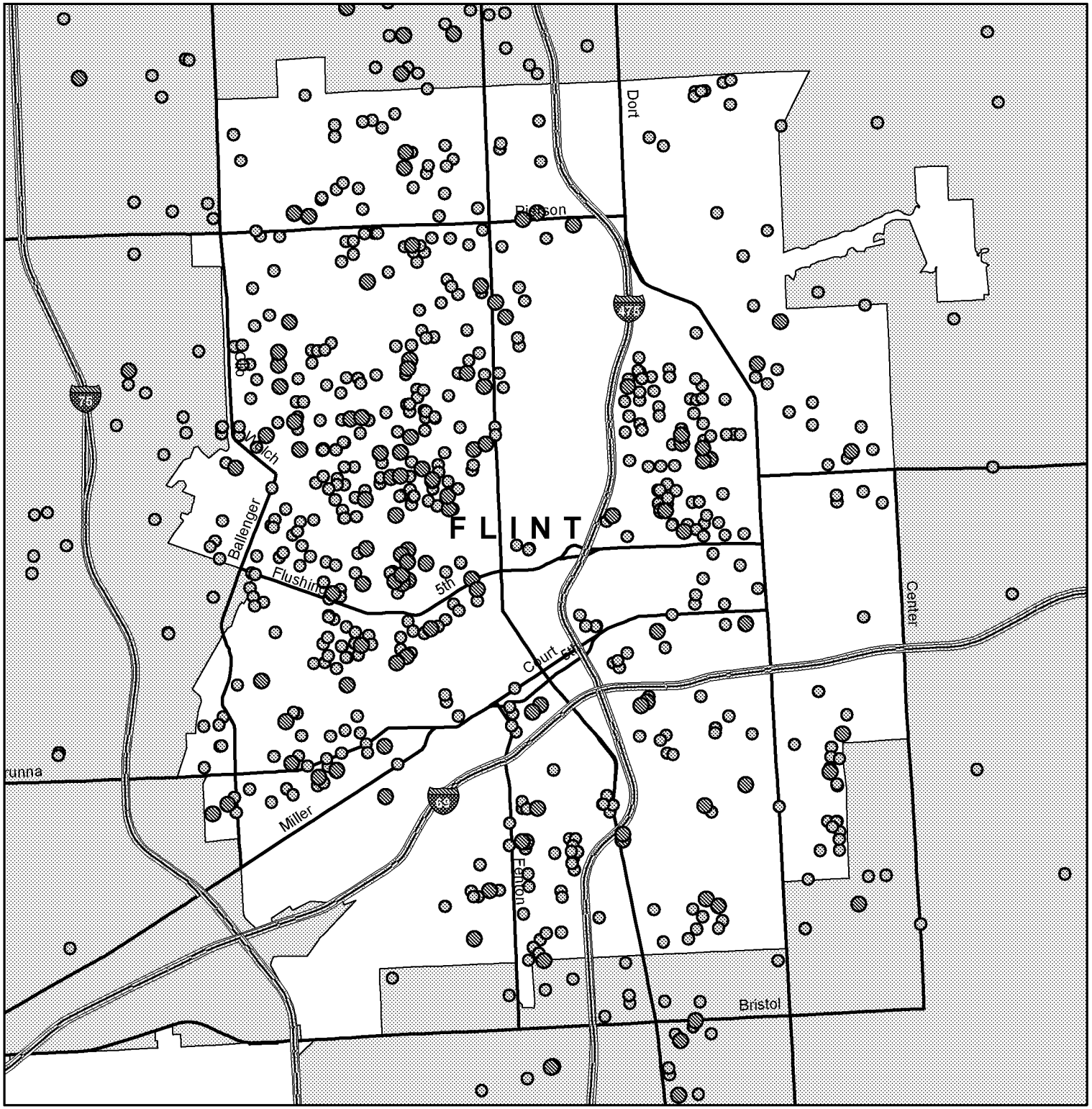
GCHD requested a map with kids with elevated BLLs. They want to use it in a presentation, as I understand it.. Please see attached. Does this violate confidentiality?

From: Scott, Robert L. (DHHS)
Sent: Thursday, December 10, 2015 5:32 PM
To: Stanbury, Martha (DHHS) <stanburym@michigan.gov>
Subject: PDF map of flint

Please see attached.

Robert L. Scott
Childhood Lead Poisoning Prevention Program
Michigan Department of Health & Human Services
(517) 335-8178
fax (517) 335-8509

Flint Area
Children with Elevated Blood Lead Levels
2010-2014



Source: MDCH Data Warehouse,
Lead Specimen table

December 10, 2015

From: Mona Hanna-Attisha <MHanna1@hurleymc.com>
Sent: Friday, December 11, 2015 9:48 AM
To: Stanbury, Martha (DHHS);Jenny LaChance
Cc: Dykema, Linda D. (DHHS);Scott, Robert L. (DHHS)
Subject: RE: DUA amendment lead/flint
Attachments: 20151211094613.pdf

Signed and attached. Thanks! Mona

From: Stanbury, Martha (DHHS) [mailto:stanburym@michigan.gov]
Sent: Thursday, December 10, 2015 2:34 PM
To: Mona Hanna-Attisha
Cc: Dykema, Linda D. (DHHS); Scott, Robert L. (DHHS)
Subject: DUA amendment lead/flint

I have put your request into a document for your signature. Please review and let me know if you would like any changes. Once I have your OK and signature I will forward through our chain of command to our legal department for review and approval. Thanks.

Martha Stanbury, MSPH
Division of Environmental Health
Michigan Department of Health and Human Services
PO Box 30195, Lansing, MI 48909
517-335-8364
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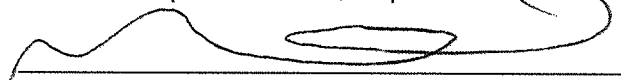
DATA RECIPIENT SIGNATURE

Mona Hanna-Attisha, MD, MPH — Director, Pediatric Residency Program, Hurley Children's Hospital
Name of Responsible Data Recipient — Title



12/11/15
Signature of Data Recipient — Date

MDHHS SIGNATURES:

MDHHS SPONSOR

Robert Scott — Departmental Specialist
Name of Responsible MDHHS Sponsor — Title

Signature of Responsible MDHHS Sponsor — Date

MDHHS RESPONSIBLE PARTY

Linda Dykema — Director, Division of Environmental Health
Name — Title

Signature — Date

From: Stanbury, Martha (DHHS)
Sent: Monday, December 14, 2015 9:16 AM
To: Dykema, Linda D. (DHHS)
Cc: Scott, Robert L. (DHHS)
Subject: FW: PDF map of flint

Bob is going to do option 3, and let them know if they want to use it for other things, then we will have to work on the map.

From: Scott, Robert L. (DHHS)
Sent: Monday, December 14, 2015 8:38 AM
To: Stanbury, Martha (DHHS) <stanburym@michigan.gov>
Subject: RE: PDF map of flint

Option 3 was the presenter's intention as far as I know. We could stipulate "no hard copy, no posting" as a condition of providing them the map.

From: Stanbury, Martha (DHHS)
Sent: Friday, December 11, 2015 3:14 PM
To: Scott, Robert L. (DHHS) <ScottR9@michigan.gov>
Subject: FW: PDF map of flint

I guess this makes your life a little more complicated. Let's discuss.

From: Miller, Corinne (DHHS)
Sent: Friday, December 11, 2015 2:19 PM
To: Dykema, Linda D. (DHHS) <DykemaL@michigan.gov>
Cc: Stanbury, Martha (DHHS) <stanburym@michigan.gov>; Scott, Robert L. (DHHS) <ScottR9@michigan.gov>
Subject: RE: PDF map of flint

If the observations are geocoded to the street address, I would be uncomfortable sharing it as part of a public presentation except under three options:

1) The "point" is randomized. That can be done and still preserve clustering, which is what I think the county wants to show. The map label can indicate that the locations have been adjusted for confidentiality purposes. Someone on the fifth floor could help with randomization if needed.
2) Have attendees sign a confidentiality agreement but that is not going to be possible if there are more than a handful in the audience.
3) Show the map for a limited amount of time but attendees are not provided a hard copy and the map is not posted on a web site.

It helps that the data cover multiple years.

Option 1 is preferred for a public presentation. Option 3 is also doable. If the presentation is just to health department staff I don't see a problem in presenting the information as is.

From: Dykema, Linda D. (DHHS)
Sent: Friday, December 11, 2015 8:42 AM

To: Miller, Corinne (DHHS) <MillerC39@michigan.gov>
Cc: Stanbury, Martha (DHHS) <stanburym@michigan.gov>; Scott, Robert L. (DHHS) <ScottR9@michigan.gov>
Subject: FW: PDF map of flint

Corinne,

Please see the attached map. I don't see it as violating confidentiality, but I've no expertise in this. Should this be sent to Colin Boes or someone else for confirmation that it's ok to present?

Linda

From: Stanbury, Martha (DHHS)
Sent: Thursday, December 10, 2015 5:38 PM
To: Dykema, Linda D. (DHHS) <DykemaL@michigan.gov>
Cc: Scott, Robert L. (DHHS) <ScottR9@michigan.gov>
Subject: FW: PDF map of flint

GCHD requested a map with kids with elevated BLLs. They want to use it in a presentation, as I understand it.. Please see attached. Does this violate confidentiality?

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To: Stanbury, Martha (DHHS) <stanburym@michigan.gov>
Subject: PDF map of flint

Please see attached.

Robert L. Scott
Childhood Lead Poisoning Prevention Program
Michigan Department of Health & Human Services
(517) 335-8178
fax (517) 335-8509

From: Travis, Rashmi (DHHS)
Sent: Friday, December 11, 2015 11:28 AM
To: Peeler, Nancy (DHHS)
Cc: Dykema, Linda D. (DHHS);Moran, Susan (DHHS)
Subject: RE: case management for children in Flint/Genesee older than age 5.

Nancy,
I will follow up with you directly on this.
Thanks,
Rashmi

From: Peeler, Nancy (DHHS)
Sent: Friday, December 11, 2015 10:58 AM
To: Travis, Rashmi (DHHS) <TravisR@michigan.gov>
Cc: Dykema, Linda D. (DHHS) <DykemaL@michigan.gov>; Moran, Susan (DHHS) <MoranS@michigan.gov>
Subject: Re: case management for children in Flint/Genesee older than age 5.

This raises a couple of questions for me, that I anticipate we will receive from GCHD:
1. Is this on a 'use your discretion' basis?
2. Or will Bob be adding those children to the list that he sends to GCHD, that the CM is tied to, so that this is an expectation?

Within both of the above questions is the question of what it is you want us to monitor in terms of implementation? Right now we are monitoring against the list being provided to them. I appreciate any clarification you can offer.

In terms of our follow up -
--yes, we will discuss this with the GCHD CM staff.
--I am anticipating that we will need to make some modifications to the CM protocol, as there are some required components that apply to young children, but not appropriate for older children (for example, developmental screening).
--We may also need to amend the contract language, depending on your response to the above questions. Are there other modifications you anticipate that could impact the contract language, so that we could incorporate those at the same time?

Nancy

Sent from my iPad

On Dec 11, 2015, at 9:39 AM, Travis, Rashmi (DHHS) <TravisR@michigan.gov> wrote:

> Nancy,
> It makes sense to allow the GCHD to provide case management for those beyond the age of 5. If they don't have Medicaid, they can utilize the funding provided to do that. Please convey that to the nurses and supervisor at GCHD.
> Let me know if you have any questions.
> Thanks,
> Rashmi

From: Peeler, Nancy (DHHS)
Sent: Thursday, December 10, 2015 4:56 PM
To: Travis, Rashmi (DHHS) <TravisR@michigan.gov>
Cc: Dykema, Linda D. (DHHS) <DykemaL@michigan.gov>; Moran, Susan (DHHS) <MoranS@michigan.gov>
Subject: RE: case management for children in Flint/Genesee older than age 5.

That could certainly be a point of discussion.

From: Travis, Rashmi (DHHS)
Sent: Thursday, December 10, 2015 4:47 PM
To: Peeler, Nancy (DHHS) <PeelerN@michigan.gov>
Cc: Dykema, Linda D. (DHHS) <DykemaL@michigan.gov>; Moran, Susan (DHHS) <MoranS@michigan.gov>
Subject: RE: case management for children in Flint/Genesee older than age 5.

So, for children older than 5 yrs of age, case management can occur through Medicaid billing. For those not on Medicaid, would we allow them to use the "Flint Water" funds if they feel Case Management is critical?

From: Peeler, Nancy (DHHS)
Sent: Thursday, December 10, 2015 4:22 PM
To: Travis, Rashmi (DHHS) <TravisR@michigan.gov>
Cc: Dykema, Linda D. (DHHS) <DykemaL@michigan.gov>; Moran, Susan (DHHS) <MoranS@michigan.gov>
Subject: case management for children in Flint/Genesee older than age 5.
Importance: High

Hi Rashmi, in response to your inquiry:

- The list being send to GCHD for case management was originally developed based on instructions we received from Administration; Bob and I were asked to include 0-5 year olds with an EBL >=5, living in the identified high risk zip codes (I believe it is zip codes 01-07, but Bob can confirm that detail). To my knowledge, those are still the parameters for the list that is being used.
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- The current 'Flint water' contract language does speak to providing services to children on the list (see attached).
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- An issue could be if they identify an older child for whom they feel CM is critical, who is not enrolled in Medicaid.

I hope the above information is helpful – please let me know what questions you have. I'm not sure there is a problem or barrier, but if one is identified, I'm confident we can figure out a good way to deal with it!

Nancy

From: Peeler, Nancy (DHHS)
Sent: Tuesday, December 08, 2015 4:17 PM
To: Dykema, Linda D. (DHHS)
Subject: CM update
Attachments: GCHD CM update 12.8.15.docx

See attached, lots of activity for today.

Please note item in red, which we would like to discuss during Thursday call.

Nancy

CM report through 12/4/15:

- # of contacts attempted: 171 (out of 171)
- # offered CM: 68
- # CM started: 10
- # of children receiving CM who live in Flint: 10
- # billed to Medicaid: 3
- # Other disposition: 3 (3 total children moved to Oakland County, 2 from before, 1 new on the latest report)

Families that have moved to other counties

- CM protocol has been provided to Oakland lead nurse to see the 2 children previously identified as having moved to Oakland (2 children from the same family). Names and contact information were conveyed to Oakland today.
- Another family was been identified that has moved to Oakland (this is the '1' that is reflected on the weekly CM report for 12/4); this information has also been conveyed to Oakland.
- Post-call CM staff called us back to report another family that has moved to Tuscola County (not reflected on CM report yet).
    - *Follow up: We have the contact information, and sent message to M. Miller to determine next steps for Tuscola.*

During weekly status call, reviewed barriers/challenges to families accepting CM:

- CM staff have another 6 families scheduled, not seen yet so not showing on CM report.
- Some families have multiple children that were in our count, but GCHD has been counting the family, not # of children. So numbers look low.
    - *Follow up: Genesee CM staff will discuss with their Supervisor including count of children (in columns F and H on CM report), not count of families. Both parties understand that the # of Medicaid claims filed will not match the # of children.*
- Many of these are old blood tests – so families are choosing to get a new test, want to see what those results are before they have someone come out.
- Some families have moved, are not at the same address (in Flint/Genesee County) as when the child had the EBL, therefore do not want someone to come out.
- Some people have asked for more information, so they can think about whether they want someone to come out.
- Some people live with other relatives or friends, so need to check with someone else about the decision to accept CM or invite the EBL investigator into the home.
- Some families are convinced that the water is the only problem, so they are not feeling the need for CM and/or EBL investigation that looks at the house. Some have accepted filters, but not CM/EBL.
- Some children have a history of even higher EBLs, so a 5 or even a 10 now is not a big concern to the family.
- Currently GCHD is offering both CM and EBL when they call families; some families don't want a 6 hour visit. Also the nurses are trying to go out with the EBL investigator, which sometimes holds up the CM visits.

- *Follow up: Are we comfortable with the two services being offered separately, in case the family will accept one but not the other? We agreed that MDHHS will review this issue internally; Genesee CM staff will review this with their Supervisor to get her input.*

Discretion to see children not on the MDHHS provided list

- We previously had given GCHD ability to use their discretion if there is an unusual circumstance where they deem it best to follow up and provide CM services for a child that isn't on the MDHHS list. Today's conversation was about a 6 ½ year old child with a lead level of 14; they will discuss with their Supervisor on Monday and proceed accordingly.
- We also discussed that they can visit and bill Medicaid for ANY child with a lead level over 5, per the current Medicaid policy.

From: Moran, Susan (DHHS)
Sent: Monday, January 04, 2016 8:26 AM
To: Dykema, Linda D. (DHHS)
Subject: FW: Numbered Letter L 15-73
Attachments: L 15-73.pdf; ATT00001.htm

Please add to the daily sit rep

From: Minicuci, Angela (DHHS)
Sent: Monday, January 04, 2016 8:21 AM
To: Moran, Susan (DHHS) <MoranS@michigan.gov>
Subject: FW: Numbered Letter L 15-73

Sending along for the next SitRep in case you don't have this yet.

Angela

From: Lyon, Nick (DHHS)
Sent: Thursday, December 31, 2015 1:53 PM
To: Priest, Chris (DHHS) <PriestC1@michigan.gov>; Lasher, Geralyn (DHHS) <lasherg@michigan.gov>; Minicuci, Angela (DHHS) <MinicuciA@michigan.gov>
Subject: Fwd: Numbered Letter L 15-73

Very good Chris. Thank you. We should include on our update and put on the website.

Begin forwarded message:

> **From:** MSAPolicy <MSAPolicy@michigan.gov>
> **Date:** December 30, 2015 at 3:34:58 PM CST
> **To:** "Embry, Sheila (DHHS)" <EmbryS@michigan.gov>, "Gigliotti, Lisa (LARA)" <GigliottiL@michigan.gov>, "Neff, David (DHHS)" <NeffD2@michigan.gov>, "Reid, Catherine (DHHS)" <ReidC2@michigan.gov>, "Stork-Phillips, Denise (DHHS)" <Stork-PhillipsD@michigan.gov>, "Edwards, Cynthia (DHHS)" <EdwardsC@michigan.gov>, "Eggleston, Debbie (DHHS)" <egglestond@michigan.gov>, "Elliott-Egan, Lorna (DHHS)" <Elliott-EganL@michigan.gov>, "Keisling, Brian (DHHS)" <KeislingB@michigan.gov>, "Klein, Susie (DHHS)" <KleinS4@michigan.gov>, "Lyon, Nick (DHHS)" <LyonN2@michigan.gov>, "Miles, Richard C. (DHHS)" <MilesR6@michigan.gov>, "Minicuci, Angela (DHHS)" <MinicuciA@michigan.gov>, "Moran, Susan (DHHS)" <MoranS@michigan.gov>, "Parker, Karen (DHHS)" <ParkerK7@michigan.gov>, "Prokop, Jackie (DHHS)" <prokopj@michigan.gov>, "Rutledge-Wolf, Samantha (DHHS)" <RutledgeWolfS@michigan.gov>, "Tribble, Mary Anne (DHHS)" <TribbleM1@michigan.gov>, "Barnett, Lonnie D. (DHHS)" <BarnettL@michigan.gov>, "Bendele, Steven (DHHS)" <BendeleS@michigan.gov>, "Dunbar, Paulette Dobynes (DHHS)" <dunbarp@michigan.gov>, "Embry, Sheila (DHHS)" <EmbryS@michigan.gov>, "Fink, Brenda (DHHS)" <FinkB@michigan.gov>, "Gensterblum, Sherri (DHHS)" <gensterblums@michigan.gov>, "Hinkle, Lori (DHHS)" <HinkleL@michigan.gov>, "Holcomb, Linda (DHHS)" <holcombl@michigan.gov>, "Hollis, Deborah J. (DHHS)" <HOLLISD@michigan.gov>, "Honsowitz, Keelie (DHHS)" <HonsowitzK@michigan.gov>, "Ireland, Steve (DHHS)" <irelands@michigan.gov>, "Kach, Laura (DHHS)" <kachl@michigan.gov>, "Keene, Robin (DHHS)" <KeeneR1@michigan.gov>, "Masterson, Cindy (DHHS)" <MastersonC@michigan.gov>, "Parker, Kaitlin (DHHS)" <ParkerK5@michigan.gov>,

"Pastor, Kristie (DHHS)" <pastork@michigan.gov>, "Ridge, Dan (DHHS)" <RidgeD1@michigan.gov>, "Smith, Patricia A. (DHHS)" <smithp2@michigan.gov>, "Spitzley, John (DHHS)" <SpitzleyJ1@michigan.gov>, "Stiffler, Kathleen A. (DHHS)" <StifflerK@michigan.gov>, "Swanson, Robert (DHHS)" <swansonr@michigan.gov>, "Tate, Nancy (DHHS)" <taten@michigan.gov>, "Voss, Daniel (DHHS)" <VossD@michigan.gov>, "West, Mark (DHHS)" <WestM8@michigan.gov>, "Zavala, Rita (DHHS)" <ZavalaR@michigan.gov>, "Aastad, Mary (DHHS)" <AastadM@michigan.gov>, "Baker, Anne (DHHS)" <BakerA5@michigan.gov>, "Barrie, Brian (DHHS)" <BarrieB@michigan.gov>, "Barron, Brad (DHHS)" <BarronB@michigan.gov>, "Bauer, Kevin (DHHS)" <BauerK2@michigan.gov>, "Black, Erin (DHHS)" <blacke@michigan.gov>, "Callihan, Lola (DHHS)" <CallihanL@michigan.gov>, "Chamberlain, Teri (DHHS)" <ChamberlainT@michigan.gov>, "Chrysler, Amanda (DHHS)" <ChryslerA@michigan.gov>, "Cole, Brant (DHHS)" <ColeB3@michigan.gov>, "Coleman, Jacqueline (DHHS)" <colemanj@michigan.gov>, "Daeschlein, Michael (DHHS)" <daeschleinm@michigan.gov>, "Darling, Karen (DHHS)" <DarlingK@michigan.gov>, "Diebolt, Pamela J. (DHHS)" <DieboltP@michigan.gov>, "Dilernia, Lisa (DHHS)" <DilerniaL@michigan.gov>, "Dnyate, Rajita (DHHS)" <DnyateR@michigan.gov>, "Donaldson, John R. (DHHS)" <donaldsonj@michigan.gov>, "Dreasky, Logan (DHHS)" <dreaskyl@michigan.gov>, "DuPuis, Julie (DHHS)" <dupuisj@michigan.gov>, "Fuller, Diana (DHHS)" <FullerD10@michigan.gov>, "Green, Kellie (DHHS)" <GreenK6@michigan.gov>, "Grost, Lisa (DHHS)" <grostl@michigan.gov>, "Gurzick, Nancy (DHHS)" <GurzickN@michigan.gov>, "Hadar, Sandy (DHHS)" <hadars@michigan.gov>, "Hambleton, Matthew (DHHS)" <HambletonM@michigan.gov>, "Heffron, Bridget (DHHS)" <HeffronB@michigan.gov>, "Hill, Heather (DHHS)" <HillH3@michigan.gov>, "Johnson, Penny A. (DHHS)" <JohnsonP29@michigan.gov>, "Keisling, Brian (DHHS)" <KeislingB@michigan.gov>, "Kennedy, Anne (DHHS)" <KennedyA@michigan.gov>, "Killingsworth, Marion (DHHS)" <KillingsworthM@michigan.gov>, "Kline, Crystal (DHHS)" <KlineC1@michigan.gov>, "LaPres, Marie (DHHS)" <LaPresM@michigan.gov>, "Linn, Cindy (DHHS)" <linnc@michigan.gov>, "Lipsey, Ashleigh (DHHS)" <LipseyA@michigan.gov>, "McCandless, Karla K. (DHHS)" <mccandlessk@michigan.gov>, "McCarty, Susan (DHHS)" <McCartyS@michigan.gov>, "Miller, David (DHHS)" <MillerD46@michigan.gov>, "Morrow, Denise (DHHS)" <MorrowD@michigan.gov>, "Norcross, Nick (DHHS)" <NorcrossN@michigan.gov>, "O'Keefe, Trish M. (DHHS)" <okeefet@michigan.gov>, "Pabst, Kathleen (DHHS)" <PabstK@michigan.gov>, "Perry, Roxanne R. (DHHS)" <PerryR1@michigan.gov>, "Pontius, Lori (DHHS)" <PontiusL@michigan.gov>, "Prichard, Steven (DHHS)" <PrichardS@michigan.gov>, "Prokop, Jackie (DHHS)" <prokopj@michigan.gov>, "Pung, Salli (DHHS)" <PungS@michigan.gov>, "Romelus, Tiffaney (DHHS)" <RomelusT@michigan.gov>, "Rutledge, Penny (DHHS)" <rutledgep1@michigan.gov>, "Severin, Christina (DHHS)" <SeverinC@michigan.gov>, "Sharp, Margo (DHHS)" <SharpM1@michigan.gov>, "Simon, Lori (DHHS)" <SimonL6@michigan.gov>, "Slawinski, Heather (DHHS)" <SlawinskiH@michigan.gov>, "Starkweather, Carmen (DHHS)" <StarkweatherC@michigan.gov>, "Stentoumis, Jennifer (DHHS)" <StentoumisJ@michigan.gov>, "Subhedar, Rita (DHHS)" <SubhedarR1@michigan.gov>, "Summers, Christine (DHHS)" <SummersC@michigan.gov>, "Taylor, Leslie (DHHS)" <TaylorL2@michigan.gov>, "Tisdale, Ryan (DHHS)" <TisdaleR1@michigan.gov>, "Titus, Laura (DHHS)" <TitusL@michigan.gov>, "Trumbell, Lisa (DHHS)" <TrumbellL@michigan.gov>, "Villasurda, Jon (DHHS)" <VillasurdaJ@michigan.gov>, "Warstler, Michele (DHHS)" <WarstlerM@michigan.gov>, "Wesorick, Matthew (DHHS)" <WesorickM@michigan.gov>, "Winstanley, Jill (DHHS)" <WinstanleyJ@michigan.gov>, "Rutledge-Wolf, Samantha (DHHS)" <RutledgeWolfS@michigan.gov>

Cc: ProviderSupport <ProviderSupport@michigan.gov>, ProviderOutreach <ProviderOutreach@michigan.gov>

Subject: Numbered Letter L 15-73

Attached for your information is letter L 15-73, dated December 30, 2015.

L 15-73 – Blood Lead Guidelines to Address the City of Flint Residents' Potential Exposure to Lead.

This letter was sent to Practitioners, Clinics, Laboratories and Maternal Infant Health Program (MIHP) Providers in the City of Flint.

Medicaid Letters can be accessed on the web at www.michigan.gov/medicaidproviders >> Communication and Training >> Click 2015 under Numbered Letters.

Michigan Department of Health and Human Services
PO Box 30479
Lansing MI 48909

December 30, 2015

<Provider Name>
<Provider Address1>
<Provider Address2>
<Provider City> <state> <zipcode5-zip4>

Dear Provider:

RE: Blood Lead Guidelines to Address the City of Flint Residents' Potential Exposure to Lead

Michigan Medicaid Early Periodic Screening, Diagnosis and Treatment (EPSDT) guidelines require children to be tested for blood lead poisoning at 12 and 24 months of age, and between 36 and 72 months of age if the child has not been previously tested as indicated by the Medicaid Provider Manual. The Manual is located at: www.michigan.gov/medicaidproviders >> Policy and Forms.

Due to the enhanced public health issue of an increased risk for lead exposure in the City of Flint, providers have been advised to follow enhanced guidelines for lead testing in children:

- Providers should screen ALL children (regardless of Medicaid/insurance status) between 0 and 6 years of age that may have been exposed to the City of Flint drinking water after April 2014. Note: This includes all children less than 1 year of age and children between 3 and 6 years of age.

- If the child has already been screened since April 2014 by a capillary test, providers should follow-up on any elevated levels greater than 5 mcg/dl to ensure confirmatory venous testing is conducted.

- Providers should utilize the standard Blood Lead Level (BLL) Quick Reference for Primary Care Providers located at: www.mi.gov/documents/deq/ProviderQuickReference_Sept2015_501831_7.pdf?20151204122739.

- All clients with blood lead levels greater than 5 mcg/dl should be referred for case management coordinated through the Genesee County Health Department.

- Providers should inquire about the use of a drinking water filter and/or bottled water by all clients residing within the Flint city limits.

- Providers should inquire about other potential sources of lead within the household per the current recommendations of the Childhood Lead Poisoning Prevention Program's Statewide Lead Testing/Lead Screening Plan. The Statewide Lead Testing/Lead Screening Plan is located at: www.michigan.gov/documents/mdch/testing-screening071009_287511_7.pdf.

Lead testing performed using these enhanced testing guidelines is covered as a Medicaid EPSDT service. Providers should contact the beneficiary's Medicaid health plan for additional assistance if needed. Any questions regarding this letter should be directed to Provider Inquiry, Department of Health and Human Services, P.O. Box 30731, Lansing, Michigan 48909-8231, or e-mail at ProviderSupport@michigan.gov. When you submit an e-mail, be sure to include your name, affiliation, and phone number so you may be contacted if necessary. Providers may phone toll-free 1-800-292-2550.

Sincerely,

Chris Priest, Director
Medical Services Administration

This Document is a Non-Responsive Attachment.

From: Dykema, Linda D. (DHHS)
Sent: Monday, October 19, 2015 8:54 PM
To: Wells, Eden (ewells@umich.edu);Moran, Susan (DHHS)
Subject: Fw: Information on the City of Flint's Drinking Water and Announcement of Interim Chief for ODWMA - Message from Director Dan Wyant

Fyi

Linda D Dykema
Environmental Public Health Director

From: Bruneau, Michelle (DHHS)
Sent: Monday, October 19, 2015 8:47:46 PM
To: Groetsch, Kory J. (DHHS); Dykema, Linda D. (DHHS); Gray, Jennifer (DHHS)
Subject: FW: Information on the City of Flint's Drinking Water and Announcement of Interim Chief for ODWMA - Message from Director Dan Wyant

Did you all see this?

><{{{'> www.michigan.gov/eatsafefish <'}}}><

Michelle Bruneau, MA
Michigan Department of Health & Human Services
Project Manager & Health Educator
(517) 335-8984
bruneaum@michigan.gov

From: Wyant, Dan (DEQ)
Sent: Monday, October 19, 2015 3:59 PM
Subject: Information on the City of Flint's Drinking Water and Announcement of Interim Chief for ODWMA - Message from Director Dan Wyant

Dear Colleagues:

I know you have all heard a lot lately about the drinking water situation in Flint, and I want to update you on recent developments.

Today, I released a statement announcing Chief Deputy Director Jim Sygo will immediately assume the role of interim chief of the Office of Drinking Water and Municipal Assistance.

As details of the situation have emerged, it has become apparent staff made a mistake while working with the city of Flint. Simply stated, staff employed a federal protocol they believed was appropriate, and it was not. However, I am convinced our program staff believed they were doing their job

correctly, and simply did not have the experience with the particular issue of corrosion control in cities of more than 50,000 people.

Today's actions were the result of a long process. In the spring of 2013, the city of Flint announced it would leave the Detroit Water and Sewerage Department (DWSD) in favor of joining the Karegnondi Water Authority, which is constructing a pipeline to bring drinking water from Lake Huron. In the meantime, the city used the Flint River, treated at the Flint Water Treatment Plant, as its full-time drinking water source.

Since then, the system experienced a number of problems, including most recently, elevated lead levels in some homes and schools. To address public health, the Governor led a charge to bring $6 million in state funds, plus an additional $2 million from the city and $4 million from the C.S. Mott Foundation, to fund the city's reconnection with DWSD.

This was a huge first step in fixing the problem. However, while the switch back to Detroit water carried numerous public health benefits, lead in drinking water is largely a function of outdated local infrastructure. For a long-term fix, we are looking at several options to help the city update its infrastructure and remove all lead service lines.

To ensure safe drinking water in the short-term, the state is providing water filters to every resident in the city of Flint. Many local partners, including the United Way, are also stepping up to ensure the city's schools have bottled water available for children as we design a thorough protocol to test all schools.

I know this is a stressful time for many of you, and I appreciate your dedication and hard work. This is a good time to reflect, as a staff, on our purpose as an agency. Our mission is to protect public health and the environment. Whatever the particular protocol or statute you help to implement or uphold, that is our core reason for being. Keep that at the forefront of your mind.

I am proud to lead a staff of such knowledgeable, committed individuals. Thanks, as always, for the work you do.

Sincerely,

Dan Wyant
Director

From: Dykema, Linda D. (DHHS)
Sent: Monday, October 26, 2015 2:57 PM
To: Peeler, Nancy (DHHS)
Subject: letter
Attachments: Parent Letter FINAL Draft 102615.docx

October 26, 2015

Dear Parent,

To help make sure the children of Flint are safe from lead exposure, the Genesee County Health Department and the Michigan Department of Health and Human Services ~~want to help you understand~~are providing answers to the following questions:

- Where does lead come from?
- What can I do to protect my family?
- Should I get my child tested for lead?
- Where can I find more information about lead?

Where does lead come from?

~~Lead is a serious health hazard, especially for small children who become lead poisoned when they eat, drink or breathe lead.~~ Elevated levels of lead have been found in the drinking water from lead pipes in the City of Flint. Kids can also be exposed to lead from old lead paint, soil, pottery, cosmetics and toys and some home remedies. Adult jobs and hobbies, like auto repair, stained glass, jewelry making and ammunitions handling can also put children at risk if they touch clothing or play in areas where lead is found. Lead is a serious health hazard, especially for small children who become lead poisoned when they eat, drink or breathe lead.

Should my child get a blood lead test?
Children who live in the City of Flint, live in a home using City of Flint water, or who attend school, childcare or often spend time with a caregiver in the City of Flint should be tested for lead poisoning. *This should be done as soon as possible.*

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Where should I go to get a blood lead test for my child?

The best place to get your child's blood lead test is your doctor's office. Tests are covered by most health plans. Your doctor will follow up with you on lab tests and provide you with information on what to do next. Your child can also ~~have~~ get a free lead test at the Genesee County Health Department. If you need transportation, contact 2-1-1 for help.

Understanding your child's lead test result.

A lead level below 5 means there is a little lead in your child's blood. Use the tips below to help keep your child safe. Your doctor may suggest retesting your child within the next 12 months to make sure the level does not go up.

A lead level of 5-~~4~~14 means that your child has had some exposure to lead. Work with your doctor and local health department for further guidance on how to limit your lead exposure. Your doctor may retest your child in 1-3 months to make sure the level does not go up.

Children with very high levels of lead **(over 4~~0~~0)** may require treatment at the hospital.

What Can I Do to Keep My Family Safe?

The following steps should be taken right away to help protect you and your child.

Protecting your family from lead in the water:

- Get your water tested for lead. It's free. Call (810) 787-6537 to learn more.
- Use a water filter in your home. Call 2-1-1 for information on free NSF Certified water filters.
- Run only cold water through the filter.
- If you do not have a water filter, use bottled water for drinking and mixing formula.
- Use filtered or bottled water for drinking (including making coffee, drink mixes, juice, baby formula), and cooking (even if you boil the water, the lead will stay in the water and food).
- You can use unfiltered tap water for washing your hands, and washing dishes.
- If you ~~must~~ have to use unfiltered water for drinking or cooking, run the tap for five minutes before using the water.

Safe cleaning:

Safe ~~C~~cleaning is important. Keeping your home clean and safe from lead hazards will help to protect your family.

- ~~You can use unfiltered tap water to wipe down countertops, mop floors, and wash clothes.~~
- Buildings built before 1978 could have lead paint in them.~~Keep children away from lead paint and dust.~~
- Use wet paper towels to clean up ~~lead~~ paint chips and dust in these older buildings. ~~B~~Be sure to clean around windows, play areas, and floors.
- Wash hands and toys often~~, using~~ with soap and water.
- You can use unfiltered tap water to wipe down countertops, mop floors, and wash clothes.

Good nutrition:

Some foods will help keep lead from being stored in a child's body. These are foods with a lot of calcium, iron and vitamin C. These foods include:

Calcium Rich Foods	Iron Rich Foods	Foods with Vitamin C

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- Milk
- Cheese
- Yogurt
- Tofu
- Spinach
- Beans
- Lean meats like fish and chicken
- Whole grain cereals
- Peanut butter
- Oranges
- Orange juice
- Grapefruits
- Tomatoes
- Green peppers

Always wash your fruits with filtered water. If you are concerned about your child's diet, talk with your doctor who may also recommend a daily multivitamin.

WIC and SNAP provide assistance to parents and children who need fresh and healthy foods. Contact the **Genesee County WIC office at (810) 237-4537** to learn more. SNAP also offers a Double Bucks program to purchase even more healthy food for no additional costs.

Where can I get more information on lead?

- Genesee County Health Department Lead Program
  (810) 257-3833
- Michigan Department of Health and Human Services
  Childhood Lead Poisoning Prevention Program
  (888) 322-4453
  www.michigan.gov/lead
- United States Environmental Protection Agency
  www.epa.gov/lead
- U.S. Centers for Disease Control and Prevention (CDC) Web site
  www.cdc.gov/nceh/lead

Sincerely,

Eden V. Wells, MD, MPH, FACPM
Chief Medical Executive
Michigan Department of Health and Human Services

Gary K. Johnson, MD, MPH
Medical Director
Genesee County Health Department

From: Dykema, Linda D. (DHHS)
Sent: Friday, October 30, 2015 9:04 AM
To: Moran, Susan (DHHS)
Cc: Robinson, Mikelle (DHHS);Miller, Corinne (DHHS);Travis, Rashmi (DHHS)
Subject: RE: CLPPP

I should add that Patti took a strong lead when the discussion turned to pulling the data for reporting. My opinion is that Bob would have a very hard time handling this alone.

From: Moran, Susan (DHHS)
Sent: Friday, October 30, 2015 9:01 AM
To: Dykema, Linda D. (DHHS)
Cc: Robinson, Mikelle (DHHS); Miller, Corinne (DHHS); Travis, Rashmi (DHHS)
Subject: Re: CLPPP

Do we all still agree that we should proceed with plan as we discussed yesterday?

Sent from my iPhone

On Oct 30, 2015, at 8:57 AM, Dykema, Linda D. (DHHS) <DykemaL@michigan.gov> wrote:

> We had a meeting yesterday with my staff, Nancy Peeler, Bob Scott, Corinne and Patti McKane to talk about reporting the blood testing data. The meeting went well and I think we have a plan going forward to produce both a data heavy internal report and a simpler version for the public. We're aiming for a weekly report on Mondays, starting 9/1/15…likely in the afternoon so that we can capture any data from the weekend warehouse updates.
>
> During the meeting Nancy mentioned they were planning to bring on another data entry person with some existing funds in her area (not from the supplemental). Not sure how/if this complicates the move. I do have 3 cubicles immediately available in my area on CVB 4th floor.

Linda D. Dykema, Ph.D.
Environmental Public Health Director
Division of Environmental Health
Michigan Department of Health & Human Services
517.335.8566
dykemal@michigan.gov

From: Dykema, Linda D. (DHHS)
Sent: Monday, November 02, 2015 8:07 AM
To: Moran, Susan (DHHS)
Subject: Fw: 2015-10-28 Flint Drinking Water Action Plan Update - FOIA EXEMPT AND ATTORNEY-CLIENT PRIVILEGED
Attachments: 2015-10-28 Action Steps Week of October 26-30.pdf; 2015-10-28 Flint Drinking Water Action Plan Update.pdf

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From: Dykema, Linda D. (DHHS)
Sent: Wednesday, October 28, 2015 2:45 PM
To: Moran, Susan (DHHS)
Subject: FW: 2015-10-28 Flint Drinking Water Action Plan Update - FOIA EXEMPT AND ATTORNEY-CLIENT PRIVILEGED

From: Wyant, Dan (DEQ)
Sent: Wednesday, October 28, 2015 2:36 PM
To: Scott, Allison (GOV); Muchmore, Dennis (GOV); Agen, Jarrod (GOV); Emmitt, Beth (GOV); Bedan, Morgan (GOV)
Cc: Wyant, Dan (DEQ); Dickinson, Sarah (GOV); Edgerton, Shelly (LARA); Dykema, Linda D. (DHHS)
Subject: 2015-10-28 Flint Drinking Water Action Plan Update - FOIA EXEMPT AND ATTORNEY-CLIENT PRIVILEGED

Dear Governor's Office:

Please provide the following to the Governor as a part of his daily briefing packet. If you have any questions, please let us know.

1. Action Steps Updated Document for the week of October 26-30, 2015
2. Flint Drinking Water Action Plan Update

Thank you.

Dan Wyant
Director

City of Flint Water
Action Steps for Week of October 26-30

Step No.	Action Step	Involved Parties	DEQ Point(s) of Contact	Status
1.	Conduct After Action Plan	DEQ	George Krisztian	Initial meeting held 10/22/15
2.	Introduce legislative changes to Part 54 of NREPA – Drinking Water Revolving Loan Fund	DEQ, Treasury, and EPA	Maggie Pallone George Krisztian Sonya Butler	Draft language submitted to Maggie Pallone for review
3.	After Action Review Panel	DEQ	Madhu Anderson George Krisztian Karen Tommasulo	Panel created and press release issued on 10/21/15
4.	Staff hiring plan	DEQ	Jim Sygo Maggie Pallone George Krisztian	
5.	Finalize fiscal year 2017 budget request	DEQ	Maggie Pallone George Krisztian	
6.	Meeting(s) with school staff/management	DEQ	Jim Sygo Steve Busch Pat Cook Mike Prysby	A meeting with the 10 remaining schools is tentatively scheduled for the week of 10/26/15
7.	Meet with DHHS and discuss all lead education material for schools	DEQ and DHHS	Jim Sygo Steve Busch Pat Cook Mike Prysby	Meeting held on 10/27/15; action items created
8.	Review corrosion control treatment plan and get any EPA comments	DEQ and EPA	Jim Sygo Steve Busch Pat Cook Mike Prysby	Summary of Flint's corrosion control plan submitted to EPA

Step No.	Action Step	Involved Parties	DEQ Point(s) of Contact	Status
9.	Review construction permit application and issue construction permit for phosphate equipment	DEQ	Jim Sygo Steve Busch Pat Cook Mike Prysby	Additional items provided; still need 2 more items
10.	Review Standby Operation of Flint Water Treatment Plant with city of Flint	DEQ and Flint	Jim Sygo Steve Busch Pat Cook Mike Prysby	Comments by DEQ to city of Flint have been provided
11.	Work with Karegnondi Water Authority (KWA) and other agencies to address bottleneck issues; check weekly for status update	DEQ and KWA	Jim Sygo Steve Busch Pat Cook Mike Prysby	Issues regarding soil erosion controls during construction are being addressed
12.	Contact city of Flint for Service Line Record status update and obtain a copy of the records to date	DEQ and Flint	Jim Sygo Steve Busch Pat Cook Mike Prysby	Cross-referencing process has begun
13.	Provide DHHS with any available cross-reference information	DEQ and DHHS	Jim Sygo Steve Busch Pat Cook Mike Prysby	
14.	Develop childcare facility guidance or review DHHS-related materials	DEQ and DHHS	Jim Sygo Steve Busch Pat Cook Mike Prysby	Meeting held on 10/27/15; DHHS to provide materials
15.	Create a generic school sampling guidance document for statewide distribution; target audience: schools served by municipal water	DEQ and DLARA	Jim Sygo Steve Busch Richard Benzie	

Step No.	Action Step	Involved Parties	DEQ Point(s) of Contact	Status
16.	Confirm plumbing assessment and sampling is scheduled for Brownell K-2 STEM Academy and Eisenhower Elementary School	DEQ and DLARA	Jim Sygo Steve Busch Mike Prysby	Tentatively scheduled for 10/30/15

Flint Drinking Water Action Plan Update

FOIA EXEMPT AND ATTORNEY-CLIENT PRIVILEGE

- DEQ staff met with DHHS staff on October 27 to discuss all lead education material for schools, and action items were created.

- On October 27 DEQ's Lansing District Office received updated dosage, pump specifications, and cut-sheets for phosphate product. A quick glance at the submittal shows most of the requested information has been provided, except for the NSF Standard 60 certification and the maximum dose. Staff will cross-reference the NSF Web site to verify proper certification and maximum dose. If acceptable, DEQ staff will proceed with issuance of the Act 399 permit. Otherwise, the city of Flint's consultant will need to provide the DEQ with the NSF Standard 60 certification and maximum dose information.

- DEQ staff has cross-referenced 46 of the 326 historical lead and copper monitoring sampling sites with the 10,895 service line index card information records available to date.

- DEQ staff met with DHHS staff to review and further develop childcare facility guidance and incorporate drinking water exposure information. Guidance is being provided by DHHS specific to the Genesee County emergency order, and separate guidance for statewide use will also be developed.

Additional Actions:

- Preliminary follow-up review of sampling event at Freeman Elementary School: DEQ and DLARA staff met and reviewed outlet/tap materials to correlate with sample results. DEQ staff contacted Jim Henry, Genesee County Health Department, to confirm the location of screening samples. The draft write-up is to be completed by DEQ staff on October 28.

- The weekly meeting between DEQ, DLARA, and DHHS was held. Discussion topics included a review of the results for Freeman Elementary School, along with a discussion of what the results meant and how the data would be presented to the Flint Community Schools Superintendent so that the information could be used to create an action plan for the school. Discussion also included working out the logistics for conducting the plumbing evaluation and subsequent sampling for the other two elementary schools that had results above the action level during the initial screen of 13 schools. Plans are in process to conduct these two plumbing evaluations on Friday, October 30, with the sampling to take place on Saturday, October 31.

Prepared by: George Krisztian, Flint Action Plan Coordinator
Laboratory Director
Department of Environmental Quality
Telephone: 517-284-6719
Cell: PPI
October 28, 2015

From: Dykema, Linda D. (DHHS)
Sent: Monday, November 02, 2015 3:32 PM
To: Moran, Susan (DHHS)
Subject: Fwd: 2015-11-02 Flint Drinking Water Action Plan Update - FOIA EXEMPT AND ATTORNEY-CLIENT PRIVILEGED
Attachments: 2015-11-02 Action Steps Week of October 26-30.pdf; ATT00001.htm; 2015-11-02 Flint Drinking Water Action Plan Update.pdf; ATT00002.htm

Sent from my iPhone

Begin forwarded message:

From: "Wyant, Dan (DEQ)" <WyantD@michigan.gov>
Date: November 2, 2015 at 2:36:37 PM EST
To: "Scott, Allison (GOV)" <scotta12@michigan.gov>, "Muchmore, Dennis (GOV)" <muchmored@michigan.gov>, "Agen, Jarrod (GOV)" <AgenJ@michigan.gov>, "Emmitt, Beth (GOV)" <emmittb@michigan.gov>, "Bedan, Morgan (GOV)" <BedanM@michigan.gov>
Cc: "Wyant, Dan (DEQ)" <WyantD@michigan.gov>, "Dickinson, Sarah (GOV)" <DickinsonS@michigan.gov>, "Edgerton, Shelly (LARA)" <EdgertonS1@michigan.gov>, "Dykema, Linda D. (DHHS)" <DykemaL@michigan.gov>
Subject: 2015-11-02 Flint Drinking Water Action Plan Update - FOIA EXEMPT AND ATTORNEY-CLIENT PRIVILEGED

Dear Governor's Office:

Please provide the following to the Governor as a part of his daily briefing packet. If you have any questions, please let us know.

1. Action Steps Updated Document for the week of October 26-30, 2015
2. Flint Drinking Water Action Plan Update

Effective today, we will prepare the attached reports to you weekly, every Monday afternoon, for the previous week's actions.

Thank you.

Dan Wyant
Director

City of Flint Water
Action Steps for Week of October 26-30

Step No.	Action Step	Involved Parties	DEQ Point(s) of Contact	Status
1.	Conduct After Action Plan	DEQ	George Krisztian	Meeting held on 10/29/15 to discuss time line
2.	Introduce legislative changes to Part 54 of NREPA – Drinking Water Revolving Loan Fund	DEQ, Treasury, and EPA	Maggie Pallone George Krisztian Sonya Butler	Draft language submitted to Maggie Pallone for review
3.	After Action Review Panel	DEQ	Madhu Anderson George Krisztian Karen Tommasulo	Panel created and press release issued on 10/21/15
4.	Staff hiring plan	DEQ	Jim Sygo Maggie Pallone George Krisztian	Negotiations underway to contract with the Genesee County Health Department
5.	Finalize fiscal year 2017 budget request	DEQ	Maggie Pallone George Krisztian	
6.	Meeting(s) with school staff/management	DEQ	Jim Sygo Steve Busch Pat Cook Mike Prysby	A summary report for Freeman Elementary School has been drafted
7.	Meet with DHHS and discuss all lead education material for schools	DEQ and DHHS	Jim Sygo Steve Busch Pat Cook Mike Prysby	Meeting held on 10/27/15; action items created
8.	Review corrosion control treatment plan and get any EPA comments	DEQ and EPA	Jim Sygo Steve Busch Pat Cook Mike Prysby	EPA's comments were addressed, and a letter was e-mailed to the city of Flint on 10/30/15

Step No.	Action Step	Involved Parties	DEQ Point(s) of Contact	Status
9.	Review construction permit application and issue construction permit for phosphate equipment	DEQ	Jim Sygo Steve Busch Pat Cook Mike Prysby	Act 399 permit issued 10/28/15
10.	Review Standby Operation of Flint Water Treatment Plant with city of Flint	DEQ and Flint	Jim Sygo Steve Busch Pat Cook Mike Prysby	Comments by DEQ to city of Flint have been provided
11.	Work with Karegnondi Water Authority (KWA) and other agencies to address bottleneck issues; check weekly for status update	DEQ and KWA	Jim Sygo Steve Busch Pat Cook Mike Prysby	Issues regarding soil erosion controls during construction are being addressed
12.	Contact city of Flint for Service Line Record status update and obtain a copy of the records to date	DEQ and Flint	Jim Sygo Steve Busch Pat Cook Mike Prysby	Cross-referencing process has begun
13.	Provide DHHS with any available cross-reference information	DEQ and DHHS	Jim Sygo Steve Busch Pat Cook Mike Prysby	
14.	Develop childcare facility guidance or review DHHS-related materials	DEQ and DHHS	Jim Sygo Steve Busch Pat Cook Mike Prysby	Meeting held on 10/27/15; DHHS to provide materials
15.	Create a generic school sampling guidance document for statewide distribution; target audience: schools served by municipal water	DEQ and DLARA	Jim Sygo Steve Busch Richard Benzie	Final draft of school sampling protocol has been written and is awaiting final review

Step No.	Action Step	Involved Parties	DEQ Point(s) of Contact	Status
16.	Confirm plumbing assessment and sampling is scheduled for Brownell K-2 STEM Academy and Eisenhower Elementary School	DEQ and DLARA	Jim Sygo Steve Busch Mike Prysby	Assessments confirmed and complete

This Document is a Non-Responsive Attachment.

Flint Drinking Water Action Plan Update

FOIA EXEMPT AND ATTORNEY-CLIENT PRIVILEGE

- Comments on the corrosion control treatment plan received late in the day on October 30 from EPA were addressed, and the letter to the city of Flint regarding operational and monitoring conditions related to corrosion control was finalized. A PDF of the letter was e-mailed on October 30 to the city of Flint *et al.*

- Staff from DLARA and DEQ conducted plumbing assessments at both Brownell and Eisenhower Elementary Schools on October 30. Sampling taps were identified and labeled. Based on the plumbing assessment, a sampling sequence was recommended for each school.

Additional Actions:

- DEQ Flint Action Plan Coordinator George Krisztian and DEQ Public Information Officer Karen Tommasulo met with representatives of DLARA, DHHS, and city of Flint officials, including Mayor Dayne Walling, to discuss progress made since the last meeting and to discuss actions to come in the week of November 2. Topics included the issuance of a construction permit that would enable the city of Flint to provide supplemental phosphate addition to the water coming from Detroit. A high level summary regarding the progress of the testing for lead in drinking water in the Flint schools was provided with a subsequent discussion by the group as a whole. Mayor Walling inquired as to how remediation of the schools would be funded, and he was informed that funding was outside the purview of the initial assessment.

- Staff from DEQ and DLARA conducted water sampling at Brownell K-2 STEM Academy and Eisenhower Elementary School on Saturday, October 31. In addition, staff went back to Freeman Elementary School to pull sequential samples as per comments from EPA regarding DEQ's sampling protocol. The sequential samples were also taken at Brownell and Eisenhower. Complete sampling protocols have now been conducted at three Flint schools. There were a total of 374 samples taken at the three schools on October 31.

- As provided by DHHS, the purchased total water filter/pitcher distribution for the period of October 6 through October 29 is 9,880 units.

Prepared by: George Krisztian, Flint Action Plan Coordinator
Laboratory Director
Department of Environmental Quality
Telephone: 517-284-6719
Cell: **PPI**
November 2, 2015

This Document is a Non-Responsive Attachment.

Message

From: Dykema, Linda D. (DHHS) [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=61EF63A268374D20BB1AD24E4D6E1B1E-DYKEMA LINDA D.]
Sent: 11/10/2015 1:33:31 PM
To: Moran, Susan (DHHS) [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=187c9ca7fca94c14a6f60427230837a4-Moran Susan]
Subject: RE: Update on lead data upload issues.

Tell me about it!

From: Moran, Susan (DHHS)
Sent: Tuesday, November 10, 2015 8:30 AM
To: Dykema, Linda D. (DHHS)
Cc: McKane, Patricia (DHHS); Miller, Corinne (DHHS); LyonCallo, Sarah (DHHS); Lasher, Geralyn (DHHS); Wells, Eden (DHHS)
Subject: Re: Update on lead data upload issues.

This is not acceptable

Sent from my iPhone

On Nov 10, 2015, at 8:01 AM, Dykema, Linda D. (DHHS) <DykemaL@michigan.gov> wrote:

Thanks for the information, Patti.

All: it is becoming very clear that handling the blood lead data is a major problem (and frustration). We may need to put some resources towards fixing it.

Linda

From: McKane, Patricia (DHHS)
Sent: Tuesday, November 10, 2015 7:57 AM
To: Miller, Corinne (DHHS); LyonCallo, Sarah (DHHS); Dykema, Linda D. (DHHS)
Subject: Update on lead data upload issues.

Hi all,

Bob Scott updated me on the upload of child lead data into the warehouse

"As of next Monday, we'll be two weeks behind on Lead records in the Warehouse. Jessica's computer (and everyone's around here) was upgraded to Office 2013 last Friday. ....but Access 2013 will not handle DBF files. We have used Access for a few years as a pass-through to get the DBF format (dates, I think) exactly right for loading to the Warehouse.

When I get back, I'll work with the folks from Optum to see what we can do about getting files in Warehouse-ready format."

Bob will be back next Monday.

I can pull data from the warehouse next Monday, but be aware that it may not be complete.

Patricia McKane, DVM MPH - Manager, Maternal & Child Health Epidemiology Section | Michigan Department of Health and Human Services | Lifecourse Epidemiology and Genomics Division | PO Box 30195 / 201 Townsend St 4th Floor - Lansing, MI 48909 | Cell PPI PPI Office ph: 517-335-9456 Fax 517-335-9790 | McKanep@michigan.gov

Work Hours:

M_F 7:30am – 4:00 pm

Michigan has a public records law. Most written communications to or from state officials regarding state business are public records available to the public and media upon request. **Your e-mail communications and any attachments to them may be subject to public disclosure.**

This message, including any attachments is intended solely for the use of the named recipient(s) and may contain confidential and/or privileged information. Any unauthorized review, use, disclosure, or distribution of any confidential and/or privileged information contained in this e-mail is expressly prohibited. If you are not the intended recipient, please contact the sender by reply e-mail and destroy any and all copies of the original message.

Message

From: Dykema, Linda D. (DHHS) [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=61EF63A268374D20BB1AD24E4D6E1B1E-DYKEMA LINDA D.]
Sent: 11/10/2015 1:33:48 PM
To: Moran, Susan (DHHS) [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=187c9ca7fca94c14a6f60427230837a4-Moran Susan]
Subject: RE: Update on lead data upload issues.

LOL

From: Moran, Susan (DHHS)
Sent: Tuesday, November 10, 2015 8:33 AM
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Cc: McKane, Patricia (DHHS); Miller, Corinne (DHHS); LyonCallo, Sarah (DHHS); Lasher, Geralyn (DHHS); Wells, Eden (DHHS)
Subject: Re: Update on lead data upload issues.

Sorry, hit send too soon, we need to come up with a plan to address these issues

Sent from my iPhone

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This is not acceptable

Sent from my iPhone

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Patricia McKane, DVM MPH - Manager, Maternal & Child Health Epidemiology Section | Michigan Department of Health and Human Services | Lifecourse Epidemiology and Genomics Division | PO Box 30195 / 201 Townsend St 4th Floor - Lansing, MI 48909 | **Cell** PPI PPI Office ph: 517-335-9456 Fax 517-335-9790 | McKanep@michigan.gov

Work Hours:

M_F 7:30am – 4:00 pm

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From: Dykema, Linda D. (DHHS)
Sent: Monday, November 23, 2015 3:29 PM
To: Moran, Susan (DHHS)
Subject: FW: 2015-11-23 Flint Drinking Water Action Plan Update - FOIA EXEMPT AND ATTORNEY-CLIENT PRIVILEGED
Attachments: 18-Point Partnering Plan 11-23-15.pdf; 2015-11-23 Flint Drinking Water Action Plan Update.pdf

As requested

From: Thelen, Mary Beth (DEQ)
Sent: Monday, November 23, 2015 3:10 PM
To: Scott, Allison (GOV); Muchmore, Dennis (GOV); Agen, Jarrod (GOV); Emmitt, Beth (GOV); Bedan, Morgan (GOV)
Cc: Wyant, Dan (DEQ); Dickinson, Sarah (GOV); Edgerton, Shelly (LARA); Dykema, Linda D. (DHHS)
Subject: 2015-11-23 Flint Drinking Water Action Plan Update - FOIA EXEMPT AND ATTORNEY-CLIENT PRIVILEGED

Dear Governor's Office:

Please provide the following to the Governor as a part of his daily briefing packet. If you have any questions, please let us know.

1. 18-Point Partnering Plan
2. Flint Drinking Water Action Plan Update

As a reminder we will prepare these reports to you weekly, every Monday afternoon, for the previous week's actions.

Thank you.

Dan Wyant
Director

Department of Environmental Quality
18-Point Partnering Plan

1. **After Action Plan Frequently Asked Questions will be ready by noon on November 16, 2015**

   - First version complete – updated as needed

2. **School test data**

   - School reports to be expedited
   - Steve Busch creates summary reports
   - George Krisztian creates summary spreadsheets

3. **Blood exposure**

   - DHHS is lead on providing data

4. **Meeting with Mayor Karen Weaver**

   - Harvey Hollins lead – Dan Wyant, Jim Sygo, and George Krisztian to attend

5. **Messaging our Partnering Plan**

   - Provide ongoing public updates regarding Governor's 10-point plan
   - Continue emphasis on the availability of free testing for Flint residents
   - DEQ's Office of Environmental Assistance to direct the public to the Flint water Web site: www.mi.gov/flintwater

6. **Sampling Protocol**

   - Establish alignment with the U.S. Environmental Protection Agency (EPA), Region 5, on sampling protocol

7. **Lead service line replacement**

   - Expand the Revolving Loan Fund directed at lead service line replacement
   - Amy Epkey, Maggie Pallone, and Sonya Butler

8. Partner with EPA

- Dan Wyant → Susan Hedman
- Jim Sygo → Bob Kaplan
- Mike Prysby and Steve Busch → Darren Lytle and Mike Schock
- George Krisztian → Tom Burke
- DEQ's Office of Drinking Water and Municipal Assistance (ODWMA) staff → EPA, Region 5, staff (Jennifer Crooks and Tom Poy)

9. Meet with Charles Stewart Mott Foundation to discuss Lead Service Line Identification Study

10. Lead Education Program

- DHHS is the lead on Lead Education Program

11. Moving Karegnondi Water Authority (KWA) forward

- Proactive meetings with KWA

12. Participate actively with Flint Technical Advisory Council

13. Utilize Joan Rose and Michigan State University water expertise

14. Public outreach

- Flint Mayor Karen Weaver
- Genesee County Health Department
- Drs. Lawrence Reynolds, Eden Wells, and Matthew Davis
- Ministers
- Land Bank
- Legislators
- Citizens

15. Outreach to schools

- EPA guidance on testing
- Work with State Superintendent Brian Whiston
- ODWMA staff to work on literature

16. Make recommendations to EPA about Lead and Copper Rule

17. Compliance Communication letter sent on November 9, 2015

- Wait until after December 30, 2015

18. Enhance coordination with health officials regarding personal health notifications of drinking water issues

Flint Drinking Water Action Plan Update

FOIA EXEMPT AND ATTORNEY-CLIENT PRIVILEGE

Key Actions:

- An 18-Point Partnering Plan was developed to guide DEQ staff on the Flint water issue. The document focuses on areas of concern and identifies key partnerships. The issues in the Partnering Plan address short-term, intermediate term, and long-terms goals. This document will be reviewed at least weekly, and actions by DEQ staff with respect to the Partnering Plan will be documented. The Partnering Plan has become a standing agenda item and a central focus for the internal action plan meetings.

- On November 20 the weekly meeting was held at Flint between DEQ staff and city of Flint officials. Mayor Karen Weaver was present at the meeting. This was Mayor Weaver's first time in attendance at the weekly meeting. After introductions were made, Mayor Weaver was given an overview of the data from the free homeowner's testing. Mayor Weaver was informed that the samples were from any Flint resident who wished to have their water tested and, as such, were not necessarily representative of the site selection criteria as specified in the lead and copper rule, but with that said, the results were encouraging. Mayor Weaver was informed that over 3/4 of the samples had results of 5 parts per billion (ppb) or less and that approximately 92 percent of the sample results were at 15 ppb or less. It was also stressed to Mayor Weaver that, although the results were encouraging, there were also pockets of concern where the lead levels in the drinking water were significantly above 15 ppb.

  There was also discussion about making sure that water sample results were kept in context. In order for an individual to be sure with respect to their exposure to lead, they should have their blood tested. Individuals with an elevated blood level (EBL) would then be encouraged to have an EBL investigation done to evaluate all potential exposure pathways. There was then discussion as to what the EBL investigation entailed and how the water testing was being incorporated into the EBL.

  The meeting ended with an invitation by the DEQ to Mayor Weaver to come tour the DEQ's Laboratory to see first-hand how samples were analyzed. Mayor Weaver indicated that she would be very interested in a tour and that a date would be set up.

Positions:

- There are no new positions to report since last week.

Concerns:

- There are no new concerns to report since last week.

Significant Events:

- A Frequently Asked Questions document was provided to the Governor's Flint Water Task Force (Task Force) on November 16. DEQ staff subsequently met with the Task Force on November 18.

Changes from Previous Report:

- DEQ staff provided comments on the final draft of the DHHS protocol for EBL investigations. The sampling protocol will utilize 14 drinking water samples that will be used to identify potential sources of exposure to lead located in the plumbing system of residential dwellings.

- DEQ staff provided comment on the draft sampling protocol that the city of Flint is proposing to use for compliance monitoring for the lead and copper rule. This document has been forwarded to staff at the U.S. Environmental Protection Agency (EPA) for additional comment.

- On November 19 DEQ staff contacted EPA staff via e-mail regarding a request by the city of Flint for guidance on a corrosion control treatment evaluation for Karegnondi Water Authority source water use at the Flint Water Treatment Plant. A meeting has been scheduled for December 11 to discuss the issue with all parties.

- DEQ and DLARA staff conducted a plumbing assessment of Neithercut Elementary School in Flint on November 20.

- DEQ and DLARA staff conducted school sampling at Neithercut Elementary School in Flint on Saturday, November 21.

- A draft report for Eisenhower Elementary School was completed and is awaiting final publishing and will then be posted to the Flint water Web site: www.mi.gov/flintwater.

- Draft reports for Brownell K-2 STEM Academy and Pierce Elementary Schools are in progress and near completion.

- DEQ staff has been in meetings with the Office of the Auditor General audit team and have provided information and documentation as requested.

Other Item:

- Attached is the 18-point Partnering Plan that will guide the efforts of the DEQ regarding the Flint water issue.

Prepared by: George Krisztian, Flint Action Plan Coordinator
Laboratory Director
Department of Environmental Quality
Telephone: 517-284-6719
Cell: PPI
November 23, 2015

From: Dykema, Linda D. (DHHS)
Sent: Thursday, December 03, 2015 8:15 AM
To: Peeler, Nancy (DHHS)
Subject: RE: 11/2 CM update - Flint

thanks

From: Peeler, Nancy (DHHS)
Sent: Wednesday, December 02, 2015 4:25 PM
To: Dykema, Linda D. (DHHS); Barr, Jacqui (DHHS)
Cc: Fink, Brenda (DHHS)
Subject: 11/2 CM update - Flint

- CLPPP Nurse has maintained contact with GCHD nurses regarding child with EBLL, per our Nursing protocol. Per the GCHD Nurse, the child's lead level has continued to decrease, to 20 µg/dl.
- Received calls from Rep. Neely's office regarding an upcoming Health Fair, asking about CLPPP participation or provision of materials (may be on December 15th at a Methodist church?). Suggested that GCHD staff may be their best contact; shared with GCHD that they may receive a call.

From: Dykema, Linda D. (DHHS)
Sent: Thursday, December 03, 2015 9:50 AM
To: Miller, Corinne (DHHS);Moran, Susan (DHHS);Eden
Subject: RE: 2DEc15 SitRep
Attachments: Flint Lead MDHHS Sitrep 12 2_15.docx

Ok, added that plus an item from Wes. Also condensed EBL child info into one bullet point under CM. Please distribute if ready to go.

From: Miller, Corinne (DHHS)
Sent: Thursday, December 03, 2015 9:15 AM
To: Dykema, Linda D. (DHHS); Moran, Susan (DHHS); Eden
Subject: RE: 2DEc15 SitRep

This would be a new item. Add under healthcare provider section…Sue/Eden edit if necessary.

Moran, Wells and Miller met with Medicaid health plan staff on December 2 to discuss increased promotion by health plans of EBL testing of Flint children < 6 years of age. Status update on Flint provided. Medicaid put this issue on its agenda for discussion at its December 3 meeting with Medicaid health plan CEOs. Medicaid also suggested inviting Dr. Wells to speak about Flint at a future meeting with Medicaid health plan medical directors. Medicaid identified three individuals to partner with epidemiology staff to develop a roster of Flint children enrolled in Medicaid to provide more precise estimates on the percentage of Flint children enrolled in Medicaid who receive EBL testing.

From: Dykema, Linda D. (DHHS)
Sent: Thursday, December 03, 2015 8:52 AM
To: Moran, Susan (DHHS) <MoranS@michigan.gov>; Miller, Corinne (DHHS) <MillerC39@michigan.gov>; Eden <ewells@umich.edu>
Subject: 2DEc15 SitRep

Attached for your review

Flint Water Lead Project

Michigan Department of Health and Human Services
Situation Report for December 2, 2015

****NOTE: Contains potentially Identifiable Information- REDACT AS INDICATED****
New items for the day listed first and in bold print.

Daily Briefing and Situation Report prepared by Linda Dykema

Surveillance Indicators: People Tested since 10/1/2015: 1,361;
Children less than 6 years old ≥ 5 µg/dl since 10/1/2015: 15
Children 6 to 17 years old ≥ 5 µg/dl since 10/1/2015: 6
Adults 18 years and older ≥ 5 µg/dl since 10/1/2015: 9
Severity Indicators: Hospitalized/Discharged-1/1; Deaths- 0

DAILY ACTIVITY SUMMARY

Elevated Blood Level (EBL) Environmental Investigations – ETC Contractors, Wes Priem, Courtney Wisinski

- **3 EBL investigations completed.**
- 8 investigations scheduled.
- The high EBLL home is scheduled for Friday 12/4/15.

MDHHS/Genesee County Health Department (GCHD) Case Management (CM) Services – Nancy Peeler

- **CLPPP Nurse has maintained contact with GCHD nurses regarding hospitalized child with high EBLL, per our Nursing protocol. Second lab report received, confirming that his BLL had dropped from 52 to 36 µg/dl. GCHD Nurse reports that the child's lead level has decreased to 20 µg/dl, but the lab report has not yet been received at HHS.**
- **Received calls from Rep. Neely's office regarding an upcoming Health Fair, asking about CLPPP participation or provision of materials (may be on December 15th at a Methodist church?). Suggested that GCHD staff as their best contact: shared with GCHD as they may receive a call.**
- CM report through 11/25/15:
  - # of contacts attempted: 136
  - # offered CM: 46
  - # CM started: 5
  - # of children receiving CM who live in Flint: 5
  - # billed to Medicaid: 5
  - # Other disposition: 2 (2 children moved to Oakland County)

Epidemiology/Surveillance – Patti McKane, Martha Stanbury, Bob Scott, Jessica Cooper, Karen Lishinski

- **Established protocol for notifying HHS staff and GCHD about Flint EBL children. Master list will be complied on Monday and HHS staff and GCHD who will track their CM activities re these children and report back to HHS on Friday.**

Filter Distribution Sheryl Thompson

- **November Distribution**
  - **778 Filters**
  - **63 Pitchers**
  - **924 Replacement Filters**
- **Total Distribution since October 1, 2015**
  - **10,951 Filters**
  - **184 Pitchers**
  - **924 Replacement Filters**

Communications/Information Sharing – Linda Dykema, Eden Wells

- **Linda Dykema received call from Dr. Mark Johnson, ATSDR R5 Senior Regional Representative and CDC main point of contact. Provided an update on HHS activities.**
- **Wes Priem attended a Michigan Community Development Directors' conference on housing where he talked with Susan Wilcox, Manager for Flint Community and Economic Development Program. She will schedule a meeting with HHS staff to discuss application of the Landlord Penalty Law in city of Flint.**
- Weekly (Tues. 8:00 am) coordination call with DEQ/LARA/HHS. Discussed need for informational materials for schools/residents regarding lead free plumbing replacements.
- Technical Advisory Committee meeting originally scheduled for December 9th- , then postponed by City of Flint, may actually take place: awaiting word from City.

Health Education Resources Updates - Michelle Bruneau, Emily Houk

- **Met with Liane Shekter-Smith (MDEQ), Steve Busch (MDEQ), Kory Groetsch (MDHHS), and Jennifer Gray (MDHHS) to discuss Phosphate Fact Sheet; changes forthcoming**
- **Coordinating meeting with GCHD and MDHHS to discuss phosphate dosing and potential health implications**
- **Sent out draft of "Bath Time" fact sheet to MDHHS and GCHD for review reiterating that it's safe for adults and children to bathe in Flint tap water; requested quote via Eden from Dr. Mona Hanna-Attisha**
- **Continuing to write and coordinate additions to the EBL Case Manager Binder, now known as the MDHHS Lead Safe Family Guide Book.**
- **Pending: Aerator/Filter Maintenance Fact Sheet; Flint Parent Letter re-do in partnership with Emily Houk.**

Toxicology - Kory Groetsch, Jennifer Gray, Lisa Quiggle

- Working with GCHD and DEQ to address questions concerning impact of phosphate treatment on drinking water filters.
- Working with Healthy Homes Section staff to revise EBL report for Flint Residents.

WIC

- Letter sent 11/24 to GCHD about Ready-to-feed formula availability from WIC program
- Talking points for WIC staff and for providers shared

Healthcare/Providers

- **Moran, Wells and Miller met with Medicaid health plan staff 2 to discuss increased promotion by health plans of EBL testing of Flint children < 6 years of age. Status update on Flint provided. Medicaid put this issue on its agenda for discussion at its December 3 meeting with Medicaid health plan CEOs and suggested inviting Dr. Wells to speak to Medicaid health plan medical directors.**
- **Medicaid identified three individuals to partner with epidemiology staff to develop a roster of Flint children enrolled in Medicaid to provide more precise estimates on the percentage of Flint children enrolled in Medicaid who receive EBL testing.**
- Forum for primary care providers in Flint POSTPONED pending coordination with local providers
- WIC information to be shared by GCHD to providers

DEQ Information - Linda Dykema as Liaison

- MDEQ would like to issue school drinking water testing results in coordination with MDHHS release of the blood lead test reporting.

From: Dykema, Linda D. (DHHS)
Sent: Thursday, December 03, 2015 9:57 AM
To: Miller, Corinne (DHHS);Moran, Susan (DHHS);Eden
Subject: RE: 2DEc15 SitRep
Attachments: Flint Lead MDHHS Sitrep 12 2_15.docx

Slight revision based on Sue's further comments.

From: Miller, Corinne (DHHS)
Sent: Thursday, December 03, 2015 9:54 AM
To: Dykema, Linda D. (DHHS); Moran, Susan (DHHS); Eden
Subject: RE: 2DEc15 SitRep

Looks fine to me.

From: Dykema, Linda D. (DHHS)
Sent: Thursday, December 03, 2015 9:50 AM
To: Miller, Corinne (DHHS) <MillerC39@michigan.gov>; Moran, Susan (DHHS) <MoranS@michigan.gov>; Eden <ewells@umich.edu>
Subject: RE: 2DEc15 SitRep

Ok, added that plus an item from Wes. Also condensed EBL child info into one bullet point under CM. Please distribute if ready to go.

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Sent: Thursday, December 03, 2015 9:15 AM
To: Dykema, Linda D. (DHHS); Moran, Susan (DHHS); Eden
Subject: RE: 2DEc15 SitRep

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Subject: 2DEc15 SitRep

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Flint Water Lead Project

Michigan Department of Health and Human Services
Situation Report for December 2, 2015

****NOTE: Contains potentially Identifiable Information- REDACT AS INDICATED****
New items for the day listed first and in bold print.

Daily Briefing and Situation Report prepared by Linda Dykema

Surveillance Indicators: People Tested since 10/1/2015: 1,361;
Children less than 6 years old ≥ 5 µg/dl since 10/1/2015: 15
Children 6 to 17 years old ≥ 5 µg/dl since 10/1/2015: 6
Adults 18 years and older ≥ 5 µg/dl since 10/1/2015: 9
Severity Indicators: Hospitalized/Discharged-1/1; Deaths- 0

DAILY ACTIVITY SUMMARY

Elevated Blood Level (EBL) Environmental Investigations – ETC Contractors, Wes Priem, Courtney Wisinski

- **3 EBL investigations completed.**
- 8 investigations scheduled.
- The high EBLL home is scheduled for Friday 12/4/15.

MDHHS/Genesee County Health Department (GCHD) Case Management (CM) Services – Nancy Peeler

- **CLPPP Nurse has maintained contact with GCHD nurses regarding hospitalized child with high EBLL, per our Nursing protocol. Second lab report received, confirming that his BLL had dropped from 52 to 36 µg/dl. GCHD Nurse reports that the child's lead level has decreased to 20 µg/dl, but the lab report has not yet been received at HHS.**
- **Received calls from Rep. Neely's office regarding an upcoming Health Fair, asking about CLPPP participation or provision of materials (may be on December 15th at a Methodist church?). Suggested that GCHD staff as their best contact: shared with GCHD as they may receive a call.**
- CM report through 11/25/15:
  - # of contacts attempted: 136
  - # offered CM: 46
  - # CM started: 5
  - # of children receiving CM who live in Flint: 5
  - # billed to Medicaid: 5
  - # Other disposition: 2 (2 children moved to Oakland County)

Epidemiology/Surveillance – Patti McKane, Martha Stanbury, Bob Scott, Jessica Cooper, Karen Lishinski

- **Established protocol for notifying HHS staff and GCHD about Flint EBL children. Master list will be complied on Monday and HHS staff and GCHD who will track their CM activities re these children and report back to HHS on Friday.**

Filter Distribution Sheryl Thompson

- **November Distribution**
  - **778 Filters**
  - **63 Pitchers**
  - **924 Replacement Filters**
- **Total Distribution since October 1, 2015**
  - **10,951 Filters**
  - **184 Pitchers**
  - **924 Replacement Filters**

Communications/Information Sharing – Linda Dykema, Eden Wells

- **Linda Dykema received call from Dr. Mark Johnson, ATSDR R5 Senior Regional Representative and CDC main point of contact. Provided an update on HHS activities.**
- **Wes Priem attended a Michigan Community Development Directors' conference on housing where he talked with Susan Wilcox, Manager for Flint Community and Economic Development Program. She will schedule a meeting with HHS staff to discuss application of the Landlord Penalty Law in city of Flint.**
- Weekly (Tues. 8:00 am) coordination call with DEQ/LARA/HHS. Discussed need for informational materials for schools/residents regarding lead free plumbing replacements.
- Technical Advisory Committee meeting originally scheduled for December 9th- , then postponed by City of Flint, may actually take place: awaiting word from City.

Health Education Resources Updates - Michelle Bruneau, Emily Houk

- **Met with Liane Shekter-Smith (MDEQ), Steve Busch (MDEQ), Kory Groetsch (MDHHS), and Jennifer Gray (MDHHS) to discuss Phosphate Fact Sheet; changes forthcoming**
- **Coordinating meeting with GCHD and MDHHS to discuss phosphate dosing and potential health implications**
- **Sent out draft of "Bath Time" fact sheet to MDHHS and GCHD for review reiterating that it's safe for adults and children to bathe in Flint tap water; requested quote via Eden from Dr. Mona Hanna-Attisha**
- **Continuing to write and coordinate additions to the EBL Case Manager Binder, now known as the MDHHS Lead Safe Family Guide Book.**
- **Pending: Aerator/Filter Maintenance Fact Sheet; Flint Parent Letter re-do in partnership with Emily Houk.**

Toxicology - Kory Groetsch, Jennifer Gray, Lisa Quiggle

- Working with GCHD and DEQ to address questions concerning impact of phosphate treatment on drinking water filters.
- Working with Healthy Homes Section staff to revise EBL report for Flint Residents.

WIC

- Letter sent 11/24 to GCHD about Ready-to-feed formula availability from WIC program
- Talking points for WIC staff and for providers shared

Healthcare/Providers

- **Moran, Wells and Miller met with Medicaid health plan staff 2 to discuss increased promotion by health plans of EBL testing of Flint children < 6 years of age. Status update on Flint provided. Medicaid put this issue on its agenda for discussion at its December 3 meeting with Medicaid health plan CEOs and suggested inviting Dr. Wells to speak to Medicaid health plan medical directors.**
- **Medicaid identified three individuals to partner with epidemiology staff to develop methodology to measure/report progress on the percentage of Flint children enrolled in Medicaid who receive EBL testing.**
- Forum for primary care providers in Flint POSTPONED pending coordination with local providers
- WIC information to be shared by GCHD to providers

DEQ Information - Linda Dykema as Liaison

- MDEQ would like to issue school drinking water testing results in coordination with MDHHS release of the blood lead test reporting.

From: Dykema, Linda D. (DHHS)
Sent: Thursday, December 03, 2015 5:22 PM
To: Moran, Susan (DHHS)
Subject: RE: Call with Matt Davis

I assume that I should I still proceed with drafting a response to the Task Force as we discussed. We can always delete sections if they're not needed.

From: Moran, Susan (DHHS)
Sent: Thursday, December 03, 2015 4:42 PM
To: Lyon, Nick (DHHS); Becker, Timothy (DHHS); Lasher, Geralyn (DHHS)
Cc: Grijalva, Nancy (DHHS); Wells, Eden (DHHS); Dykema, Linda D. (DHHS)
Subject: Call with Matt Davis

We had a great call with Matt, overall seemed very supportive of our recent efforts and intends to modify the letter to the Governor based on actions taken by MDHHS.

Highlights from our discussion:

- VERY PLEASED with today's release of information regarding lead testing
- Matt supportive of our ICS-like structure (with project managed by Division of Environmental Health) – very much in line with centralized coordination and communication
- Agrees with our proposal to use Medicaid population denominator as proxy for measuring progress in accelerating lead testing efforts
- VERY pleased with the efforts to partner with, engage Medicaid Health Plans in the public health response
- Had some suggestions for using MCIR as a tool to link children and their school districts to determine potential lead exposure
- Agrees there is lack of consensus among community providers about testing infants, but Eden/Sue/Matt agree that there must be a risk assessment for lead exposure from water, infants are at highest risk for adverse effects.

Please let me know if you have questions.

From: Dykema, Linda D. (DHHS)
Sent: Tuesday, December 08, 2015 10:23 AM
To: Stanbury, Martha (DHHS)
Cc: Scott, Robert L. (DHHS)
Subject: RE: flint sitrep 12/7/15

Thanks. Nancy said she'd give me the updated numbers for CM later today.

From: Stanbury, Martha (DHHS)
Sent: Monday, December 07, 2015 4:13 PM
To: Dykema, Linda D. (DHHS)
Cc: Scott, Robert L. (DHHS)
Subject: flint sitrep 12/7/15

On duty: Martha Stanbury, Bob Scott, Jessica Cooper

- In response to a request from a reporter for lead surveillance data for the state of Michigan by zip code, there were communications between the epidemiology and surveillance management staff about case definitions and data suppression, to ensure that data analysis between what was released to the public and data that will be released in response to this request are as consistent as possible and that confidentiality is maintained. The data should be ready tomorrow.
- In response to a request from the research team at Hurley medical center for BLL data on children in Flint reported after September 15 , we will be adding an amendment to the existing Data Use Agreement. We will be talking with the team on Wednesday to be sure we are clear on what they are asking, and to ensure that the request is within the scope of their IRB approval.
- A weekly report on activities at GCHD to follow up on children with elevated BLLs was received today. This spreadsheet will continue to be updated on a weekly basis. The numbers of children needing follow-up has gone down from 183 to 169, because confirmatory venous tests have been received that are below 5 ug/dl.

Martha Stanbury, MSPH
Division of Environmental Healt
Michigan Department of Health and Human Services
PO Box 30195, Lansing, MI 48909
517-335-8364
stanburym@michigan.gov

From: Moran, Susan (DHHS)
Sent: Friday, December 11, 2015 9:01 AM
To: Dykema, Linda D. (DHHS)
Subject: RE: Model used for lead in water exposure

Sounds good.

-----Original Message-----
From: Dykema, Linda D. (DHHS)
Sent: Friday, December 11, 2015 8:48 AM
To: Moran, Susan (DHHS)
Subject: RE: Model used for lead in water exposure

Not right away. I brought it up in the 12:30 meeting yesterday with Geralyn...I'm not certain I got an answer, but I said I would look at the DEQ school reports to see what language they used. I'll follow through with that on Monday and also refresh my memory of the details in our technical support document for the modeling before I ask for an ok to share.

-----Original Message-----
From: Moran, Susan (DHHS)
Sent: Thursday, December 10, 2015 4:46 PM
To: Dykema, Linda D. (DHHS) <DykemaL@michigan.gov>
Subject: RE: Model used for lead in water exposure

Are you waiting for a response from me on this?

-----Original Message-----
From: Dykema, Linda D. (DHHS)
Sent: Thursday, December 10, 2015 2:08 PM
To: Wells, Eden (DHHS); Moran, Susan (DHHS); Lasher, Geralyn (DHHS)
Subject: RE: Model used for lead in water exposure

Eden,

GCHD has asked for it as well. I've asked for some guidance from the 6th/7th floor.

Linda

-----Original Message-----
From: Wells, Eden (DHHS)
Sent: Thursday, December 10, 2015 12:31 PM
To: Dykema, Linda D. (DHHS) <DykemaL@michigan.gov>
Subject: Model used for lead in water exposure

Stuart Batterman was asking about the bio exposure model---is that something he can see? He is working with a few in potential long term effects on health/IQ E

Sent from my iPhone

From: Scott, Robert L. (DHHS)
Sent: Friday, December 18, 2015 12:17 PM
To: Priem, Wesley F. (DHHS);Sue Gunderson
Cc: Dykema, Linda D. (DHHS);Stanbury, Martha (DHHS)
Subject: RE: CLEARCorps

Sue,

You can find recent data on blood lead testing in Flint at this website: www.michigan.gov/flintwater. Please bear in mind that with the recent upswing in testing, including many children a bit older than the usual target ages, the findings may be a bit different from usual.

Thanks,
Bob

Robert L. Scott
Childhood Lead Poisoning Prevention Program
Michigan Department of Health & Human Services
(517) 335-8178
fax (517) 335-8509

From: Priem, Wesley F. (DHHS)
Sent: Thursday, December 17, 2015 4:36 PM
To: Sue Gunderson <sue@clearcorps.org>
Cc: Scott, Robert L. (DHHS) <ScottR9@michigan.gov>
Subject: RE: CLEARCorps

Hello Sue.

I am passing your request to Bob Scott who may be able to answer your question. However he will need to know specifically what you need. I know he is swamped so if your request is for personal curiosity it may be a lower priority for him as we are really busy pulling together information to help the community at this time…I know you will understand….

FLINT's GHHI site is non-existent at this point.

I am well and good this with all this attention!

Hope you are doing well as well.

From: Sue Gunderson [mailto:sue@clearcorps.org]
Sent: Thursday, December 17, 2015 4:23 PM
To: Priem, Wesley F. (DHHS) <priemw@michigan.gov>
Subject: CLEARCorps

Hi Wes,
I imagine that the Flint disaster is keeping the state lead programs busy. The newspaper only talks about the increased number of children who are testing positive for lead but they have not said anything about what the average lead levels are. Do you have any idea what they are finding? Is there someone else that I should be asking this question to?

Isn't Flint one of Ruth Ann's cities?

Hope that you are well.

Sue

--
Sue Gunderson
Executive Director
CCUSA
651-707-7232

From: Dykema, Linda D. (DHHS)
Sent: Monday, December 21, 2015 3:16 PM
To: Moran, Susan (DHHS)
Subject: FW: 2015-12-21 Flint Drinking Water Action Plan Update - FOIA EXEMPT AND ATTORNEY-CLIENT PRIVILEGED
Attachments: 2015-12-21 Flint Drinking Water Action Plan Update.pdf; EPA 12-16-15 E-Mail to Flint.pdf; MSU Extension Nutrition and Lead release_Dec18_FINAL.pdf

Note the EPA e-mail to Flint. Speaks to Dr. Mona's point about not rushing the switch to the KWA water source next year.

From: Wyant, Dan (DEQ)
Sent: Monday, December 21, 2015 3:10 PM
To: Scott, Allison (GOV) <scotta12@michigan.gov>; Muchmore, Dennis (GOV) <muchmored@michigan.gov>; Agen, Jarrod (GOV) <AgenJ@michigan.gov>; Emmitt, Beth (GOV) <emmittb@michigan.gov>; Bedan, Morgan (GOV) <BedanM@michigan.gov>; Baird, Richard (GOV) <bairdr@michigan.gov>
Cc: Dickinson, Sarah (GOV) <DickinsonS@michigan.gov>; Edgerton, Shelly (LARA) <EdgertonS1@michigan.gov>; Dykema, Linda D. (DHHS) <DykemaL@michigan.gov>; Wyant, Dan (DEQ) <WyantD@michigan.gov>
Subject: 2015-12-21 Flint Drinking Water Action Plan Update - FOIA EXEMPT AND ATTORNEY-CLIENT PRIVILEGED

Dear Governor's Office:

Please provide the following to the Governor as a part of his daily briefing packet. If you have any questions, please let us know.

- Flint Drinking Water Action Plan Update
- EPA's December 16, 2015, e-mail to the city of Flint
- MSU Extension release regarding nutrition and lead

As a reminder we will prepare these reports to you weekly, every Monday afternoon, for the previous week's actions.

Thank you.

Dan Wyant
Director

Flint Drinking Water Action Plan Update

FOIA EXEMPT AND ATTORNEY-CLIENT PRIVILEGE

Key Actions:

DEQ staff set aside additional time this week to address the backlog of FOIA legislative requests.

A conference call with staff from the DEQ, U.S. Environmental Protection Agency (EPA), and city of Flint was held on December 15, 2015, to discuss the transition to the Karegnondi Water Authority (KWA) as the city's source of drinking water. The EPA indicated that they would provide written recommendations regarding the actions that Flint should take prior to switching to the KWA.

On December 18, 2015, staff from the DEQ and DLARA conducted an initial plumbing evaluation of Flint Community Schools' Northwestern High School and Southwestern Classical Academy. These two schools are scheduled for a final evaluation and subsequent sampling during the week of December 28, 2015. Due to the extracurricular activities that typically take place on the weekends, it was determined that the best time to conduct the sampling would be during the winter school break.

Positions:

There are no new positions to report since last week.

Concern:

On December 16, 2015, the EPA sent an e-mail to Flint City Administrator, Natasha Henderson, outlining the recommended precautionary measures for Flint to implement prior to switching to the KWA for their source water. The list of recommendations is very broad in nature and could potentially costs millions of dollars to implement. In addition, the recommendations could potentially delay the switch to the KWA by several months. Given the costs associated with implementing these measures, the city of Flint will be working to set up a meeting with Harvey Hollins and George Krisztian to discuss funding options, including asking the EPA for assistance.

Significant Event:

The DEQ has assigned Eric Pocan, Office of Drinking Water and Municipal Assistance, to serve as the project manager to assist the city of Flint with providing the documentation necessary for the city to apply for loans under the Drinking Water Revolving Loan Fund. A time line outlining the various steps in the process has been given to the city of Flint to assist them in ensuring that all requisite documents are generated and submitted within the necessary deadlines. Additional follow-up meetings will be held to assist the city with any issues related to the submission of the required documentation.

Changes from Previous Report:

- Final plumbing assessment reports for Pierce Elementary and Doyle/Ryder Elementary Schools are being prepared. Staff from the DEQ, Office of Environmental Assistance, are being trained to assist with the preparation of the reports in order to reduce the turnaround time.

- The MSU Extension provided a release regarding nutrition and lead. The release provides resources for utilizing nutrition to lessen the effects of lead exposure.

- Staff from the DEQ met with staff from the city of Flint on December 18, 2015, to discuss the recommendations made by the EPA earlier in the week. The city expressed concern that EPA's recommendations went beyond the requirements of the Lead and Copper Rule. It was agreed that further discussion needed to occur to determine how these recommendations could be funded.

- Staff from the DEQ met with the Michigan Association for Local Public Health (MALPH). One of the main topics of conversation was the Flint water situation. Members of MALPH expressed concern that the lead exposure issues were not unique to Flint and that, based on the recent article in *Bridge Magazine*, the issue was statewide and there were areas in the state that had significantly high lead exposure levels.

Other Items:

Attached is the EPA's December 16, 2015, e-mail to the city of Flint, including the document entitled, "Task Force Recommendations Regarding Flint Drinking Water Treatment Performance Evaluation."

Attached is the MSU Extension release.

Prepared by: George Krisztian, Flint Action Plan Coordinator
Laboratory Director
Department of Environmental Quality
Telephone: 517-284-6719
Cell: **PPI**
December 21, 2015

Shaler, Karen (DEQ)

From: Sygo, Jim (DEQ)
Sent: Wednesday, December 16, 2015 7:49 PM
To: Shekter Smith, Liane (DEQ); Busch, Stephen (DEQ); Prysby, Mike (DEQ); Krisztian, George (DEQ)
Subject: Fwd: EPA Flint Drinking Water Task Force Recommendations -- Performance Evaluation Period
Attachments: performance evaluation period 12-16-15 final.pdf; ATT00001.htm

FYI

Sent from my iPhone

Begin forwarded message:

> **From:** "Kaplan, Robert" <kaplan.robert@epa.gov>
> **Date:** December 16, 2015 at 5:47:22 PM EST
> **To:** Natasha Henderson <nhenderson@cityofflint.com>
> **Cc:** "Sygo, Jim (DEQ)" <SygoJ@michigan.gov>
> **Subject: EPA Flint Drinking Water Task Force Recommendations -- Performance Evaluation Period**
>
> Natasha,
>
> Attached please find the EPA Flint Drinking Water Task Force Recommendations for a Performance Evaluation Period.
>
> As we discussed on December 11 and December 15, it is important to gain operational experience at the Flint Plant prior to distribution of KWA-sourced water. We have informally referred to this as a "shakedown" period for ensuring a safe and appropriate transition to the new water source.
>
> Please feel free to call me if you have any questions. We are pleased to continue to work together.
>
> - Bob
>
> Cc: Jim Sygo, MDEQ

Flint Drinking Water Task Force (FTF 15-5)

Task Force Recommendations Regarding Flint Drinking Water Treatment Performance Evaluation

For protection of public health, Flint must avoid significant distribution system issues similar to those experienced following the source water switch to the Flint River and subsequent operation of Flint's water treatment plant.

The EPA Flint Safe Drinking Water Task Force recommends that Flint develop and implement a Performance Assessment Plan prior to distribution of water from the Karegnondi Water Authority (KWA) source. The plan must address how the treatment plant will be brought on-line, and how finished drinking water will be introduced to the distribution system. This plan is particularly important given the City has no experience treating the KWA-supplied water, and is operating a distribution system that is still recovering from the past upset.

Flint should work with its consultant and MDEQ to establish objective water quality and plant performance criteria. The plan must include operation of Flint's drinking water treatment plant for a reasonable period of time to treat KWA-supplied water until:

(1) the treated water meets finished water quality goals;
(2) the finished water quality is consistently maintained;
(3) potential plant operational and mechanical start-up issues are identified and addressed; and
(4) water plant operations staff are proficient in treating the new source.

<u>KWA water should not be distributed to the public until these conditions are satisfied.</u>

During this performance evaluation period, Flint must distribute to the public water from an alternate source. As water is already received from Detroit (Great Lakes Water Authority), that is an obvious and appropriate choice for that interim period. The length of the performance evaluation period will be dependent on the amount of time it takes for the treatment plant to consistently and reliably meet the performance criteria.

Because of similarities in source water and in treatment processes with Detroit's Huron plant, the Flint water plant will likely be configured to produce treated water with similar quality to that of the water currently being received from Detroit. Continued use of Detroit water during the performance evaluation period will minimize the risk of distribution system upsets.

We encourage Flint and the City's consultant to perform a number of assessments prior to the completion of the KWA pipeline and availability of the Lake Huron source water to expedite the plant transition period. For example, the planned bench-scale jar tests will be helpful in establishing full-scale treatment plant operating parameters. Assessment of corrosion control treatment using Detroit source water with lead pipe loop rigs in advance of switching to the KWA source may also be transferrable to the KWA source water. Pipe loops rigs operated during the performance assessment period will help predict whether lead release will be an issue when the new plant goes on line. EPA will work with the City to set up pipe loops at the Flint treatment plant.

This Document is a Non-Responsive Attachment.

From: Peeler, Nancy (DHHS)
Sent: Tuesday, December 22, 2015 11:58 AM
To: Dykema, Linda D. (DHHS)
Subject: Copy of 12182015 FLINT BLOOD LEAD CM.xlsx
Attachments: Copy of 12182015 FLINT BLOOD LEAD CM.xlsx

Flint #'s for this week, with totals added. Note the new last row, that shows all 6-17 year olds.

Genesee County Childhood Elevated Lead Case Management Weekly Report
For week ending 12/18/2015

	A	B
1	**Target Population**	**# for whom contact has been attempted**
2		
3		
4		
5		
6	All children with elevated Capillary ≥ 5 from April 2014 – September 2015 (row total = **77**)	77
7		
8	All children with newly elevated Venous ≥ 5 from April 2014 – September 2015 (row total = **83**)	79
9		
10	All children with new elevated Capillary ≥ 5 since October 2015 (row total = **11**)	10
11		
12	All children with new elevated Venous ≥ 5 since October 2015 (row total = **15**)	15
13		
14	All children **6-17** with elevated Venous or Capillary ≥ 5 since April 2014 (row total = **12**)	11
15		
16	Totals	181 0-5 year olds, 11 6-17 year olds
17		
18	** X will reflect the new, weekly numbers*	
19	Metrics included in contract (as amended 11.18.15):	
20	1. Number and percentage of target children with elevated blood lead levels of **≥ 5 ug/dL** for whom contact has been attempted.	
21	2. Number and percentage of target children with elevated blood lead levels of **≥ 5 ug/dL** that are successfully contacted and offered case management services.	
22	3. Number and percentage of target children receiving case management services.	
23	4. Number and percentage of target children receiving case management services residing in the City of Flint.	
24	5. Number of Medicaid claims filed for children enrolled in Medicaid who receive testing or nursing assessment visits.	
25		
26		
27		
28	*v3 11.23.15*	

Genesee County Childhood Elevated Lead Case Management Weekly Report
For week ending 12/18/2015

	C	D	E	F	G
1	**% for whom contact has been attempted** (Col. B / total for row)	**# successfully contacted and offered CM**	**% of total**	**# of children receiving CM**	**% of total**
2			**% of attempted**		**% of contacted**
3			(Col. D / total for row		(Col. F / total for row
4			AND		AND
5			Col. D / Col. B)		Col. F / Col. D)
6	100%	41	53%	NA	#VALUE!
7			53%		#VALUE!
8	95%	47	57%	18	22%
9			59%		38%
10	91%	8	73%	NA	#VALUE!
11			80%		#VALUE!
12	100%	13	87%	6	40%
13			87%		46%
14	92%	6	50%	2	17%
15			55%		33%
16		109 0-5 year olds, 6 6-17 year olds		24 0-5 year olds, 2 6-17 year olds	
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Genesee County Childhood Elevated Lead Case Management Weekly Report
For week ending 12/18/2015

	H	I	J	K	L
1	**# of children receiving CM who live in Flint**	**% of CM in Flint**	**# of CM Medicaid claims filed**	**% for whom Medicaid claims filed** (Col. J / Col. F)	
2		(Col. H / Col. F)			**# other**
3					**disposition**
4					(closed, moved)
5					
6	NA	#VALUE!	NA	#VALUE!	5
7					
8	18	100%	8	44%	14
9					
10	NA	#VALUE!	NA	#VALUE!	1
11					
12	6	100%	5	83%	3
13					
14	2	100%	1	50%	1
15					
16	24 0-5 year olds, 2 6-17 year olds		13 0-5 year olds, 1 6-17 year olds		23 0-5 year olds, 1 6-17 year olds
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Genesee County Childhood Elevated Lead Case Management Weekly Report
For week ending 12/18/2015

	M	N
1		
2	**% with other**	
3	**disposition**	**Disposition notes**
4	(Col. L / total for row)	
5		
6	6%	3 have been retested and now <5, but were capillary screenings; 2 have moved out of the county
7		
8	17%	2 moved out of county; 12 have retested and now <5
9		
10	9%	1 level is reading as 5 but really was a 3
11		
12	20%	3 have retested and are < 5
13		
14	7%	1 has been retested and now < 5
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From: Dykema, Linda D. (DHHS)
Sent: Tuesday, December 22, 2015 12:25 PM
To: Peeler, Nancy (DHHS)
Subject: RE: Copy of 12182015 FLINT BLOOD LEAD CM.xlsx

Thanks. I'll put these in the SitRep for today.

From: Peeler, Nancy (DHHS)
Sent: Tuesday, December 22, 2015 11:58 AM
To: Dykema, Linda D. (DHHS) <DykemaL@michigan.gov>
Subject: Copy of 12182015 FLINT BLOOD LEAD CM.xlsx

Flint #'s for this week, with totals added. Note the new last row, that shows all 6-17 year olds.

From: Moran, Susan (DHHS)
Sent: Tuesday, January 05, 2016 12:38 PM
To: Dykema, Linda D. (DHHS)
Subject: RE: daily situational reports

My bad... thanks.

From: Dykema, Linda D. (DHHS)
Sent: Tuesday, January 05, 2016 12:30 PM
To: Moran, Susan (DHHS) <MoranS@michigan.gov>; Barr, Jacqui (DHHS) <BarrJ3@michigan.gov>
Cc: Turner, Jane (DHHS) <TurnerJ1@michigan.gov>; Eggleston, Debbie (DHHS) <egglestond@michigan.gov>; Wells, Eden (DHHS) <WellsE3@michigan.gov>; Bouters, Janese (DHHS) <BoutersJ@michigan.gov>
Subject: RE: daily situational reports

Copying Janese Bouters as she typically distributes the SitReps, with Jacqui as back up.

Linda

From: Moran, Susan (DHHS)
Sent: Tuesday, January 05, 2016 12:26 PM
To: Barr, Jacqui (DHHS) <BarrJ3@michigan.gov>; Dykema, Linda D. (DHHS) <DykemaL@michigan.gov>
Cc: Turner, Jane (DHHS) <TurnerJ1@michigan.gov>; Eggleston, Debbie (DHHS) <egglestond@michigan.gov>; Wells, Eden (DHHS) <WellsE3@michigan.gov>
Subject: daily situational reports

Jacqui- please add Dr. Jane Tuner to the daily Flint water situational reports. Dr. Turner is the Associate Medical Director for the Children's Special Health Care Services (CSHCS) program, I want to link her in in so she is aware of provider engagement efforts, and similarly, Dr. Turner will keep us appraised of provider engagement/enhancement efforts that she may be involved in within the Flint community.

Jane- if you have an update for the daily report, send to Linda Dykema. Thank you!

Sue

From: Moran, Susan (DHHS)
Sent: Friday, October 09, 2015 9:47 AM
To: Robinson, Mikelle (DHHS);Miller, Mark (DHHS)
Subject: Fwd: Flint Drinking Water Action Plan Update - FOIA EXEMPT AND ATTORNEY-CLIENT PRIVILEGED

FYI

Sent from my iPhone

Begin forwarded message:

> **From:** "Moran, Susan (DHHS)" <MoranS@michigan.gov>
> **Date:** October 9, 2015 at 9:00:50 AM EDT
> **To:** "Lyon, Nick (DHHS)" <LyonN2@michigan.gov>
> **Cc:** "Lasher, Geralyn (DHHS)" <lasherg@michigan.gov>, "Hertel, Elizabeth (DHHS)" <HertelE@michigan.gov>, "Becker, Timothy (DHHS)" <beckert1@michigan.gov>, "Grijalva, Nancy (DHHS)" <GrijalvaN@michigan.gov>, Eden Wells <ewells@umich.edu>
> **Subject: Re: Flint Drinking Water Action Plan Update - FOIA EXEMPT AND ATTORNEY-CLIENT PRIVILEGED**
>
> Support local and county efforts to educate providers about Lead monitoring and follow up protocols.
>
> We want to coordinate with health dept and medical society on these efforts- Eden feel free to add.
>
> FyI- there are many kids who have a capillary (finger prick) test, but not a venous blood test, which is the next step in protocol.
>
> Sent from my iPhone
>
> On Oct 9, 2015, at 8:41 AM, Lyon, Nick (DHHS) <LyonN2@michigan.gov> wrote:
>
> > Some of these may belong to us. Are there things we should add? I would think so
> >
> > Begin forwarded message:
> >
> > > **From:** "Wyant, Dan (DEQ)" <WyantD@michigan.gov>
> > > **Date:** October 9, 2015 at 8:14:12 AM EDT
> > > **To:** "Lyon, Nick (DHHS)" <LyonN2@michigan.gov>, "Zimmer, Mike (LARA)" <zimmerm@michigan.gov>
> > > **Cc:** "Thelen, Mary Beth (DEQ)" <THELENM2@michigan.gov>
> > > **Subject: FW: Flint Drinking Water Action Plan Update - FOIA EXEMPT AND ATTORNEY-CLIENT PRIVILEGED**

I will schedule a meeting or call to discuss. Governor would like a point person assigned to each of these items.

Dan Wyant, Director
Department of Environmental Quality
517-284-6700 (New Number)

From: Wyant, Dan (DEQ)
Sent: Thursday, October 08, 2015 5:40 PM
To: Scott, Allison (GOV); Muchmore, Dennis (GOV); Agen, Jarrod (GOV); Dickinson, Sarah (GOV); Emmitt, Beth (GOV); Snyder, PPI
Cc: Wyant, Dan (DEQ)
Subject: Flint Drinking Water Action Plan Update - FOIA EXEMPT AND ATTORNEY-CLIENT PRIVILEGED
Importance: High

Dear Governor,

Below are our 26 action steps we are working on:

26 Action Steps for Next Week, October 12-16, 2015

1. Identify schools and prioritize for assessment
2. Get DLARA plumbers organized
3. Complete sampling instructions
4. MDARD info for restaurants
5. Update 2004 letter to EPA
6. Approve Flint plan for water line
7. Lead education plan for schools for Drinking Water
8. Begin regular meetings with Flint
9. Schedule WTP tour
10. Meet with schools and DLARA-invitation only
11. Update Web page
12. Contact DHHS to see where they are with United Way
13. Circulate protocol draft with EPA
14. Contact City about homeowner sample delivery
15. Communicate to MDARD and City that business samples should be coordinated though lab
16. Figure out number of samples from schools and child care facilities
17. Confirm Lynda Dykema is POC for DHHS
18. Contact KWA to find out if there are any bottlenecks we need to remove
19. Expedite 399 Plan and Phosphate Plan
20. Get update on service line index card conversion and identify where partial replacements exist
21. Make sure DHHS gets info so they can cross reference
22. Legislative contacts
23. Legislative time line and summary
24. Dan reconnect with state superintendent

25. Conduct After Action Plan
26. Change Part 54-Drinking Water Revolving Loan Fund

If you have any questions, please let me know.

Dan Wyant
Director

From: Moran, Susan (DHHS)
Sent: Tuesday, October 13, 2015 4:56 PM
To: Miller, Mark (DHHS)
Subject: Fwd: Plan
Attachments: Briefing_Action Plan_Flint Water_Oct 13 2015.docx; ATT00001.htm

Here is action plan

Sent from my iPhone

Begin forwarded message:

> **From:** "Lasher, Geralyn (DHHS)" <lasherg@michigan.gov>
> **Date:** October 13, 2015 at 3:43:04 PM EDT
> **To:** "Moran, Susan (DHHS)" <MoranS@michigan.gov>, "Wells, Eden (DHHS)" <WellsE3@michigan.gov>, "Hertel, Elizabeth (DHHS)" <HertelE@michigan.gov>
> **Cc:** "Ridley, Nancy (DHHS)" <RidleyN@michigan.gov>, "Grijalva, Nancy (DHHS)" <GrijalvaN@michigan.gov>
> **Subject: Plan**
>
> The Director has approved the attached plan and you are free to move forward with providing it to the Genesee County Health Department.
>
> This version differs slightly from the version Eden sent as I cleaned up some acronyms and removed the date at the top of the page as it doesn't seem to be needed as you have an updated time for version control. I also changed the last point under communications because it just read "send resources to Flint" which could have been misinterpreted.
>
> Thanks--g

Michigan Department of Community Health (MDHHS) / Genesee County Health Department (GCHD) Flint Water Action Plan

Highlight Green is completed

Last Updated: 2:00 PM on October 13, 2015			
Action	**Local Lead**	**MDHHS Lead**	**Tasks**
Filter/Water Distribution	Tamara Brickley (GCHD)	Sheryl Thompson, MDHHS	- Coordination of distribution (GCHD) - Identify at-risk sub-groups (GCHD) - Tracking filters- uniform registry held by GCHD - Ordering filter replacements (MDHHS)
Blood Testing	Tony LaRocco (GCHD) Possible partners: - Hurley - Great Flint Health Coalition - MIHP - LHD - Schools	Eden Wells/ Nancy Peeler (CLPPP)	- Test all ○ Students 0-16 ○ Priorities: ▪ 3 schools ▪ 2 zip codes ▪ ages 0-15 - Convene meeting with GCHD and all potential partners (MDHHS) ○ Partner with schools- information about testing sites options distributed through school districts to parents ○ Partner with Great Flint Health Coalition-network to develop testing sites and information about testing to healthcare providers ○ Partner with Hurley/McClaren/Genesys ○ Partner with MIHP/Home Visiting Program - Confirm that the state lab has capacity to handle increase in tests- CONFIRMED
Case Management Follow Up	Tony LaRocco (GCHD)	Eden Wells/ Nancy Peeler (CLPPP)	- Identification of all current positives- confirmatory testing for > 5 mcg/dl (as of April 2014) - Maintain registry of all tests performed (-/+) - Follow-up all cases >5 mcg/dl with the CLPP Case Management protocol

Elevated Blood Level Investigations(all > 5 mcg/dl)	Dawn Hallwood (GCHD)	Linda Dykema	- Secure financial resources necessary to support environmental health response - Follow-up CLPPP to see if immediate funds available - Recommendation currently Dykema/Priem is to contract with Lead Investigation company thru SEMHA-licensed investigators
Communications	Hilda McShane (GCHD)	Geralyn Lasher	- Develop plan - Daily MDHHS and GCHD phone calls (3PM) - Add Geralyn, Elizabeth,Chris Shaenow and Sheryl Thompson to 3 PM calls - Provide provider education- links sent for Governor's site to GCHD 10/12 - Provide public education - Provide risk education - Provide links with lead prevention information to Flint

From: Hensler, Jeanette (DHHS)
Sent: Thursday, October 22, 2015 9:11 AM
To: Peeler, Nancy (DHHS);Miller, Mark (DHHS)
Cc: Travis, Rashmi (DHHS)
Subject: RE: Emergency Elevated Lead Management in Flint, financial vehicle for Follow-up Nurses

Hi Mark and Nancy,
We need the information for this project in order to add this to the Genesee County Health Department agreement.

Please provide the project title, amount, and Attachment III language for this project. Please send this information to our mailbox as well as the budget liaison.

Please let me know if there will be a delay in forwarding this information.
Thank you,
Jeanette

From: Peeler, Nancy (DHHS)
Sent: Monday, October 19, 2015 5:18 PM
To: Miller, Mark (DHHS)
Cc: Hensler, Jeanette (DHHS); Travis, Rashmi (DHHS)
Subject: Re: Emergency Elevated Lead Management in Flint, financial vehicle for Follow-up Nurses

Hi Mark - we know Sherry Taylor, who we agree is great, will be good to have her involved. If they can do the nursing via the health department, we concur with that approach.

Nancy

Sent from my iPad

On Oct 19, 2015, at 3:56 PM, Miller, Mark (DHHS) <millerm1@michigan.gov> wrote:

> Jeanette and Nancy,
>
> I just had a call with Sue, Rashmi and Genesee on possible vehicles to get nurses to do the follow-up on children in Flint with elevated lead levels.
>
> Mark Valacak, the health officer already has a nurse, Sherry XXXX, who is experienced in lead management, but currently working in immunization. He also has another nurse ID'ed who can do the task. Depending on how much $ we send, he could get a couple more nurses for the follow-up, from his seasonal nurse bank (retired public health nurses).
>
> At any rate, looks like the vehicle would be through the GCHD, rather than us trying to contract from up here.
>
> Nancy what do you think of this scheme?

Jeanette, how should we work this in Egrams. Set up a separate new project?

Augment an existing project, like MCH Block Grant?

Some other procedure?

What would be fastest?

Thanks

Mark Miller
Director, Local Health Services
Michigan Department of Health & Human Services
201 Townsend, 6th Floor
Lansing MI 48913
(517) 335-8032
millerm1@michigan.gov

From: Peeler, Nancy (DHHS)
Sent: Thursday, October 22, 2015 4:50 PM
To: Miller, Mark (DHHS)
Subject: Re: Emergency Elevated Lead Management in Flint, financial vehicle for Follow-up Nurses

Rashmi wants us to insert metrics into the contract, just haven't had a chance to even think about that yet. Tomorrow. But if you are otherwise OK with the language, we didn't miss anything you think needs to be in there, then we're a step closer.

Sent from my iPad

On Oct 22, 2015, at 3:53 PM, Miller, Mark (DHHS) <millerm1@michigan.gov> wrote:

> Nancy,
>
> So:
>
> "Flint Water", and $450 k are all set.
>
> I'll bet you're waitin' on approval for the att. III language, eh?
>
> You guys are doing some impressive work on this project……
>
> mark

From: Hensler, Jeanette (DHHS)
Sent: Thursday, October 22, 2015 9:11 AM
To: Peeler, Nancy (DHHS) <PeelerN@michigan.gov>; Miller, Mark (DHHS) <millerm1@michigan.gov>
Cc: Travis, Rashmi (DHHS) <TravisR@michigan.gov>
Subject: RE: Emergency Elevated Lead Management in Flint, financial vehicle for Follow-up Nurses

Hi Mark and Nancy,
We need the information for this project in order to add this to the Genesee County Health Department agreement.

Please provide the project title, amount, and Attachment III language for this project. Please send this information to our mailbox as well as the budget liaison.

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Cc: Hensler, Jeanette (DHHS); Travis, Rashmi (DHHS)
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Nancy

Sent from my iPad

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>
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>
> Augment an existing project, like MCH Block Grant?
>
> Some other procedure?
>
> What would be fastest?
>
> Thanks
>
> Mark Miller
> Director, Local Health Services
> Michigan Department of Health & Human Services
> 201 Townsend, 6th Floor
> Lansing MI 48913
> (517) 335-8032
> millerm1@michigan.gov

From: Miller, Mark (DHHS)
Sent: Wednesday, November 18, 2015 3:46 PM
To: Robinson, Mikelle (DHHS);Peeler, Nancy (DHHS)
Subject: RE: 11182015 FLINT BLOOD LEAD CM - weekly status tracking form

Nancy, if we give the below talking points to Eden, are they accurate?

I think these would be some talking points for Eden:

The governor signed the legislation for funding on Oct. 15th.

Contracts were negotiated and in place by Oct. 23rd.

GCHD hired 2.5 staff and trained them by Nov. 10th; staff have begun to contact children and offer/conduct case management services.

There are 163 children with elevated blood lead levels reported since April 2014. Staff just started, but have contacted 5 families to offer case management, and have conducted case management on one of those cases (as of 11/13/15).

We expect these numbers to grow in the coming weeks.

From: Robinson, Mikelle (DHHS)
Sent: Wednesday, November 18, 2015 2:56 PM
To: Miller, Mark (DHHS) <millerm1@michigan.gov>
Subject: FW: 11182015 FLINT BLOOD LEAD CM - weekly status tracking form

FYI.

From: Peeler, Nancy (DHHS)
Sent: Wednesday, November 18, 2015 2:09 PM
To: Miller, Christopher (DHHS) <MillerC42@michigan.gov>; Robinson, Mikelle (DHHS) <RobinsonM18@michigan.gov>
Subject: FW: 11182015 FLINT BLOOD LEAD CM - weekly status tracking form

Data we received this morning about Flint case management.

From: Lishinski, Karen (DHHS)
Sent: Wednesday, November 18, 2015 9:12 AM
To: Peeler, Nancy (DHHS) <PeelerN@michigan.gov>
Subject: FW: 11182015 FLINT BLOOD LEAD CM - weekly status tracking form

---

From: July, Jori [mailto:jjuly@gchd.us]
Sent: Wednesday, November 18, 2015 9:09 AM

To: Lishinski, Karen (DHHS)
Subject: FW: 11182015 FLINT BLOOD LEAD CM - weekly status tracking form

Jori July MSN RN ANP-BC
PHN Supervisor
Genesee County Health Department
jjuly@gchd.us
(810) 237-4543

From: Noble, Kim
Sent: Wednesday, November 18, 2015 8:11 AM
To: Taylor, Sherry; July, Jori
Cc: July, Jori
Subject: 11182015 FLINT BLOOD LEAD CM - weekly status tracking form

One more update with newer numbers and addition to notes.
Do you want it sent to Karen before call? She had requested it prior to call.
I think Toni wants a copy too if you think it is alright.

Kim Noble RN, BSN
Public Health Nurse
Genesee County Health Department
G-3373 S. Saginaw Street
Flint, MI 48529
Telephone: 810- 237-4571
Fax: 810- 237-4612

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From: Miller, Mark (DHHS)
Sent: Friday, December 04, 2015 8:08 AM
To: Peeler, Nancy (DHHS)
Cc: Robinson, Mikelle (DHHS)
Subject: RE: case management for children with elevated blood Pb levels identified outside of Genesee County

As below, Mikelle and I chatted. I'll talk to Valacak this AM on options, but Mikelle figured we could just have Oakland (or whomever) send us a voucher for the time, and we'll pay it out of our PH&AS general funds $'s. Shouldn't be too many of them.

After you get with Karen, give me a call to consult, then I can try to cut a deal with the Health Officer in Oakland.

Mark

From: Peeler, Nancy (DHHS)
Sent: Thursday, December 03, 2015 5:21 PM
To: Miller, Mark (DHHS) <millerm1@michigan.gov>
Subject: RE: case management for children with elevated blood Pb levels identified outside of Genesee County

Well, I'm not surprised. We didn't retain any of the Flint CM funding – sent it all to Genesee - so we don't have that source to pay another county for this work.

Right now there are 2 kids, not sure if GCHD will find more. Probably a few, but my guess is it won't be a high number.

If the child is on Medicaid, yes it is billable to Medicaid, and that should always be the first fund source. Oakland does not bill Medicaid, regardless.

I will have to get with Karen to get info on what Oakland currently does to respond to EBL cases, e.g. at what level do they send a letter vs. send out a nurse, etc. It is different for every county, so I want to make sure I get you accurate information.

What we currently do in Oakland is that Surveillance sends them their weekly data file of lead results, and they invoke their own policy about how they will respond (or not). Remembering that Oakland will have no idea if a child previously lived in Flint, unless we identify that for them.

I agree, we'll have to think about alternate fund sources.

From: Miller, Mark (DHHS)
Sent: Thursday, December 03, 2015 3:55 PM
To: Peeler, Nancy (DHHS) <PeelerN@michigan.gov>
Subject: case management for children with elevated blood Pb levels identified outside of Genesee County

I chatted with GCHD; they weren't too enamored with our idea to have OCHD bill them. I told Mark V. I'd think of some more ideas and call him tomorrow. Mikelle figured if the #'s are low we'd just have them bill us……

So how many do we think we'll have in this fiscal year?

What would the bill be for case management? How would that be reduced if the child was on Medicaid?

Are there nurses in Oakland who can do case management? If so, I can probably work out a deal with the HO, especially if we can pay them.

How would we normally handle a kid ID'ed in Oakland with an elevated blood Pb level?

Mark Miller
Director, Local Health Services
Michigan Department of Health & Human Services
201 Townsend, 6th Floor
Lansing MI 48913
(517) 335-8032
millerm1@michigan.gov

From: Stanbury, Martha (DHHS)
Sent: Friday, December 18, 2015 1:23 PM
To: MDHHS-IRB
Cc: Scott, Robert L. (DHHS)
Subject: RE: For your review (Hurley amendment)
Attachments: HIPAA Waiver Request Hanna-Attisha amend 12 18 15.pdf

Hello Ian: Attached is the HIPAA waiver form amended that has been signed by Dr. Hanna-Attisha, which hopefully addresses your concerns. Please let Bob and me know. Many thanks, Martha

---

From: MDHHS-IRB
Sent: Tuesday, December 15, 2015 4:36 PM
To: Scott, Robert L. (DHHS) <ScottR9@michigan.gov>
Cc: Stanbury, Martha (DHHS) <stanburym@michigan.gov>
Subject: RE: For your review (Hurley amendment)

Hello Bob and Martha,

I want to send a note right away as I'm actually not sure this proposed revision is as straight forward as I thought it might be earlier (when I spoke with Martha). This IRB application was approved while thinking of this research as retrospective and involving data that had already been collected. Our IRB approved of the research with a waiver of the requirement for informed consent and a waiver of authorization for the Department to disclose protected health information to Hurley. The justification that permitted approval of those waivers (attached) included the following language:

"This study could not be practically conducted without Waiver of Authorization. The number of subjects would be greatly reduced if authorization was not waived for several reasons:

1) At best, possibly 75% of Flint children (and even less non-Flint children) have their labs processed at Hurley.
2) Of the patients whose labs were processed at Hurley, the contact information on file is often outdated or wrong.
3) Finally, a considerable percentage of subjects may not return calls/contacts even if the information on file was correct for them.

It is critical for this issue that we have the most data to get an accurate assessment of the impact of the water change on children's lead levels. This will help to determine risk and prioritize response. A biased sample may make any issues seem worse or better than the actual situation.

(A greatly reduced sample size would also lead to power issues with the analysis as the sample size with authorization would likely not be adequate for the analysis considering the percentage of children with elevated blood levels.)"

This language doesn't clearly support a waiver that pertains to prospective data collection. Although the issue of a biased sample may still be compelling, problems with contact information being outdated or wrong are not applicable if the potential to interact with subjects at the time of lead testing is present (that is, if the test hasn't occurred yet).

This isn't to say that a waiver of informed consent or a waiver of authorization to disclose protected health information isn't possible, but a new justification that accounts for the fact that the desired data is now to be collected prospectively is necessary. Our IRB requests that the attached document be updated to reflect this change in the research. It appears that for potentially 75% of subjects, the researcher/her institution will have an opportunity at the time blood is sampled

to obtain informed consent and authorization from Hurley patients (or parents) for the use of the test result and other patient information (address specifically) in research. If a consent process is appropriate, one should be proposed. Alternatively, a justification for why that can't occur, and/or why MDHHS must still provide identifiable data to the researcher without authorization from subjects is needed for the research to proceed.

I'm available and very willing to discuss any questions related to this. I certainly understand the interest in making data available to study this important issue. I'm also sensitive that children involved in this research have rights under the Common Rule regulations/HIPAA that prohibit the use of their identifiable information in research without consent of a parent, or without an approved waiver of the requirement for informed consent. Aside from having the researcher respond with an informed consent proposal or a revised version of the attached document, let me know if you have questions or concerns at this point.

Thank you,
-Ian

Ian A. Horste, MPH
Institutional Review Board Administrator/Chair
Michigan Department of Health and Human Services
517-241-0806
www.michigan.gov/irb

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From: Scott, Robert L. (DHHS)
Sent: Tuesday, December 15, 2015 10:59 AM
To: MDHHS-IRB <MDHHS-IRB@michigan.gov>
Cc: Stanbury, Martha (DHHS) <stanburym@michigan.gov>
Subject: For your review (Hurley amendment)

Ian,

Please see attached.

Thanks,
Bob

Robert L. Scott
Childhood Lead Poisoning Prevention Program
Michigan Department of Health & Human Services
(517) 335-8178
fax (517) 335-8509

Study Title: Analysis of Pediatric Blood Lead Levels in Flint, MI

Responsible Department Employee: Robert L. Scott

Primary Investigator: Mona Hanna-Attisha MD MPH

Research Staff Requiring Access to Protected Health Information (PHI):
Mona Hanna-Attisha MD, MPH; Jenny LaChance MS; Richard Sadler PhD; Allison Schnepp MD

Name(s) of Covered Entity(ies) and Location(s) Where PHI Will Be Reviewed:
--Hurley Medical Center, One Hurley Plaza, Flint, MI 48503
--Division of Public Health, College of Human Medicine, Michigan State University, 200 East 1st Street Room 337, Flint, MI 48502

PHI Required and Intended Use:
Child ID number, date of birth, date of blood draw, address with zip code.

Child ID number is required so that we can remove duplicate entries when one child has multiple lead level results.
Date of birth and date of draw are needed to calculate age at time of blood draw.
Date of blood draw is also needed to determine time period in relation to water switch (pre/post).
Address with zipcode is needed for GIS (geographic information system) analysis and to determine if child lives in potentially high risk area for lead.

Does the use or disclosure of the PHI involve more than minimal risk to the privacy of the potential subjects? (please select one answer) __ YES X NO
Data will be sent to researchers using secure email transfer from State of Michigan system. Data will be kept very secure through the use of encrypted thumb drives (or on hospital secure computers in individual researchers' offices) and only seen by 4 researchers. Data will be with one of the researchers or in a locked office at all times. Identifiers will be removed for files for analysis as not needed and all identifiable data destroyed once not needed.

Describe your plan to destroy identifiers at the earliest opportunity consistent with conducting the research. (All identifier links must be destroyed for minimal risk research. For other research, unless there is a health or research justification for retaining the identifiers or such retention is otherwise required by law. If retention of identifiers is required, explain the reason and indicate that the identifiers will be stored and retained.)

Child ID number is required so that we can remove duplicate entries when one child has multiple lead level results. Once duplicates have been removed, child ID number will be deleted from raw data file.

Date of birth is required so we can determine the age of the child at time of blood lead level. Date of birth will be removed from the raw data file once the age has been calculated.

Date of lead level blood draw will be kept in raw data file (but not analysis file) until 1-year post dissemination in case there is a need to redefine pre/post (or other time period) based on other information learned or requests from others.

Addresses must be kept with raw data file and GIS analysis file as these are the basis for the GIS analysis. GIS software uses addresses in its calculations. Addresses will be destroyed 1 year post final dissemination as this allows time for other researchers to question work (i.e., peer response) and for us to produce other information if necessary based on commentary/questions. After 1 year post dissemination, only GIS maps that were created will be kept.

Describe your plan to adequately protect the identifiers from improper use and disclosure (Check all that apply and explain other protective measures you will use):

X Names and other direct identifiers of individuals will be removed at the earliest possible time if consistent with research design
X Protected health information (PHI) will be kept in locked storage when not in use
X Records of research subjects or potential subjects will be kept separate from other patient records
X Access to records will be restricted to those persons directly involved in the research
NA Records of individuals not selected to participate in research will be destroyed as soon as possible
X If researcher discloses PHI to a third party (e.g. a research sponsor, data analyst, centralized database, etc.) researcher has received written assurances that the third party will maintain confidentiality of the PHI

Describe why the study could not practicably be conducted without access to and use of the protected health information (PHI) requested:

Child ID number is required so that we can remove duplicate entries when one child has multiple lead level results.
Date of birth and date of draw are needed to calculate age at time of blood draw.
Date of blood draw is also needed to determine time period in relation to water switch.
Address with zipcode is needed for GIS analysis and to determine if child lives in potentially high risk area for lead

All of the above are needed to assess the change in lead levels in children in Flint, MI. Without each of these elements, we wouldn't be able to assess the impact of the water

source changes. Without the Child ID number we wouldn't be able to remove duplicates from the data. Without date of birth (and date of blood draw), we wouldn't know the child's age at time of blood draw. Without the date of blood draw, we wouldn't be able to determine if the child's lead level represents the pre or post time period in relation to the initial water swtich or, if from after the switch back to Lake Huron water, when in relation to the switch back to Lake Huron water. Finally, without the addresses, we wouldn't be able to use GIS software to examine the trends and patterns of blood lead levels in the city and how they may have changed pre/post/follow up the water switch. The addresses are especially important as these can also help guide efforts for change and interventions in specific areas and may allow us to see the relation to lead service lines (once that information is available from City of Flint.)

Describe why the study could not practicably be conducted without this Waiver of Authorization:

We have revised our study methods (and revised our study proposal) so that we are now collecting data prospectively. We have revised this Waiver of Authorization accordingly. Without the waiver, we could not identify if the child lived in an area with Flint water, if the child was younger and therefore potentially more vulnerable, if the data is unique lead result for 1 child. Finally, without the waiver we would not be able to determine the water conditions (source and timing from change of sources) at the lead value.

Our revised study could not be practically conducted without this Waiver of Authorization. The research proposal that initially was approved by the MDHHS IRB was a retrospective study of the association between lead in the Flint water system and blood lead levels of children potentially exposed to lead via the water system. We are requesting an amendment to this project to extend our analysis prospectively in order to be able to track trends in children's blood lead levels as the water system undergoes changes to lower lead levels. We are requesting that the waiver of consent be continued under this amendment for the following reasons:

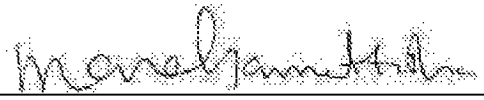
1) The study continues to involve no more than minimal risk to the subjects.
2) The waiver will continue to not adversely affect the rights and welfare of the subjects.
3) The research could not practicably be carried out without the waiver. The research is designed to use population-based data on ALL children with blood lead tests within the geographic area, which is available from the MDHHS laboratory-based registry of children's blood lead tests, to track trends over time and associate trends with water provided by the Flint public water supply system. The IRB has already agreed that efforts to obtain consent retrospectively would have been infeasible and has granted the waiver. Prospective data on children's blood lead levels is necessary to have a complete picture of the relationship of lead in the Flint water system and trends in children's blood lead levels. This is because of changes instituted in the source of water and its treatment in October 2015, and additional changes that will be implemented in the future. Although it is theoretically possible to request consent from the parents/guardians of the children who come in the future to Hurley Medical Center for their blood lead test, the effort to obtain consent, in person, would be very difficult to coordinate among the multiple practitioners at the Center and thus it can be anticipated

that written consent would be missing from a significant number of tested children at Hurley. Furthermore, 25% of children tested for lead in Flint are tested outside of the Hurley Medical Center, including children whose blood lead tests are ordered by a practitioner outside of the Hurley system, children tested in WIC clinics, and children tested in clinics run by the Genesee County Health Department and other venues. It would be nearly impossible logistically and with existing resources to establish a process to request consent at the time of testing in these venues. Not having the full counts of all children tested for the duration of the study (i.e. population-based from the start to the end of the study) would introduce bias into the study results, make it impossible to track trends over time from the start date of the study until the time in the future when the water system problems have been corrected, and invalidate statistical methods used to track these time trends. It should be emphasized that the minimal amount of Protected Health Information requested from the MDHHS childhood lead registry is used only to identify the same child with multiple blood lead test results, assign age, in years, to each child tested, and for mapping of areas within Flint that are high risk for lead poisoned children. These identifiers will be removed when no longer needed for data analysis, except for address which will kept for 1 year post final dissemination.

Statement of the Primary Investigator:

I affirm that:

- The requested access, use or disclosure of PHI is necessary for the purposes of the proposed research;
- The requested access, use or disclosure of PHI is solely for the purpose for which waiver is being requested;
- The waiver of authorization will not adversely affect the welfare or privacy rights of the research subjects;
- The benefits of research outweigh the risks to the privacy rights of the research subjects;
- The requested information constitutes the minimum necessary data to accomplish the goals of the research; and,
- The protected health information will not be re-used or disclosed to any other person or entity, except as required by law, for the authorized oversight of the research study, or for other research for which the use or disclosure of protected health information would be permitted by the HIPAA Privacy Rule.



12-18-15

Primary Investigator's Signature **Date**

Message

From: Moran, Susan (DHHS) [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=187C9CA7FCA94C14A6F60427230837A4-MORAN SUSAN]
Sent: 12/3/2015 1:11:32 AM
To: Stanbury, Martha (DHHS) [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=9051f88309e84aea86fb48005135336d-Stanbury Martha]
CC: Miller, Corinne (DHHS) [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=2a1eb71cc5e443b3bb368d7f77bc5f5b-Miller Corinne]
Subject: Re: 2014 lead data

Nice response Martha, really appreciate your thoughtful approach to the many complexities of this situation.

Sue

Sent from my iPhone

On Dec 2, 2015, at 5:00 PM, Stanbury, Martha (DHHS) <stanburym@michigan.gov> wrote:
It is true that those old reports do have unsuppressed data by zip code. Colin has weighed in recently on this with Bob Scott, so Bob has told me, advising that this should change. I support the need to implement a set of suppression rules for CLPP data. Coincidently, Corinne recently convened a workgroup to discuss the issue of data suppression for all of the BOE surveillance systems. (Note: different surveillance programs use different rules, for various reasons). We will need to discuss this issue with Corinne and, I would assume, Colin, and come up with an appropriate set of rules for CLPP before we release 2014 zipcode level counts.

From: Lasher, Geralyn (DHHS)
Sent: Wednesday, December 02, 2015 4:52 PM
To: Dykema, Linda D. (DHHS); Stanbury, Martha (DHHS)
Cc: Eisner, Jennifer (DHHS); Wells, Eden (DHHS); Miller, Corinne (DHHS); Moran, Susan (DHHS); Minicuci, Angela (DHHS)
Subject: RE: 2014 lead data

So does what the HHS privacy officer is telling us apply to the reports that have been posted on our website for some time with 2012 and 2013 data? I am not sure those tables that are currently posted have suppressed data.

http://www.michigan.gov/documents/mdhhs/CLPPP_2013_Data_Report_502175_7.pdf
http://www.michigan.gov/documents/mdch/2012AnnualDataReportOnBloodLeadLevels_419508_7.pdf

These reports are easily found at the CLPPP page from here http://www.michigan.gov/mdhhs/0,5885,7-339-73971_4911_4913---,00.html

From: Dykema, Linda D. (DHHS)
Sent: Wednesday, December 02, 2015 4:19 PM
To: Lasher, Geralyn (DHHS) <lasherg@michigan.gov>; Stanbury, Martha (DHHS) <stanburym@michigan.gov>
Cc: Eisner, Jennifer (DHHS) <EisnerJ@michigan.gov>; Wells, Eden (DHHS) <WellsE3@michigan.gov>; Miller, Corinne (DHHS) <MillerC39@michigan.gov>; Moran, Susan (DHHS) <MoranS@michigan.gov>; Minicuci, Angela (DHHS) <MinicuciA@michigan.gov>

Subject: RE: 2014 lead data
Importance: High

Okay! If the reporter is asking for 2014 zip code data for the state, here is the answer:

- <!--[if !supportLists]--><!--[endif]-->We have those data – de-duplicated by year (as was the report for the Gov's office), BUT
- <!--[if !supportLists]--><!--[endif]-->Only for cases that were confirmed by a venous blood draw (would not include capillary finger pokes that were included in the counts for the Gov's office, so the counts would not match), AND
- <!--[if !supportLists]--><!--[endif]-->Many of the zip codes have a very small number of cases, so we would have to suppress the data for those zip codes per Colin Boes, HHS privacy officer.

The history behind the case definition is a longer story, but if we want to provide zip code data that matches the data provided in the "one-pager" that is now 3 pages, it will take time. Not sure how much until Patti McKane is involved.

Linda

From: Lasher, Geralyn (DHHS)
Sent: Wednesday, December 02, 2015 2:35 PM
To: Dykema, Linda D. (DHHS); Stanbury, Martha (DHHS)
Cc: Eisner, Jennifer (DHHS); Wells, Eden (DHHS); Miller, Corinne (DHHS); Moran, Susan (DHHS); Minicuci, Angela (DHHS)
Subject: RE: 2014 lead data
Importance: High

Well, let us know today what the timeframe is on the 2014 CLPPP zip code level data so we can answer the reporter. IF the answer is simply "it is still being worked on and I don't have a release date yet" that is fine, but someone needs to get us an answer today.

From: Dykema, Linda D. (DHHS)
Sent: Wednesday, December 02, 2015 1:29 PM
To: Lasher, Geralyn (DHHS) <lasherg@michigan.gov>
Cc: Eisner, Jennifer (DHHS) <EisnerJ@michigan.gov>; Wells, Eden (DHHS) <WellsE3@michigan.gov>; Miller, Corinne (DHHS) <MillerC39@michigan.gov>; Moran, Susan (DHHS) <MoranS@michigan.gov>; Minicuci, Angela (DHHS) <MinicuciA@michigan.gov>; Stanbury, Martha (DHHS) <stanburym@michigan.gov>
Subject: RE: 2014 lead data

Exactly. So if the call comes into your office, please go first to Martha rather than to staff so we can coordinate the response. And the '14 data are on our radar.

From: Lasher, Geralyn (DHHS)
Sent: Wednesday, December 02, 2015 1:22 PM
To: Dykema, Linda D. (DHHS)
Cc: Eisner, Jennifer (DHHS); Wells, Eden (DHHS); Miller, Corinne (DHHS); Moran, Susan (DHHS); Minicuci, Angela (DHHS);

Stanbury, Martha (DHHS)
Subject: Re: 2014 lead data

Thanks Linda, but the media call originated in our office.

the bigger issue here is this is data that is routinely available on the MDHHS web site and before the '14 data is posted and/or provided to a reporter, we want to ensure that the program and Epi agree it is correct. I would not want to be in a situation where epi looks at the past data posted and says "we don't think that is accurate".

Sent from my iPad

On Dec 2, 2015, at 1:13 PM, Dykema, Linda D. (DHHS) <DykemaL@michigan.gov> wrote:
Hi Jennifer,

Martha has instructed Bob and Jessica that they must inform her should they get any further media calls. Martha will then alert the PIO office and other PHCSA leadership so that we can ensure consistency in the lead data and information HHS is making public. Should the inquiry come to you first, please work through Martha and we'll make sure you get what you need. Thanks

Linda

From: Eisner, Jennifer (DHHS)
Sent: Tuesday, December 01, 2015 5:36 PM
To: Wells, Eden (DHHS); Miller, Corinne (DHHS); Moran, Susan (DHHS); Lasher, Geralyn (DHHS); Dykema, Linda D. (DHHS); Minicuci, Angela (DHHS)
Subject: FW: 2014 lead data

All –

A reporter with Bridge Magazine is requesting the statewide 2014 (and if possible, 2015) CLPPP data. Bob sent me the attached county-level info for 2014 which I have not shared yet, as it's not the final report.

We would like to touch base to make sure the data has been finalized and reviewed by epi before it's posted online.

Eden – we'll reach out to you in the morning to discuss the media request. Beyond the data, the reporter is also interested in discussing home lead investigations.

Jennifer Eisner
Public Information Officer
Michigan Department of Health and Human Services
Office: 517-241-2112 or EisnerJ@michigan.gov
Cell: PPI

From: Scott, Robert L. (DHHS)
Sent: Tuesday, December 01, 2015 12:51 PM

To: Eisner, Jennifer (DHHS) <EisnerJ@michigan.gov>
Subject: 2014 lead data

Please see three attached files.

Robert L. Scott
Childhood Lead Poisoning Prevention Program
Michigan Department of Health & Human Services
(517) 335-8178
fax (517) 335-8509

From: Scott, Robert L. (DHHS)
Sent: Tuesday, December 08, 2015 11:47 AM
To: Stanbury, Martha (DHHS)
Subject: RE: 12042015 FLINT BLOOD LEAD CM - weekly status tracking form v4 11.24.15.xlsx

No, I didn't get it.

From: Stanbury, Martha (DHHS)
Sent: Tuesday, December 08, 2015 11:32 AM
To: Scott, Robert L. (DHHS) <ScottR9@michigan.gov>
Subject: FW: 12042015 FLINT BLOOD LEAD CM - weekly status tracking form v4 11.24.15.xlsx

See below: Did you get this tracking form ? If yes, do the numbers add up to what they put on the spreadsheet?

From: Wells, Eden (DHHS)
Sent: Tuesday, December 08, 2015 10:57 AM
To: Peeler, Nancy (DHHS)
Cc: Dykema, Linda D. (DHHS); Stanbury, Martha (DHHS); Miller, Corinne (DHHS)
Subject: Re: 12042015 FLINT BLOOD LEAD CM - weekly status tracking form v4 11.24.15.xlsx

Good!

Sent from my iPhone

On Dec 8, 2015, at 10:41 AM, Peeler, Nancy (DHHS) <PeelerN@michigan.gov> wrote:

> We need to have some conversation with them to understand the data -- not sure if that will change anything. But I'm very concerned that the # of children actually receiving CM is quite low. More than last week, but still quite low. I'd like to get their perspective on what they thing is happening, barriers and challenges, etc. We have a call with them today, will broach the topic then.
>
> Nancy
>
> ---
>
> **From:** Dykema, Linda D. (DHHS)
> **Sent:** Tuesday, December 08, 2015 10:37 AM
> **To:** Wells, Eden (DHHS) <WellsE3@michigan.gov>
> **Cc:** Stanbury, Martha (DHHS) <stanburym@michigan.gov>; Miller, Corinne (DHHS) <MillerC39@michigan.gov>; Peeler, Nancy (DHHS) <PeelerN@michigan.gov>
> **Subject:** RE: 12042015 FLINT BLOOD LEAD CM - weekly status tracking form v4 11.24.15.xlsx
>
> Ok,
>
> Nancy I totaled the numbers and added them to the sitrep.
>
> ---
>
> **From:** Wells, Eden (DHHS)
> **Sent:** Tuesday, December 08, 2015 10:32 AM

To: Dykema, Linda D. (DHHS)
Cc: Stanbury, Martha (DHHS); Miller, Corinne (DHHS)
Subject: Re: 12042015 FLINT BLOOD LEAD CM - weekly status tracking form v4 11.24.15.xlsx

Ok- either way- this is this weeks report!

Sent from my iPhone

On Dec 8, 2015, at 10:28 AM, Dykema, Linda D. (DHHS) <DykemaL@michigan.gov> wrote:

> We don't have calls on Tuesdays now, just Thursdays.
>
> ---
>
> **From:** Wells, Eden (DHHS)
> **Sent:** Tuesday, December 08, 2015 9:44 AM
> **To:** Dykema, Linda D. (DHHS)
> **Cc:** Stanbury, Martha (DHHS); Miller, Corinne (DHHS)
> **Subject:** Fw: 12042015 FLINT BLOOD LEAD CM - weekly status tracking form v4 11.24.15.xlsx
>
> Case Tracking Report from GCHD---so that Toni doesn't have to read off it during today's call,
>
> E
>
> ---
>
> **From:** LaRocco, Toni <tlarocco@gchd.us>
> **Sent:** Tuesday, December 8, 2015 9:21 AM
> **To:** Wells, Eden (DHHS)
> **Subject:** FW: 12042015 FLINT BLOOD LEAD CM - weekly status tracking form v4 11.24.15.xlsx

Toni L LaRocco MS, RN
Director of Nursing Services
Genesee County Health Department
810.237.4544
tlarocco@gchd.us

"Gratitude unlocks the fullness of life. It turns what we have into enough, and more, It turns denial into acceptance, chaos to order, confusion to clarity. It can turn a meal into a feast, a house into a home, a stranger into a friend. Gratitude makes sense of our past, brings peace for today, and creates a vision for tomorrow."- Melody Beattie

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From: Noble, Kim
Sent: Tuesday, December 8, 2015 9:05 AM
To: Taylor, Sherry; July, Jori; LaRocco, Toni; Lishinski, Karen (DHHS); peelern@michigan.gov
Cc: Wenstrom, Janet
Subject: 12042015 FLINT BLOOD LEAD CM - weekly status tracking form v4 11.24.15.xlsx

Good morning
Here is our weekly status report for the week ending 12/4/15.
Thank you
Kim
Kim Noble RN, BSN
Public Health Nurse
Genesee County Health Department
G-3373 S. Saginaw Street
Burton, MI 48529
Telephone: 810- 237-4571
Fax: 810- 237-4612
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From: Peeler, Nancy (DHHS)
Sent: Friday, December 11, 2015 3:14 PM
To: Stanbury, Martha (DHHS)
Subject: Re: # of kids =>6 w elevated BLL

Yes, very helpful!

Sent from my iPhone

On Dec 11, 2015, at 3:12 PM, Stanbury, Martha (DHHS) <stanburym@michigan.gov> wrote:

> As per our discussion just now, in 2014, 913 kids age 6 -17 were tested in Genesee and 6 had a BLL =>5. (This includes Flint and is whole year, not april-Dec)
> For Flint alone in 2014,428 were tested and 5 had BLL =>5 in 2014. (i.e. 5 of the 6 elevated lived in flint)
>
> For 2015 through November, 1,197 were tested in Genesee and 10 were elevated.
> For flint alone in 2015, 765 were tested and 8 were elevated.
>
> I hope this helps.
>
> Martha Stanbury, MSPH
> Division of Environmental Health
> Michigan Department of Health and Human Services
> PO Box 30195, Lansing, MI 48909
> 517-335-8364
> stanburym@michigan.gov

From: Scott, Robert L. (DHHS)
Sent: Monday, December 14, 2015 9:23 AM
To: 'Genesee'
Cc: Stanbury, Martha (DHHS)
Subject: map
Attachments: fint 121015.pdf

Sherry,

Please see attached. Per my boss's stipulations: it can be displayed for a limited time, but no hard copy; and it should not be posted on a website or otherwise distributed outside the health department.

Let me know if you have questions.

Thanks,
Bob

Robert L. Scott
Childhood Lead Poisoning Prevention Program
Michigan Department of Health & Human Services
(517) 335-8178
fax (517) 335-8509

From: Scott, Robert L. (DHHS)
Sent: Monday, December 14, 2015 12:56 PM
To: Maqsood, Junaid (DHHS)
Cc: Stanbury, Martha (DHHS)
Subject: RE: PDF map of flint
Attachments: fint 121015.mxd; New WinZip File (2).zip; fint 121015.pdf

Junaid,

Please see attached: the ArcGIS file itself, plus a zipfile with all related shapefiles. Also the PDF so you can see what's it looks like.

Let me know if you have questions.

Thanks,
Bob

From: Stanbury, Martha (DHHS)
Sent: Monday, December 14, 2015 12:11 PM
To: Scott, Robert L. (DHHS) <ScottR9@michigan.gov>
Cc: Maqsood, Junaid (DHHS) <MaqsoodJ@michigan.gov>
Subject: FW: PDF map of flint

Can you get Junaid the map and he'll try doing the randomization.

From: Maqsood, Junaid (DHHS)
Sent: Monday, December 14, 2015 11:27 AM
To: Stanbury, Martha (DHHS) <stanburym@michigan.gov>
Subject: RE: PDF map of flint

I looked up how to do randomization in GIS and think I might have found a way (http://forums.esri.com/Thread.asp?c=93&f=1113&t=280712&mc=4#msgid869058).

I can give it a try if I can access Bob's map document.

From: Stanbury, Martha (DHHS)
Sent: Monday, December 14, 2015 10:10 AM
To: Maqsood, Junaid (DHHS) <MaqsoodJ@michigan.gov>
Subject: FW: PDF map of flint

See below – and I'll stop by.

From: Dykema, Linda D. (DHHS)
Sent: Monday, December 14, 2015 8:29 AM
To: Miller, Corinne (DHHS) <MillerC39@michigan.gov>
Cc: Stanbury, Martha (DHHS) <stanburym@michigan.gov>; Scott, Robert L. (DHHS) <ScottR9@michigan.gov>
Subject: RE: PDF map of flint

Randomization seems the best, most data protective option. Martha, can Junaid handle this or do we need some assistance from the 5th floor?

From: Miller, Corinne (DHHS)
Sent: Friday, December 11, 2015 2:19 PM
To: Dykema, Linda D. (DHHS) <DykemaL@michigan.gov>
Cc: Stanbury, Martha (DHHS) <stanburym@michigan.gov>; Scott, Robert L. (DHHS) <ScottR9@michigan.gov>
Subject: RE: PDF map of flint

If the observations are geocoded to the street address, I would be uncomfortable sharing it as part of a public presentation except under three options:

1) The "point" is randomized. That can be done and still preserve clustering, which is what I think the county wants to show. The map label can indicate that the locations have been adjusted for confidentiality purposes. Someone on the fifth floor could help with randomization if needed.
2) Have attendees sign a confidentiality agreement but that is not going to be possible if there are more than a handful in the audience.
3) Show the map for a limited amount of time but attendees are not provided a hard copy and the map is not posted on a web site.

It helps that the data cover multiple years.

Option 1 is preferred for a public presentation. Option 3 is also doable. If the presentation is just to health department staff I don't see a problem in presenting the information as is.

From: Dykema, Linda D. (DHHS)
Sent: Friday, December 11, 2015 8:42 AM
To: Miller, Corinne (DHHS) <MillerC39@michigan.gov>
Cc: Stanbury, Martha (DHHS) <stanburym@michigan.gov>; Scott, Robert L. (DHHS) <ScottR9@michigan.gov>
Subject: FW: PDF map of flint

Corinne,

Please see the attached map. I don't see it as violating confidentiality, but I've no expertise in this. Should this be sent to Colin Boes or someone else for confirmation that it's ok to present?

Linda

From: Stanbury, Martha (DHHS)
Sent: Thursday, December 10, 2015 5:38 PM
To: Dykema, Linda D. (DHHS) <DykemaL@michigan.gov>
Cc: Scott, Robert L. (DHHS) <ScottR9@michigan.gov>
Subject: FW: PDF map of flint

GCHD requested a map with kids with elevated BLLs. They want to use it in a presentation, as I understand it.. Please see attached. Does this violate confidentiality?

From: Scott, Robert L. (DHHS)
Sent: Thursday, December 10, 2015 5:32 PM

To: Stanbury, Martha (DHHS) <stanburym@michigan.gov>
Subject: PDF map of flint

Please see attached.

Robert L. Scott
Childhood Lead Poisoning Prevention Program
Michigan Department of Health & Human Services
(517) 335-8178
fax (517) 335-8509

PHI

From: Maqsood, Junaid (DHHS)
Sent: Wednesday, December 16, 2015 1:33 PM
To: Stanbury, Martha (DHHS);Scott, Robert L. (DHHS)
Subject: Flint map with randomized points
Attachments: fint 121015.pdf; Flint Randomized 12162015.pdf

Martha and Bob,

Attached is the map of Flint with points randomized by zip code, meaning I calculated the # of cases with BLL between 5 and 9 ug/dL (inclusive) and with BLL ≥10 ug/dL for each zip code and plotted the same number of cases per zip code in random locations within the zip code boundary. Unfortunately, as we originally suspected, the clustering of cases depicted in the original map (also attached) is lost with this randomization.

Junaid

PHI

Flint Area
Children with Elevated Blood Lead Levels
2010-2014

- Child w/ BLL 5 to 9 ug/dL (Randomized by ZIP)
- Child w/ confirmed BLL >=10 ug/dL (Randomized by ZIP)

Source: MDCH Data Warehouse, Lead Specimen table

Updated December 16, 2015

From: Taylor, Sherry <STAYLOR@gchd.us>
Sent: Wednesday, December 16, 2015 4:29 PM
To: Scott, Robert L. (DHHS)
Cc: Stanbury, Martha (DHHS)
Subject: RE: 2014 lead

Oh Bob,

I am sorry I forgot to let you know the meeting for CHAP this week was cancelled so Toni will do the presentation in January.

Thank you

Sherry Taylor, RN, BSN
Public Health Nurse Coordinator
Genesee County Health Department
G-3373 S. Saginaw Street
Flint, MI 48529
Telephone: 810- 257-3833
Fax: 810- 237-4612

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From: Scott, Robert L. (DHHS) [mailto:ScottR9@michigan.gov]
Sent: Wednesday, December 16, 2015 2:37 PM
To: Taylor, Sherry
Cc: Stanbury, Martha (DHHS)
Subject: RE: 2014 lead

Sherry,

I forgot to ask about this (the map for Toni) on our call yesterday. Has she already done the presentation?

It was deemed that the points on the map should be somewhat randomized to protect privacy. One of my colleagues made a first attempt at that, but it spread them out so evenly as to be pointless. (no pun intended) He's going to try again.

Please let me know whether you need a map or not. He'll probably keep working anyway, to learn more for future requests.

Thanks,
Bob

From: Scott, Robert L. (DHHS)
Sent: Thursday, December 10, 2015 5:31 PM
To: 'Taylor, Sherry' <STAYLOR@gchd.us>
Subject: RE: 2014 lead

I talked with my supervisor, showed her the new map, explained you have the old one—she's going to talk with her boss tomorrow. If we can do this, would Monday be soon enough?

Thanks,
Bob

From: Taylor, Sherry [mailto:STAYLOR@gchd.us]
Sent: Thursday, December 10, 2015 12:42 PM
To: Scott, Robert L. (DHHS) <ScottR9@michigan.gov>
Subject: RE: 2014 lead

The map is going to be used in a Presentation that Toni is giving to a community partner, CHAP. So yes it is an audience outside of the health dept.

Sherry Taylor, RN, BSN
Public Health Nurse Coordinator
Genesee County Health Department
G-3373 S. Saginaw Street
Flint, MI 48529
Telephone: 810- 257-3833
Fax: 810- 237-4612

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From: Scott, Robert L. (DHHS) [mailto:ScottR9@michigan.gov]
Sent: Thursday, December 10, 2015 12:03 PM
To: Taylor, Sherry
Subject: RE: 2014 lead

Sherry,

Can you tell me what the map will be used for? If it will stay internal to GCHD, no problem. But if you're planning to display it to an outside audience, there may be a problem regarding confidentiality. (Even though the map will be similar to last year's, there is more and more attention to what goes out these days.)

Thanks,
Bob

From: Taylor, Sherry [mailto:STAYLOR@gchd.us]
Sent: Thursday, December 10, 2015 11:12 AM

To: Scott, Robert L. (DHHS) <ScottR9@michigan.gov>
Subject: RE: 2014 lead

Thanks

Sherry Taylor, RN, BSN
Public Health Nurse Coordinator
Genesee County Health Department
G-3373 S. Saginaw Street
Flint, MI 48529
Telephone: 810- 257-3833
Fax: 810- 237-4612

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From: Scott, Robert L. (DHHS) [mailto:ScottR9@michigan.gov]
Sent: Thursday, December 10, 2015 9:17 AM
To: Taylor, Sherry
Cc: Noble, Kim
Subject: RE: 2014 lead

Sherry,

I'll try to get it done today. Otherwise it'll be Monday, as I'm out tomorrow.

Bob

From: Taylor, Sherry [mailto:STAYLOR@gchd.us]
Sent: Thursday, December 10, 2015 8:52 AM
To: Scott, Robert L. (DHHS) <ScottR9@michigan.gov>
Cc: Noble, Kim <knoble@gchd.us>
Subject: FW: 2014 lead

Hello Bob,

This is just a friendly reminder. Will we be able to get the updated map this week?

Sherry Taylor, RN, BSN
Public Health Nurse Coordinator
Genesee County Health Department
G-3373 S. Saginaw Street
Flint, MI 48529
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From: Taylor, Sherry
Sent: Friday, December 04, 2015 12:51 PM
To: 'Scott, Robert L. (DHHS)'
Subject: RE: 2014 lead

Yes that would be great! Thank you

Sherry Taylor, RN, BSN
Public Health Nurse Coordinator
Genesee County Health Department
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From: Scott, Robert L. (DHHS) [mailto:ScottR9@michigan.gov]
Sent: Friday, December 04, 2015 11:06 AM
To: Taylor, Sherry
Subject: RE: 2014 lead

No, I don't have an update, but I can do it. The 2009-2013 covers five years. Do you want the update to show 2010-2014, to keep the five-year thing?

From: Taylor, Sherry [mailto:STAYLOR@gchd.us]
Sent: Friday, December 04, 2015 10:44 AM
To: Scott, Robert L. (DHHS) <ScottR9@michigan.gov>
Subject: RE: 2014 lead

Thank you Bob,

This is just what I was looking for! Do you happen to have an update of the map of kids tested in Flint area with elevated blood lead levels from 2009 to 2013? It is not something we need today. It is dated 7/23/2014

Thank you

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From: Scott, Robert L. (DHHS) [mailto:ScottR9@michigan.gov]
Sent: Friday, December 04, 2015 8:53 AM
To: Taylor, Sherry
Cc: Noble, Kim
Subject: 2014 lead

Robert L. Scott
Childhood Lead Poisoning Prevention Program
Michigan Department of Health & Human Services
(517) 335-8178
fax (517) 335-8509

From: Scott, Robert L. (DHHS)
Sent: Wednesday, December 16, 2015 4:31 PM
To: Taylor, Sherry
Cc: Stanbury, Martha (DHHS)
Subject: RE: 2014 lead

OK, no problem. If we come up with anything reasonable before then, we'll pass it on.

From: Taylor, Sherry [mailto:STAYLOR@gchd.us]
Sent: Wednesday, December 16, 2015 4:29 PM
To: Scott, Robert L. (DHHS) <ScottR9@michigan.gov>
Cc: Stanbury, Martha (DHHS) <stanburym@michigan.gov>
Subject: RE: 2014 lead

Oh Bob,

I am sorry I forgot to let you know the meeting for CHAP this week was cancelled so Toni will do the presentation in January.

Thank you

Sherry Taylor, RN, BSN
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From: Scott, Robert L. (DHHS) [mailto:ScottR9@michigan.gov]
Sent: Wednesday, December 16, 2015 2:37 PM
To: Taylor, Sherry
Cc: Stanbury, Martha (DHHS)
Subject: RE: 2014 lead

Sherry,

I forgot to ask about this (the map for Toni) on our call yesterday. Has she already done the presentation?

It was deemed that the points on the map should be somewhat randomized to protect privacy. One of my colleagues made a first attempt at that, but it spread them out so evenly as to be pointless. (no pun intended) He's going to try again.

Please let me know whether you need a map or not. He'll probably keep working anyway, to learn more for future requests.

Thanks,
Bob

From: Scott, Robert L. (DHHS)
Sent: Thursday, December 10, 2015 5:31 PM
To: 'Taylor, Sherry' <STAYLOR@gchd.us>
Subject: RE: 2014 lead

I talked with my supervisor, showed her the new map, explained you have the old one—she's going to talk with her boss tomorrow. If we can do this, would Monday be soon enough?

Thanks,
Bob

From: Taylor, Sherry [mailto:STAYLOR@gchd.us]
Sent: Thursday, December 10, 2015 12:42 PM
To: Scott, Robert L. (DHHS) <ScottR9@michigan.gov>
Subject: RE: 2014 lead

The map is going to be used in a Presentation that Toni is giving to a community partner, CHAP. So yes it is an audience outside of the health dept.

Sherry Taylor, RN, BSN
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From: Scott, Robert L. (DHHS) [mailto:ScottR9@michigan.gov]
Sent: Thursday, December 10, 2015 12:03 PM
To: Taylor, Sherry
Subject: RE: 2014 lead

Sherry,

Can you tell me what the map will be used for? If it will stay internal to GCHD, no problem. But if you're planning to display it to an outside audience, there may be a problem regarding confidentiality. (Even though the map will be similar to last year's, there is more and more attention to what goes out these days.)

Thanks,
Bob

From: Taylor, Sherry [mailto:STAYLOR@gchd.us]
Sent: Thursday, December 10, 2015 11:12 AM
To: Scott, Robert L. (DHHS) <ScottR9@michigan.gov>
Subject: RE: 2014 lead

Thanks

Sherry Taylor, RN, BSN
Public Health Nurse Coordinator
Genesee County Health Department
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Thank you

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Sent: Friday, December 04, 2015 8:53 AM
To: Taylor, Sherry
Cc: Noble, Kim
Subject: 2014 lead

Robert L. Scott
Childhood Lead Poisoning Prevention Program
Michigan Department of Health & Human Services
(517) 335-8178
fax (517) 335-8509

From: Peeler, Nancy (DHHS)
Sent: Tuesday, December 22, 2015 9:48 AM
To: Stanbury, Martha (DHHS)
Subject: RE: data question

Sounds good!

-----Original Message-----
From: Stanbury, Martha (DHHS)
Sent: Tuesday, December 22, 2015 9:48 AM
To: Peeler, Nancy (DHHS) <PeelerN@michigan.gov>
Subject: Re: data question

Ok - I'll set something up for early January.

From: Peeler, Nancy (DHHS)
Sent: Tuesday, December 22, 2015 9:33 AM
To: Stanbury, Martha (DHHS)
Subject: RE: data question

I am hoping to be off the week between Christmas and New Year's Day, back on January 4th unless something happens that I need to come in.

-----Original Message-----
From: Stanbury, Martha (DHHS)
Sent: Tuesday, December 22, 2015 9:26 AM
To: Peeler, Nancy (DHHS) <PeelerN@michigan.gov>; Scott, Robert L. (DHHS) <ScottR9@michigan.gov>
Subject: Re: data question

And happy holidays to you. Are you around the week after Christmas? Maybe we could get together to talk about MPHI contract etc..

From: Peeler, Nancy (DHHS)
Sent: Tuesday, December 22, 2015 9:23 AM
To: Stanbury, Martha (DHHS); Scott, Robert L. (DHHS)
Subject: RE: data question

Thanks, Martha. Karen was able to look it up this morning, so I am all set. Hope you are enjoying your time off!

-----Original Message-----
From: Stanbury, Martha (DHHS)
Sent: Tuesday, December 22, 2015 9:18 AM
To: Peeler, Nancy (DHHS) <PeelerN@michigan.gov>; Scott, Robert L. (DHHS) <ScottR9@michigan.gov>
Subject: Re: data question

Hi Nancy - bob is out of the office today. I believe he is doing training in Flint. Patti McKane should be able to help you with this. She pulled the latest data from the warehouse yesterday. However I think it is by calendar year, not fiscal year.

From: Peeler, Nancy (DHHS)
Sent: Tuesday, December 22, 2015 6:40 AM
To: Scott, Robert L. (DHHS)
Cc: Stanbury, Martha (DHHS)
Subject: data question

Good morning, Bob. I wondered if you can help me with some data that would provide context for an email that I need to send to Sue Moran this morning. She asked about how many children had EBLs higher than 40 during FY2015. Is that something you could easily tell me?

Also, if memory serves, before November, the last child in Genesee County with an EBL above 40 was back in 2009. Is that accurate?

Thanks for any help you can give me with this; I appreciate it! I know you are headed out to Genesee County for the training, hoping this is an easy question that won't delay your departure. Certainly call me if that is easier - 517-243-6635.

Nancy

Sent from my iPad

From: Maqsood, Junaid (DHHS)
Sent: Tuesday, December 22, 2015 2:12 PM
To: Scott, Robert L. (DHHS);Stanbury, Martha (DHHS)
Subject: UPDATE: Flint map randomization
Attachments: Flint EBLL 2010-2014 Randomized 2015Dec22.pdf

Martha and Bob,

Attached is a new map of EBLL cases in Flint randomized by a method used by Ed Hartwick. It's better than the previous map I generated where cases were scattered at random throughout the city. In the revised map, cases were shifted slightly from their original point so some of the clustering still holds up. This is probably the final map that GCHD could use for their presentation.

Let me know if you have any questions or if you want to discuss.

Thank you,
Junaid

From: Scott, Robert L. (DHHS)
Sent: Wednesday, December 16, 2015 2:43 PM
To: Maqsood, Junaid (DHHS) <MaqsoodJ@michigan.gov>; Stanbury, Martha (DHHS) <stanburym@michigan.gov>
Subject: RE: Flint map with randomized points

OK, thanks.

From: Maqsood, Junaid (DHHS)
Sent: Wednesday, December 16, 2015 2:26 PM
To: Stanbury, Martha (DHHS) <stanburym@michigan.gov>; Scott, Robert L. (DHHS) <ScottR9@michigan.gov>
Subject: RE: Flint map with randomized points

I'm going to try to randomize points by City (Flint) and zip code(only zip codes in city of Flint) rather than just zip code -- perhaps the output will be better? I will get the new map out sometime tomorrow.

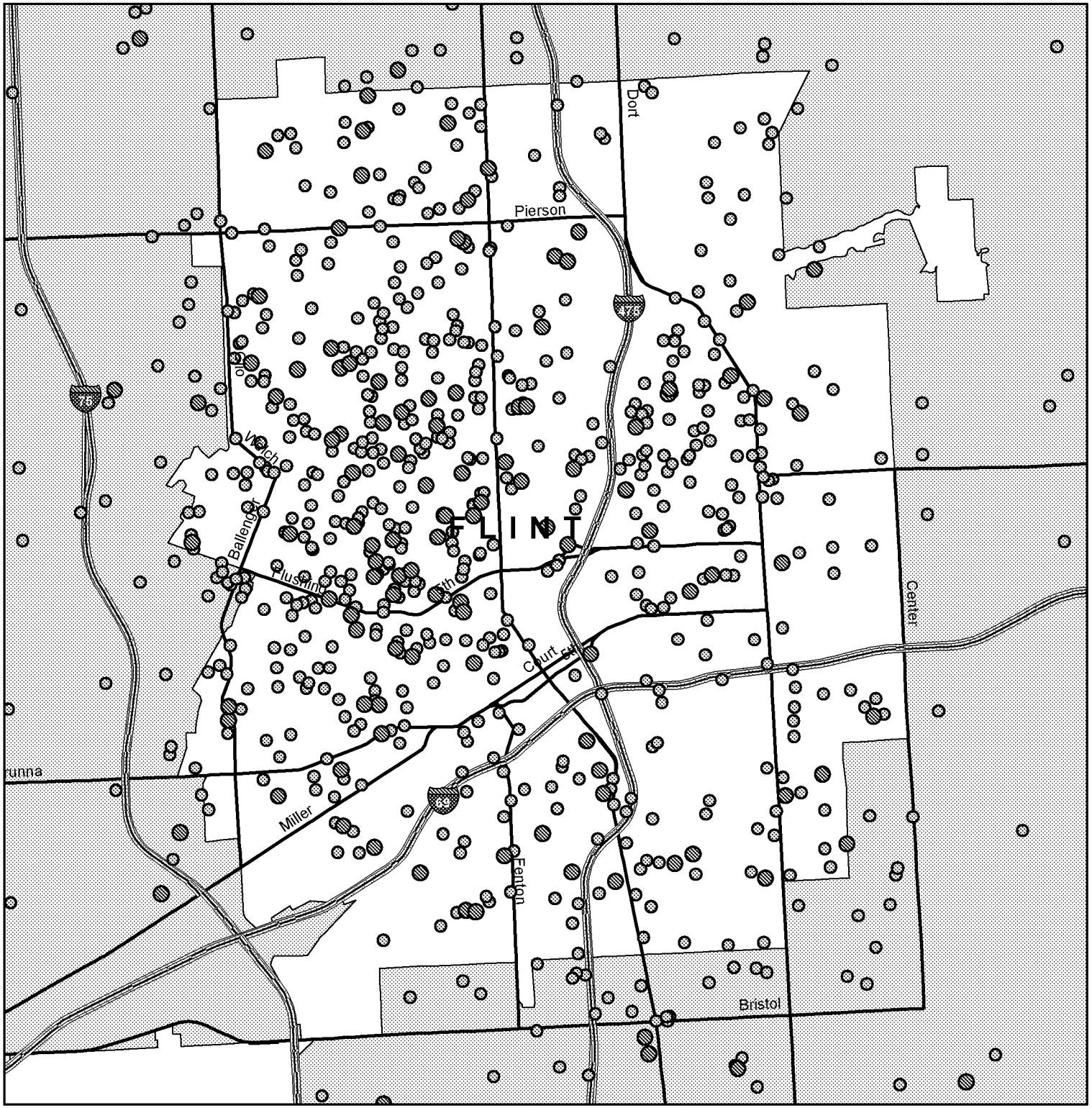
From: Maqsood, Junaid (DHHS)
Sent: Wednesday, December 16, 2015 1:33 PM
To: Stanbury, Martha (DHHS) <stanburym@michigan.gov>; Scott, Robert L. (DHHS) <ScottR9@michigan.gov>
Subject: Flint map with randomized points

Martha and Bob,

Attached is the map of Flint with points randomized by zip code, meaning I calculated the # of cases with BLL between 5 and 9 ug/dL (inclusive) and with BLL ≥10 ug/dL for each zip code and plotted the same number of cases per zip code in random locations within the zip code boundary. Unfortunately, as we originally suspected, the clustering of cases depicted in the original map (also attached) is lost with this randomization.

Junaid

Flint Area
Children with Elevated Blood Lead Levels
2010-2014



Child w/ confirmed BLL >=10 ug/dL

Child w/ BLL 5 to 9 ug/dL

Source: MDCH Data Warehouse, Lead Specimen table

December 22, 2015

From: Scott, Robert L. (DHHS)
Sent: Wednesday, December 23, 2015 3:21 PM
To: Maqsood, Junaid (DHHS);Stanbury, Martha (DHHS)
Subject: RE: UPDATE: Flint map randomization

Whoops, I think I responded to the wrong email. The second map you sent is the best, I think.

From: Maqsood, Junaid (DHHS)
Sent: Tuesday, December 22, 2015 4:07 PM
To: Scott, Robert L. (DHHS) <ScottR9@michigan.gov>; Stanbury, Martha (DHHS) <stanburym@michigan.gov>
Subject: RE: UPDATE: Flint map randomization

Here's another version of the map. I used a slightly different randomization method that Ed mentioned. Either this map or the one I sent in my previous e-mail is fine to use.

From: Maqsood, Junaid (DHHS)
Sent: Tuesday, December 22, 2015 2:12 PM
To: Scott, Robert L. (DHHS) <ScottR9@michigan.gov>; Stanbury, Martha (DHHS) <stanburym@michigan.gov>
Subject: UPDATE: Flint map randomization

Martha and Bob,

Attached is a new map of EBLL cases in Flint randomized by a method used by Ed Hartwick. It's better than the previous map I generated where cases were scattered at random throughout the city. In the revised map, cases were shifted slightly from their original point so some of the clustering still holds up. This is probably the final map that GCHD could use for their presentation.

Let me know if you have any questions or if you want to discuss.

Thank you,
Junaid

From: Scott, Robert L. (DHHS)
Sent: Wednesday, December 16, 2015 2:43 PM
To: Maqsood, Junaid (DHHS) <MaqsoodJ@michigan.gov>; Stanbury, Martha (DHHS) <stanburym@michigan.gov>
Subject: RE: Flint map with randomized points

OK, thanks.

From: Maqsood, Junaid (DHHS)
Sent: Wednesday, December 16, 2015 2:26 PM
To: Stanbury, Martha (DHHS) <stanburym@michigan.gov>; Scott, Robert L. (DHHS) <ScottR9@michigan.gov>
Subject: RE: Flint map with randomized points

I'm going to try to randomize points by City (Flint) and zip code(only zip codes in city of Flint) rather than just zip code -- perhaps the output will be better? I will get the new map out sometime tomorrow.

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Subject: Flint map with randomized points

Martha and Bob,

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Junaid

From: Stanbury, Martha (DHHS)
Sent: Monday, December 28, 2015 10:02 AM
To: Scott, Robert L. (DHHS)
Subject: AJPH article
Attachments: hannaattisha ajph nov 2015.pdf

Martha Stanbury, MSPH
Division of Environmental Health
Michigan Department of Health and Human Services
PO Box 30195, Lansing, MI 48909
517-335-8364
stanburym@michigan.gov

Elevated Blood Lead Levels in Children Associated With the Flint Drinking Water Crisis: A Spatial Analysis of Risk and Public Health Response

Mona Hanna-Attisha, MD, MPH, Jenny LaChance, MS, Richard Casey Sadler, PhD, and Allison Champney Schnepp, MD

Objectives. We analyzed differences in pediatric elevated blood lead level incidence before and after Flint, Michigan, introduced a more corrosive water source into an aging water system without adequate corrosion control.

Methods. We reviewed blood lead levels for children younger than 5 years before (2013) and after (2015) water source change in Greater Flint, Michigan. We assessed the percentage of elevated blood lead levels in both time periods, and identified geographical locations through spatial analysis.

Results. Incidence of elevated blood lead levels increased from 2.4% to 4.9% ($P < .05$) after water source change, and neighborhoods with the highest water lead levels experienced a 6.6% increase. No significant change was seen outside the city. Geospatial analysis identified disadvantaged neighborhoods as having the greatest elevated blood lead level increases and informed response prioritization during the now-declared public health emergency.

Conclusions. The percentage of children with elevated blood lead levels increased after water source change, particularly in socioeconomically disadvantaged neighborhoods. Water is a growing source of childhood lead exposure because of aging infrastructure. (*Am J Public Health.* Published online ahead of print December 21, 2015: e1–e8. doi:10.2105/AJPH.2015.303003)

In April 2014, the postindustrial city of Flint, Michigan, under state-appointed emergency management, changed its water supply from Detroit-supplied Lake Huron water to the Flint River as a temporary measure, awaiting a new pipeline to Lake Huron in 2016. Intended to save money, the change in source water severed a half-century relationship with the Detroit Water and Sewage Department. Shortly after the switch to Flint River water, residents voiced concerns regarding water color, taste, and odor, and various health complaints including skin rashes.[1] Bacteria, including *Escherichia coli*, were detected in the distribution system, resulting in Safe Drinking Water Act violations.[2] Additional disinfection to control bacteria spurred formation of disinfection byproducts including total trihalomethanes, resulting in Safe Drinking Water Act violations for trihalomethane levels.[2]

Water from the Detroit Water and Sewage Department had very low corrosivity for lead as indicated by low chloride, low chloride-to-sulfate mass ratio, and presence of an orthophosphate corrosion inhibitor.[3,4] By contrast, Flint River water had high chloride, high chloride-to-sulfate mass ratio, and no corrosion inhibitor.[5] Switching from Detroit's Lake Huron to Flint River water created a perfect storm for lead leaching into drinking water.[6] The aging Flint water distribution system contains a high percentage of lead pipes and lead plumbing, with estimates of lead service lines ranging from 10% to 80%.[7] Researchers from Virginia Tech University reported increases in water lead levels (WLLs),[5] but changes in blood lead levels (BLLs) were unknown.

Lead is a potent neurotoxin, and childhood lead poisoning has an impact on many developmental and biological processes, most notably intelligence, behavior, and overall life achievement.[8] With estimated societal costs in the billions,[9–11] lead poisoning has a disproportionate impact on low-income and minority children.[12] When one considers the irreversible, life-altering, costly, and disparate impact of lead exposure, primary prevention is necessary to eliminate exposure.[13]

Historically, the industrial revolution's introduction of lead into a host of products has contributed to a long-running and largely silent pediatric epidemic.[14] With lead now removed from gasoline and paint, the incidence of childhood lead poisoning has decreased.[15] However, lead contamination of drinking water may be increasing because of lead-containing water infrastructures, changes in water sources, and changes in water treatment including disinfectant.[16–18] A soluble metal, lead leaches into drinking water via lead-based plumbing or lead particles that detach from degrading plumbing components. ("Plumbing" is derived from the Latin word for lead,

ABOUT THE AUTHORS

Mona Hanna-Attisha and Allison Champney Schnepp are with Hurley Children's Hospital/Michigan State University College of Human Medicine, Department of Pediatrics and Human Development, Flint, MI. Jenny LaChance is with Hurley Medical Center Research, Flint. Richard Casey Sadler is with Michigan State University College of Human Medicine, Division of Public Health, Flint.

Correspondence should be sent to Mona Hanna-Attisha, MD, MPH, FAAP, Hurley Medical Center, Pediatrics 3W, One Hurley Plaza, Flint, MI 48503 (e-mail: mhanna1@hurleymc.com). Reprints can be ordered at http://www.ajph.org by clicking the "Reprints" link.

This article was accepted November 21, 2015.

doi: 10.2105/AJPH.2015.303003

"plumbum.") Lead was restricted in plumbing material in 1986, but older homes and neighborhoods may still contain lead service lines, lead connections, lead solder, or other lead-based plumbing materials. Lead solubility and particulate release is highly variable and depends on many factors including water softness, temperature, and acidity.[19–21] The US Environmental Protection Agency (EPA) regulates lead in public water supplies under the Safe Drinking Water Act Lead and Copper Rule, which requires action when lead levels reach 15 parts per billion (ppb).

Lead in drinking water is different from lead from other sources, as it disproportionately affects developmentally vulnerable children and pregnant mothers. Children can absorb 40% to 50% of an oral dose of water-soluble lead compared with 3% to 10% for adults.[22] In a dose–response relationship for children aged 1 to 5 years, for every 1-ppb increase in water lead, blood lead increases 35%.[23] The greatest risk of lead in water may be to infants on reconstituted formula. Among infants drinking formula made from tap water at 10 ppb, about 25% would experience a BLL above the Centers for Disease Control and Prevention (CDC) elevated blood lead level (EBLL) of 5 micrograms per deciliter (μg/dL).[24] Tap water may account for more than 85% of total lead exposure among infants consuming reconstituted formula.[25] A known abortifacient, lead has also been implicated in increased fetal deaths and reduced birth weights.[26]

As recommended by the CDC and supported by the American Academy of Pediatrics, blood lead screening is routine for high-risk populations and for children insured by Medicaid at age 1 and 2 years.[27] The CDC-recommended screening ages are based on child development (increased oral–motor behavior), which places a child most at risk for house-based lead exposure (e.g., peeling paint, soil, dust). State and national blood lead–screening programs, however, do not adequately capture the risk of lead in water because infants are at greatest risk.

Armed with reports of elevated WLLs and recognizing the lifelong consequences of lead exposure, our research team sought to analyze blood lead data before (pre) and after (post) the water source switch with a geographic information system (GIS) to determine lead exposure risk and prioritize responses. This research has immediate public policy, public health, environmental, and socioeconomic implications.

This research includes Flint, Michigan, and surrounding municipalities in Genesee County (Greater Flint). Greater Flint is a postindustrial region of nearly 500 000 people struggling from years of disinvestment by the automobile industry and associated manufacturing activities: the region has lost 77% of its manufacturing employment and 41% of employment overall since 1980.[28] National and local data sources demonstrate dismal indicators for children, especially within Flint city limits.[29–32] Greater Flint ranks toward the bottom of the state in rates of childhood poverty (42% in Flint vs 16.2% in Michigan and 14.8% in the United States), unemployment, violent crime, illicit drug use, domestic violence, preterm births, infant mortality, and overall health outcomes (81st out of 82 Michigan counties).

Greater Flint's struggles have been amplified by a history of racial discrimination, whereby exclusionary housing practices were common.[33,34] Such attitudes toward integration later precipitated White flight and emboldened home-rule governance,[35,36] causing a massive decline in tax revenue for the city. The declining industrial and residential tax bases strained the city's ability to provide basic services and reversed the public health fortunes of the city and suburbs.[37] Severely reduced city population densities reduced water demand in the distribution system, exacerbating problems with lead corrosion.

METHODS

This retrospective study includes all children younger than 5 years who had a BLL processed through the Hurley Medical Center's laboratory, which runs BLLs for most Genesee County children. The pre time period (before the water source change) was January 1, 2013, to September 15, 2013, and the post time period (after the water source change) was January 1, 2015, to September 15, 2015. The primary study group comprised children living within the city of Flint (n = 1473; pre = 736; post = 737) who received water from the city water system. Children living outside the city where the water source was unchanged served as a comparison group (n = 2202; pre = 1210; post = 992).

After institutional review board approval and Health Insurance Portability and Accountability Act waiver, we drew data from the Epic electronic medical record system including BLL, medical record number, date of birth, date of blood draw, full address, sex, and race. For each child, only the highest BLL was maintained in the data set. We coded timing (pre or post) of the BLL on the basis of the date of blood draw. We calculated age at time of blood draw.

We geocoded the data set with a dual-range address locator, and manually confirmed accuracy of geocoded addresses. We conducted a series of spatial joins to assign participant records to Greater Flint municipalities and Flint wards (including those with high WLL), enabling the calculation of the number and percentage of children with EBLLs in each geographic region for both time periods. The reference value for EBLL was 5 μg/dL or greater. We identified Flint wards with high WLLs with water lead sampling maps.[38] Wards 5, 6, and 7 had the highest WLLs; in each ward, more than 25% of samples had a WLL higher than 15 ppb. We theorized that children living in this combination of wards would have the highest incidence of EBLLs (referred to as "high WLL Flint"; the remainder of Flint was referred to as "lower WLL Flint").

We derived overall neighborhood-level socioeconomic disadvantage from census block group variables intended to measure material and social deprivation. We calculated these scores from an unweighted z score sum of rates of lone parenthood, poverty, low educational attainment, and unemployment (adapted from Pampalon et al.[39]; used previously in Flint by Sadler et al.[40]), and assigned these to each child on the basis of home address. Positive values denote higher disadvantage, and negative values denote lower disadvantage. Table 1 highlights the overall socioeconomic disadvantage score comparison by time period and area.

We created spatial references for EBLL risk and a predictive surface for BLL by using GIS, providing the ability to see otherwise invisible spatial–temporal patterns in environmental exposure.[17] Because of the need to

TABLE 1—Demographic Comparison of the Time Periods Before (Pre) and After (Post) Water Source Change From Detroit-Supplied Lake Huron Water to the Flint River, by Area: Flint, MI, 2013 and 2015

	Outside Flint		All Flint		High WLL Flint		Lower WLL Flint	
Characteristic	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Gender, %								
Male	51.6	49.5	48.6	52.9	47.6	54.4	49.1	52.3
Female	48.4	50.5	51.4	47.1	52.4	45.6	50.9	47.7
Race/ethnicity, %								
African American	24.3	24.5	69.4	70.6	74.9	78.8	67.0	66.9
Other categories	75.7	75.5	30.6	29.4	25.1	21.2	33.0	33.1
Age, y, mean	1.89	1.83	2.09	2.06	2.06	2.02	2.11	2.07
Overall socioeconomic disadvantage score	−0.83	−0.98	2.94	2.88	2.18	2.39	3.28	3.10

Note. WLL = water lead level. No statistically significant differences were found in any pre–post value within any of the 4 geographical areas.

understand spatial variations and geographically target resources, we also ran ordinary Kriging with a spherical semivariogram model on the entire data set for Greater Flint, allowing interpolation of associated BLL risks with lead in water. Previous methods for evaluating spatial variation in lead levels have ranged from multivariable analyses at the individual level[41] to interpolation methods such as inverse distance weighting[42] and Kriging.[43] Given our assumption that lead risk is spatially correlated in Greater Flint because of the age and condition of pipes, interpolation methods are appropriate for building a preliminary risk surface. Both inverse distance weighting and Kriging derive such surfaces by calculating values at unmeasured locations based on weighting nearby measured values more strongly than distant values.[44] Whereas inverse distance weighting is a deterministic procedure and relies on predetermined mathematical formulae, Kriging has the added sophistication of using geostatistical models that consider spatial autocorrelation, thereby improving accuracy of prediction surfaces (ArcGIS Desktop version 10.3, Environmental Systems Research Institute, Redlands, CA). As well, Kriging can be run with relatively few input points: adequate ranges fall between 30 and 100 total points, although Kriging has been conducted with just 7.[44]

Our city of Flint sample included 736 children in the pre period and 737 children in the post period, which amounts to a density of approximately 22 points per square mile. Kriging has become an increasingly common method for measuring variations in soil lead, and is given more in-depth treatment elsewhere.[45] To examine change in proportion of children with EBLL from the pre to post time periods, we used χ^2 analysis with continuity correction for each area (outside Flint, all Flint, high WLL Flint, and lower WLL Flint). In addition, we examined differences in overall socioeconomic disadvantage scores from the pre to post time periods by using the independent t test. Finally, we used both χ^2 analysis with continuity correction and 1-way ANOVA to assess demographic differences by area. We used post hoc least significant difference analysis following statistically significant 1-way ANOVAs.

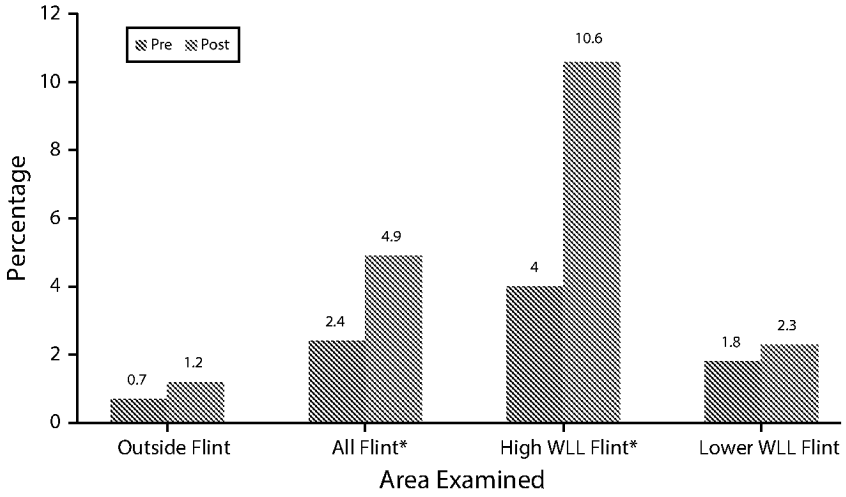
RESULTS

We uncovered a statistically significant increase in the proportion of Flint children with EBLL from the pre period to the proportion of Flint children in the post period. In the pre period, 2.4% of children in Flint had an EBLL; in the post period, 4.9% of children had an EBLL ($P < .05$). By comparison, outside of Flint water, the change in EBLL was not statistically significant (0.7% to 1.2%; $P > .05$). In high WLL Flint, EBLL increased from 4.0% to 10.6% ($P < .05$). Figure 1 shows the EBLL percentage change per area.

Results of the GIS analyses show significant clustering of EBLLs within the Flint city limits. According to ordinary Kriging, Figure 2 shows a predicted surface based on observations of actual child BLL geocoded to home address to visualize BLL variation over space (measured in μg/dL). The darkest shades of red represent the highest risk for EBLL based on existing observations. Outside Flint, the entire county falls entirely within the lowest half of the range (in shades of blue); the only locations where predicted BLL is greater than 1.75 μg/dL is within Flint city limits.

Within Figure 2, each ward is also labeled according to the percentage of water samples that exceeded 15 ppb. The areas with the highest WLLs strongly coincide with the areas with the highest predicted BLLs. In addition, the high percentage of EBLL in wards 5, 6, and 7 also correspond with the high WLLs in wards 5, 6, and 7 (the labels in Figure 2). Table 2 shows ward-specific WLLs, pre period and post period EBLL percentages, and predicted BLL and predicted change in BLL from Kriging.

Areas experiencing the highest predicted BLL in the post period (Figure 2) are generally also areas with greatest change in predicted BLL (measured in μg/dL) when compared with the pre period (Table 2; Figure A, available as a supplement to the online version of this article at http://www.ajph.org). Figure A quantifies this rate of change with a green to red scale: large increases are shown in increasingly darker shades of red, whereas large decreases are shown in increasingly darker shades of green. These once again match with city wards that experienced greater rates of EBLL percentage increase (Figure 1, Table 2). In wards 5 and 6 (which experienced a predicted 0.51 and 0.27 μg/dL increase, respectively), the EBLL percentage more than tripled. In ward 5, the EBLL percentage increased from 4.9% to 15.7% ($P < .05$). The area of intersection between wards 3, 4, and 5 (in the east side of the city) also appeared high in the Kriging analysis of Figure 2, and with a different unit of aggregation this neighborhood would also exhibit a significant increase in EBLL percentage. Ward 7 had high pre period and post period EBLL percentage levels above 5% (with a particularly high rate in the western portion of the ward). Citywide,



Note. WLL = water lead level.
*$P < .05$.

FIGURE 1—Comparison of Elevated Blood Lead Level Percentage, Before (Pre) and After (Post) Water Source Change From Detroit-Supplied Lake Huron Water to the Flint River: Flint, MI, 2013 and 2015

4 wards (1, 4, 7, and 9) experienced decreases in predicted BLL, 3 wards (2, 5, and 6) experienced large increases, and 2 wards (3 and 8) remained largely the same (Figure A).

Overall, statistically significant differences exist between the areas examined (outside Flint, high WLL Flint, and lower WLL Flint) in all demographic characteristics except sex. The overall percentage of African American children is 24.4% outside Flint, compared with 76.8% in high WLL Flint and 67.0% in lower WLL Flint ($P < .001$). Children outside Flint were younger (mean = 1.86 years [SD = 1.10]) than high WLL Flint (mean = 2.04 years [SD = 1.02]) and lower WLL Flint (mean = 2.09 years [SD = 1.07]; $P < .001$). Differences in overall socioeconomic disadvantage scores are likewise significant ($P < .001$). Post hoc least significant difference analysis shows statistically significant differences for overall socioeconomic disadvantage between outside Flint and high WLL Flint ($P < .001$), between outside Flint and lower WLL Flint ($P < .001$), and between high WLL Flint and lower WLL Flint ($P < .001$).

DISCUSSION

Our findings reveal a striking increase in the percentage of Flint children with EBLL when we considered identical seasons before and after the water source switch, with no statistically significant increase in EBLL outside Flint. The spatial and statistical analyses highlight the greatest EBLL increase within certain wards of Flint, which correspond to the areas of elevated WLLs.

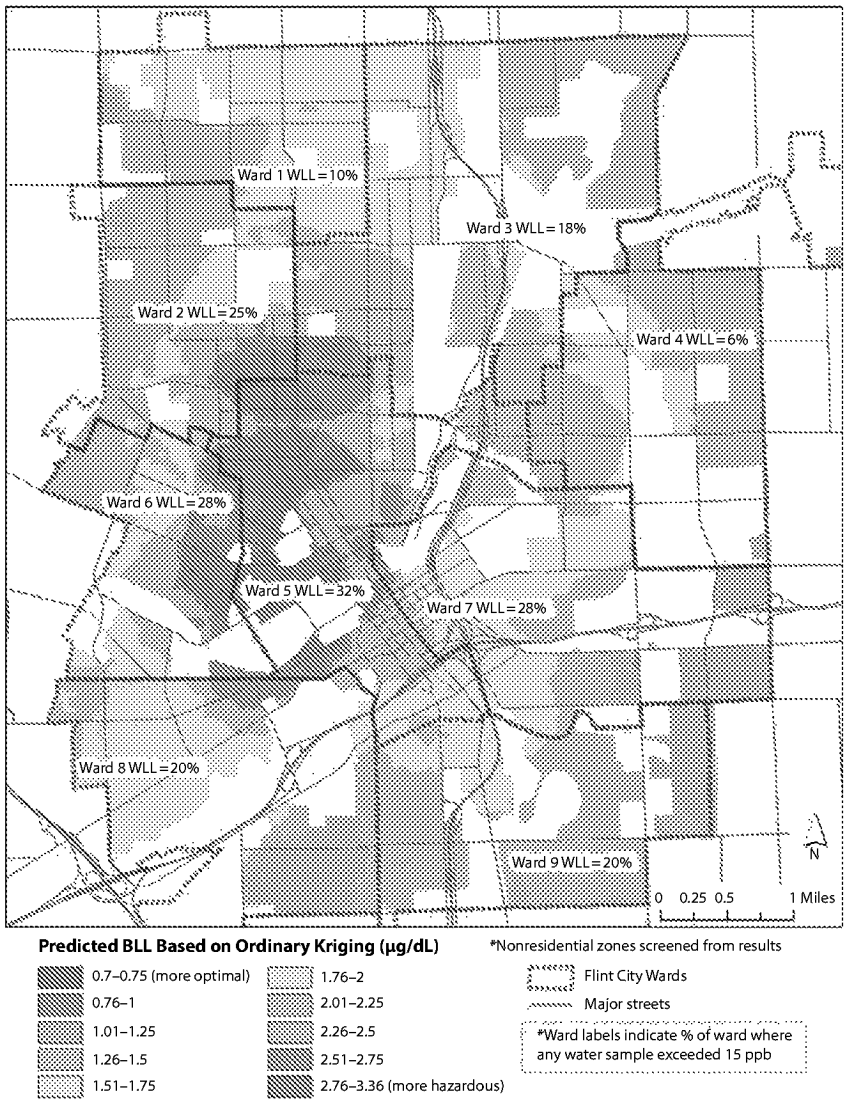
A review of alternative sources of lead exposure reveals no other potential environmental confounders during the same time period. Demolition projects by the Genesee County Land Bank Authority (Heidi Phaneuf, written communication, October 29, 2015) showed no spatial relationship to the areas of increased EBLL rates. As well, no known new lead-producing factories nor changes in indoor lead remediation programs were implemented during the study period. Although Flint has a significant automobile history, the historical location of potentially lead-using manufacturing (e.g., battery plants, paint and pigment storage, production plants) do not align with current exposures.

Because there was no known alternative source for increased lead exposure during this time period, the geospatial WLL results, the innate corrosive properties of Flint River water, and, most importantly, the lack of corrosion control, our findings strongly implicate the water source change as the probable cause for the dramatic increase in EBLL percentage.

As in many urban areas with high levels of socioeconomic disadvantage and minority populations,[46] we found a preexisting disparity in lead poisoning. In our pre water source switch data, the EBLL percentage in Flint was 2.4% compared with 0.7% outside Flint. This disparity widened with a post water source switch Flint EBLL of 4.8%, with no change in socioeconomic or demographic variables (Table 1). Flint children already suffer from risk factors that innately increase their lead exposure: poor nutrition, concentrated poverty, and older housing stock. With limited protective measures, such as low rates of breastfeeding,[47,48] and scarce resources for water alternatives, lead in water further exacerbates preexisting risk factors. Increased lead-poisoning rates have profound implications for the life course potential of an entire cohort of Flint children already rattled with toxic stress contributors (e.g., poverty, violence, unemployment, food insecurity). This is particularly troublesome in light of recent findings of the epigenetic effects of lead exposure on one's grandchildren.[49]

The Kriging analysis showed the highest predicted BLLs within the city along a wide swath north and west of downtown. This area has seen significant demographic change, an increase in poverty, and an increase in vacant properties, especially over the past 25 years (Richard Sadler, written communication, October 5, 2015). Higher BLLs were also predicted northeast of downtown and in other older neighborhoods where poverty and vacancy rates have been high for many decades. Significantly, the biggest changes in predicted BLL since 2013 were also found in these impoverished neighborhoods; more stable neighborhoods in the far north and south of the city may have experienced improved predicted BLLs because of prevention efforts taken by the more-often middle-class residents in response to the water source change. Of considerable interest is that the areas shown as having the best public health indices by Board and Dunsmore in Figure 2 of their 1948 article[37] are virtually identical to the areas with the worst lead levels today.

After our preliminary zip code–based findings (pre to post water source switch



Note. BLL = blood lead level; WLL = water lead level.

FIGURE 2—Predicted Surface of Child Blood Lead Level and Ward-Specific Elevated Water Lead Level After (Post) Water Source Change From Detroit-Supplied Lake Huron Water to the Flint River: Flint, MI, 2015

EBLL = 2.1% to 4.0%; $P < .05$) were shared at a press conference,[50] the City of Flint and the Genesee County Health Department released health advisories,[51] and the county health department subsequently declared a public health emergency.[52] Shortly after, the State of Michigan released an action plan with short- and long-term solutions focusing on additional sampling, filter distribution, and corrosion control.[53] One week later, Michigan's governor revealed WLLs in 3 schools to be in the toxic range with 1 school showing a water lead level of 101 ppb, almost 7 times the level that requires remediation.[54] A $12 million plan to reconnect to Detroit's water source was announced.[54]

We undertook our current spatial analytic approach to overcome limitations of zip code boundaries and to develop a more thorough understanding of specific areas in Flint where EBLL risk is more severe (post office addresses often do not align with municipal boundaries in Michigan, and one third of Flint mailing addresses are not in the city of Flint). This spatial analysis is valuable for understanding subneighborhood patterns in EBLL risk because aggregation by zip code or ward minimizes the richness of spatial variation and creates artificial barriers that may obscure hot spots (as in the confluence of wards 3, 4, and 5).

Such use of spatial analysis for estimating lead exposure risk has been used to target blood lead–screening programs. In our case, in addition to identifying areas of risk, spatial analysis helps guide municipal and nongovernmental relief efforts aimed at identifying vulnerable populations in specific neighborhoods for priority distribution of resources (e.g., bottled water, filters, premixed formula).

Limitations

Our research contains a few limitations. First, we may have underestimated water-based lead exposure. Our sample included all children younger than 5 years with blood lead screening, although the greatest risk from lead in water is in utero and during infancy when lead screening is not done. If lead screening were recommended at a younger age (e.g., 6 or 9 months) for children who live in homes with potential lead piping or lead service lines, more children with EBLL from water could be identified, although state and national comparison rates would be lacking. Second, lead screening is not completed for all children. It is mandated by Medicaid and CDC-recommended for other high-risk groups; such data may be skewed toward higher-risk children and thus overestimate EBLL, especially in non–high-risk areas. Third, the underserved population of Flint has significant housing instability: lead levels may reflect previous environmental exposure, and exposure often cannot be adequately estimated on the basis of current residence alone.[55]

Fourth, although large, our sample does not reflect all lead screening from Flint. We estimate that our data capture approximately 60% to 70% of the Michigan Childhood Lead Poisoning Prevention Program data for Flint. Annual data released from this program further support our findings, revealing an annual decrease in EBLL percentage from May to April 2010 to 2011 until the same period in 2013 to 2014 (4.1%,

TABLE 2—Ward-Based Comparison of Observed and Predicted Water Lead Level Percentages, Before (Pre) and After (Post) Water Source Change From Detroit-Supplied Lake Huron Water to the Flint River: Flint, MI, 2013 and 2015

Ward	WLL % >15 ppb	Pre EBLL%	Post EBLL%	Predicted Post BLL[a]	Change in Predicted BLL From Pre to Post, μg/dL
1	10	0.0	2.8	1.4	−0.10
2	25	0.0	1.4	0.7	0.19
3	18	1.0	4.5	2.9	0.05
4	6	3.1	1.7	2.4	−0.15
5[b]	32	4.9	15.7	10.3	0.51
6[b]	28	2.2	9.3	5.5	0.27
7[b]	28	5.4	5.9	5.7	-0.26
8	20	2.7	1.4	2.0	0.01
9	20	3.4	1.6	2.5	−0.43

Note. BLL = blood lead level; EBLL = elevated blood lead level; WLL = water lead level.
[a]Ordinary Kriging geostatistical analysis.
[b]Indicates wards defined as high WLL risk in this study.

3.3%, 2.7%, 2.2%, respectively[56]; Robert L. Scott, e-mail correspondence, September 25, 2015). Following the water switch in April 2014, the 4-year declining trend (as seen nationally) reversed with an annual EBLL of 3.0%.

We found consistent results (with control for age and methodology) when we analyzed Michigan Childhood Lead Poisoning Prevention Program data for both high WLL Flint (EBLL percentage increased: 6.6% to 9.6%) and outside Flint (EBLL percentage remained virtually unchanged: 2.2% to 2.3%). Our institution-processed laboratory blood lead tests, however, had an even greater proportion of children with EBLLs versus state data in the post period. This may reflect that the BLLs processed at Hurley Medical Center, the region's only safety-net public hospital, represent a patient population most at risk with limited resources to afford tap water alternatives.

Conclusions and Future Research

Future research directions include conducting more detailed geospatial analyses of lead service-line locations with locations of elevated BLLs and WLLs; repeating identical spatial and statistical analyses in the same time period in 2016 reflecting changes associated with the health advisory and return to Lake Huron source water; analyzing feeding type (breastfed or reconstituted formula) for children with EBLLs; analyzing cord blood lead of Flint newborns compared with non-Flint newborns; and conducting water lead testing from homes of children with EBLLs.

A once celebrated cost-cutting move for an economically distressed city, the water source change has now wrought untold economic, population health, and geopolitical burdens. With unchecked lead exposure for more than 18 months, it is fortunate that the duration was not longer (as was the case in Washington, DC,'s lead-in-water issue).[16] Even so, the Flint drinking water crisis is a dramatic failure of primary prevention. The legal safeguards and regulating bodies designed to protect vulnerable populations from preventable lead exposure failed.

The Lead and Copper Rule requires water utilities to notify the state of a water source or treatment change recognizing that such changes can unintentionally have an impact on the system's corrosion control.[57] Although a review is required before implementing changes, the scope of risk assessment is not specified and is subject to misinterpretation. In response to the Flint drinking water crisis, the EPA recently released a memo reiterating and clarifying the need for states to conduct corrosion control reviews before implementing changes.[58] This recommendation is especially relevant for communities with aging infrastructures, usurped city governance, and minimal water utility capacity; in such situations, there is an increased need for state and federal expertise and oversight to support decisions that protect population health.

Through vigilant public health efforts, lead exposure has fallen dramatically over the past 30 years.[13] With the increasing recognition that no identifiable BLL is safe and without deleterious and irreversible health outcomes,[13] *Healthy People 2020* identified the elimination of EBLLs and underlying disparities in lead exposure as a goal.[59] Regrettably, our research reveals that the potentially increasing threat of lead in drinking water may dampen the significant strides in childhood lead-prevention efforts. As our aging water infrastructures continue to decay, and as communities across the nation struggle with finances and water supply sources, the situation in Flint, Michigan, may be a harbinger for future safe drinking-water challenges. Ironically, even when one is surrounded by the Great Lakes, safe drinking water is not a guarantee. AJPH

CONTRIBUTORS

M. Hanna-Attisha originated the study, developed methods, interpreted analysis, and contributed to the writing of the article. J. LaChance and R. Casey Sadler assisted with the development of the methods, analyzed results, interpreted the findings, and contributed to the writing of the article. A. Champney Schnepp assisted with the interpretation of the findings and contributed to the writing of the article.

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HUMAN PARTICIPANT PROTECTION

This study was reviewed and approved by Hurley Medical Center institutional review board.

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From: Scott, Robert L. (DHHS)
Sent: Monday, December 28, 2015 11:19 AM
To: Stanbury, Martha (DHHS)
Subject: lead by zip
Attachments: ziplist2014.xlsx

Martha,

Please see attached.

Bob

Robert L. Scott
Childhood Lead Poisoning Prevention Program
Michigan Department of Health & Human Services
(517) 335-8178
fax (517) 335-8509

	A	B	C	D	E	F	G	H
1	**Children Tested for Lead Poisoning -- Calendar Year 2014**							
2	**All ZIP Codes in Michigan**							
3								
4	**Children less than Six Years of Age**							
5								
6	ZIP	Number of Children Tested		Total confirmed ≥ 5 µg/dL^	% with confirmed BLL >= 5 ug/dL		Total ≥ 5 µg/dL, confirmed & unconfirmed ^^	% with BLL >= 5 ug/dL, confirmed & unconfirmed
7	48001	145		*	*		*	*
8	48002	19		*	*		*	*
9	48003	42		*	*		*	*
10	48005	39		*	*		*	*
11	48006	45		*	*		*	*
12	48009	254		*	*		*	*
13	48014	69		*	*		*	*
14	48015	112		*	*		*	*
15	48017	123		*	*		*	*
16	48021	541		9	1.7		14	2.6
17	48022	23		*	*		*	*
18	48023	53		*	*		*	*
19	48025	125		*	*		*	*
20	48026	174		*	*		*	*
21	48027	50		*	*		*	*
22	48028	*		*	*		*	*
23	48030	290		*	*		10	3.4
24	48032	26		*	*		*	*
25	48033	284		*	*		*	*
26	48034	262		*	*		*	*
27	48035	422		*	*		*	*
28	48036	273		*	*		*	*
29	48038	385		*	*		*	*
30	48039	101		*	*		*	*
31	48040	101		*	*		*	*
32	48041	42		*	*		*	*
33	48042	222		*	*		*	*
34	48043	161		*	*		6	3.7
35	48044	436		*	*		*	*
36	48045	201		*	*		*	*
37	48047	371		*	*		*	*
38	48048	85		*	*		*	*
39	48049	64		*	*		*	*
40	48050	12		*	*		*	*
41	48051	166		*	*		*	*
42	48054	58		*	*		*	*
43	48059	182		*	*		*	*
44	48060	1291		19	1.5		55	4.3

	A	B	C	D	E	F	G	H
45	48062	87		*	*		*	*
46	48063	44		*	*		*	*
47	48064	40		*	*		*	*
48	48065	81		*	*		*	*
49	48066	646		*	*		9	1.4
50	48067	221		*	*		*	*
51	48069	24		*	*		*	*
52	48070	60		*	*		*	*
53	48071	438		*	*		6	1.4
54	48072	173		*	*		*	*
55	48073	332		*	*		6	1.8
56	48074	177		*	*		*	*
57	48075	449		*	*		6	1.3
58	48076	393		*	*		*	*
59	48079	122		*	*		*	*
60	48080	196		*	*		*	*
61	48081	186		*	*		*	*
62	48082	121		*	*		*	*
63	48083	259		*	*		*	*
64	48084	139		*	*		6	4.3
65	48085	188		*	*		*	*
66	48088	217		*	*		*	*
67	48089	687		*	*		16	2.3
68	48091	643		6	0.9		17	2.6
69	48092	353		*	*		7	2.0
70	48093	278		*	*		*	*
71	48094	131		*	*		*	*
72	48095	31		*	*		*	*
73	48096	17		*	*		*	*
74	48097	92		*	*		*	*
75	48098	124		*	*		*	*
76	48101	334		*	*		*	*
77	48103	321		*	*		*	*
78	48104	113		*	*		*	*
79	48105	171		*	*		*	*
80	48108	223		*	*		6	2.7
81	48111	593		*	*		*	*
82	48114	101		*	*		*	*
83	48116	105		*	*		*	*
84	48117	73		*	*		*	*
85	48118	72		*	*		*	*
86	48120	331		*	*		*	*
87	48122	304		*	*		*	*
88	48124	351		*	*		*	*
89	48125	389		*	*		*	*
90	48126	1553		29	1.9		35	2.3
91	48127	770		7	0.9		9	1.2
92	48128	158		*	*		*	*

	A	B	C	D	E	F	G	H
93	48130	77		*	*		*	*
94	48131	83		*	*		*	*
95	48133	58		*	*		*	*
96	48134	313		*	*		*	*
97	48135	314		*	*		*	*
98	48137	18		*	*		*	*
99	48138	70		*	*		*	*
100	48139	*		*	*		*	*
101	48140	29		*	*		*	*
102	48141	749		9	1.2		11	1.5
103	48143	*		*	*		*	*
104	48144	68		*	*		*	*
105	48145	36		*	*		*	*
106	48146	949		10	1.1		16	1.7
107	48150	269		*	*		6	2.2
108	48152	352		*	*		*	*
109	48154	320		*	*		*	*
110	48157	15		*	*		*	*
111	48158	39		*	*		*	*
112	48159	23		*	*		*	*
113	48160	89		*	*		*	*
114	48161	375		*	*		*	*
115	48162	328		*	*		*	*
116	48164	79		*	*		*	*
117	48165	89		*	*		*	*
118	48166	153		*	*		*	*
119	48167	187		*	*		*	*
120	48168	154		*	*		*	*
121	48169	104		*	*		*	*
122	48170	203		*	*		*	*
123	48173	106		*	*		*	*
124	48174	604		*	*		*	*
125	48176	96		*	*		*	*
126	48178	311		*	*		*	*
127	48179	37		*	*		*	*
128	48180	1464		15	1.0		24	1.6
129	48182	179		*	*		*	*
130	48183	519		*	*		9	1.7
131	48184	277		*	*		*	*
132	48185	798		6	0.8		19	2.4
133	48186	563		*	*		9	1.6
134	48187	448		*	*		8	1.8
135	48188	444		*	*		7	1.6
136	48189	91		*	*		*	*
137	48190	*		*	*		*	*
138	48191	24		*	*		*	*
139	48192	361		*	*		*	*
140	48193	238		7	2.9		11	4.6

	A	B	C	D	E	F	G	H
141	48195	454		*	*		6	1.3
142	48197	689		*	*		12	1.7
143	48198	646		*	*		*	*
144	48201	389		11	2.8		14	3.6
145	48202	393		50	12.7		60	15.3
146	48203	742		77	10.4		87	11.7
147	48204	808		108	13.4		132	16.3
148	48205	1553		144	9.3		156	10.0
149	48206	651		109	16.7		132	20.3
150	48207	565		36	6.4		38	6.7
151	48208	302		22	7.3		27	8.9
152	48209	1508		102	6.8		116	7.7
153	48210	1569		116	7.4		137	8.7
154	48211	253		36	14.2		43	17.0
155	48212	1597		94	5.9		128	8.0
156	48213	812		92	11.3		100	12.3
157	48214	618		89	14.4		102	16.5
158	48215	431		39	9.0		43	10.0
159	48216	136		7	5.1		13	9.6
160	48217	180		*	*		*	*
161	48218	279		6	2.2		9	3.2
162	48219	1532		39	2.5		53	3.5
163	48220	261		*	*		6	2.3
164	48221	951		41	4.3		56	5.9
165	48223	768		24	3.1		30	3.9
166	48224	1599		116	7.3		130	8.1
167	48225	272		*	*		*	*
168	48226	45		*	*		*	*
169	48227	1447		75	5.2		97	6.7
170	48228	2100		64	3.0		88	4.2
171	48229	286		*	*		9	3.1
172	48230	147		*	*		*	*
173	48234	1128		53	4.7		67	5.9
174	48235	1267		30	2.4		42	3.3
175	48236	262		*	*		7	2.7
176	48237	602		*	*		6	1.0
177	48238	1002		78	7.8		125	12.5
178	48239	670		*	*		8	1.2
179	48240	388		*	*		*	*
180	48301	97		*	*		*	*
181	48302	93		*	*		*	*
182	48304	101		*	*		*	*
183	48306	132		*	*		*	*
184	48307	343		*	*		*	*
185	48309	149		*	*		*	*
186	48310	675		*	*		12	1.8
187	48312	367		*	*		*	*
188	48313	373		*	*		*	*

	A	B	C	D	E	F	G	H
189	48314	226		*	*		*	*
190	48315	158		*	*		*	*
191	48316	211		*	*		*	*
192	48317	344		*	*		*	*
193	48320	41		*	*		*	*
194	48322	307		*	*		*	*
195	48323	137		*	*		*	*
196	48324	125		*	*		*	*
197	48326	260		*	*		6	2.3
198	48327	245		*	*		*	*
199	48328	317		*	*		*	*
200	48329	232		*	*		*	*
201	48331	201		*	*		*	*
202	48334	191		*	*		*	*
203	48335	477		19	4.0		33	6.9
204	48336	375		*	*		*	*
205	48340	780		*	*		6	0.8
206	48341	320		10	3.1		11	3.4
207	48342	539		9	1.7		10	1.9
208	48346	234		*	*		*	*
209	48348	232		*	*		*	*
210	48350	74		*	*		*	*
211	48353	26		*	*		*	*
212	48356	51		*	*		*	*
213	48357	56		*	*		*	*
214	48359	98		*	*		*	*
215	48360	96		*	*		*	*
216	48362	122		*	*		*	*
217	48363	41		*	*		*	*
218	48367	31		*	*		*	*
219	48370	7		*	*		*	*
220	48371	178		*	*		*	*
221	48374	212		*	*		*	*
222	48375	291		*	*		*	*
223	48377	296		*	*		*	*
224	48380	33		*	*		*	*
225	48381	107		*	*		*	*
226	48382	196		*	*		*	*
227	48383	133		*	*		*	*
228	48386	153		*	*		*	*
229	48390	264		*	*		*	*
230	48393	305		*	*		*	*
231	48401	13		*	*		*	*
232	48412	65		*	*		*	*
233	48413	115		*	*		*	*
234	48414	29		*	*		*	*
235	48415	170		*	*		*	*
236	48416	59		*	*		*	*

	A	B	C	D	E	F	G	H
237	48417	48		*	*		*	*
238	48418	49		*	*		*	*
239	48419	31		*	*		*	*
240	48420	306		*	*		*	*
241	48421	72		*	*		*	*
242	48422	93		*	*		*	*
243	48423	398		*	*		7	1.8
244	48426	9		*	*		*	*
245	48427	30		*	*		*	*
246	48428	22		*	*		*	*
247	48429	117		*	*		*	*
248	48430	320		*	*		9	2.8
249	48432	15		*	*		*	*
250	48433	299		*	*		*	*
251	48434	*		*	*		*	*
252	48435	30		*	*		*	*
253	48436	45		*	*		*	*
254	48437	*		*	*		*	*
255	48438	59		*	*		*	*
256	48439	522		*	*		6	1.1
257	48440	*		*	*		*	*
258	48441	42		*	*		*	*
259	48442	211		*	*		*	*
260	48444	145		*	*		9	6.2
261	48445	13		*	*		*	*
262	48446	361		*	*		12	3.3
263	48449	44		*	*		*	*
264	48450	44		*	*		*	*
265	48451	125		*	*		*	*
266	48453	74		*	*		*	*
267	48454	23		*	*		*	*
268	48455	40		*	*		*	*
269	48456	12		*	*		*	*
270	48457	142		*	*		*	*
271	48458	353		*	*		*	*
272	48460	38		*	*		*	*
273	48461	93		*	*		*	*
274	48462	103		*	*		*	*
275	48463	35		*	*		*	*
276	48464	21		*	*		*	*
277	48465	*		*	*		*	*
278	48466	21		*	*		*	*
279	48467	15		*	*		*	*
280	48468	7		*	*		*	*
281	48469	7		*	*		*	*
282	48470	*		*	*		*	*
283	48471	82		*	*		*	*
284	48472	24		*	*		*	*

	A	B	C	D	E	F	G	H
285	48473	299		*	*		*	*
286	48475	19		*	*		*	*
287	48476	10		*	*		*	*
288	48502	10		*	*		*	*
289	48503	502		17	3.4		29	5.8
290	48504	671		13	1.9		30	4.5
291	48505	604		17	2.8		29	4.8
292	48506	549		8	1.5		17	3.1
293	48507	763		*	*		17	2.2
294	48509	111		*	*		*	*
295	48519	126		*	*		*	*
296	48529	251		*	*		*	*
297	48532	393		*	*		8	2.0
298	48601	1183		18	1.5		48	4.1
299	48602	776		16	2.1		51	6.6
300	48603	372		*	*		*	*
301	48604	149		*	*		*	*
302	48607	30		*	*		*	*
303	48609	120		*	*		*	*
304	48610	25		*	*		*	*
305	48611	49		*	*		*	*
306	48612	118		*	*		*	*
307	48613	13		*	*		*	*
308	48614	18		*	*		*	*
309	48615	38		*	*		*	*
310	48616	110		*	*		*	*
311	48617	136		*	*		*	*
312	48618	43		*	*		*	*
313	48619	*		*	*		*	*
314	48620	*		*	*		*	*
315	48621	10		*	*		*	*
316	48622	81		*	*		*	*
317	48623	138		*	*		*	*
318	48624	162		*	*		*	*
319	48625	209		*	*		*	*
320	48626	57		*	*		*	*
321	48627	*		*	*		*	*
322	48628	7		*	*		*	*
323	48629	79		*	*		*	*
324	48630	*		*	*		*	*
325	48631	43		*	*		*	*
326	48632	56		*	*		*	*
327	48633	*		*	*		*	*
328	48634	31		*	*		*	*
329	48635	*		*	*		*	*
330	48636	*		*	*		*	*
331	48637	41		*	*		*	*
332	48638	208		*	*		6	2.9

	A	B	C	D	E	F	G	H
333	48640	170		*	*		*	*
334	48642	192		*	*		*	*
335	48647	16		*	*		*	*
336	48649	30		*	*		*	*
337	48650	70		*	*		*	*
338	48651	51		*	*		*	*
339	48652	12		*	*		*	*
340	48653	60		*	*		*	*
341	48654	8		*	*		*	*
342	48655	97		*	*		*	*
343	48656	35		*	*		*	*
344	48657	40		*	*		*	*
345	48658	59		*	*		*	*
346	48659	44		*	*		*	*
347	48661	59		*	*		*	*
348	48662	12		*	*		*	*
349	48701	31		*	*		*	*
350	48703	29		*	*		*	*
351	48705	*		*	*		*	*
352	48706	547		*	*		17	3.1
353	48708	471		12	2.5		29	6.2
354	48720	11		*	*		*	*
355	48721	*		*	*		*	*
356	48722	42		*	*		*	*
357	48723	238		*	*		*	*
358	48724	10		*	*		*	*
359	48725	24		*	*		*	*
360	48726	90		*	*		*	*
361	48727	15		*	*		*	*
362	48728	*		*	*		*	*
363	48729	17		*	*		*	*
364	48730	17		*	*		*	*
365	48731	24		*	*		*	*
366	48732	140		*	*		*	*
367	48733	26		*	*		*	*
368	48734	44		*	*		*	*
369	48735	16		*	*		*	*
370	48737	*		*	*		*	*
371	48738	*		*	*		*	*
372	48739	12		*	*		*	*
373	48740	13		*	*		*	*
374	48741	35		*	*		*	*
375	48742	9		*	*		*	*
376	48743	*		*	*		*	*
377	48744	63		*	*		*	*
378	48745	11		*	*		*	*
379	48746	115		*	*		*	*
380	48747	22		*	*		*	*

	A	B	C	D	E	F	G	H
381	48748	8		*	*		*	*
382	48749	18		*	*		*	*
383	48750	77		*	*		*	*
384	48754	22		*	*		*	*
385	48755	30		*	*		*	*
386	48756	21		*	*		*	*
387	48757	60		*	*		*	*
388	48759	47		*	*		*	*
389	48760	18		*	*		*	*
390	48761	*		*	*		*	*
391	48762	*		*	*		*	*
392	48763	22		*	*		*	*
393	48765	8		*	*		*	*
394	48766	17		*	*		*	*
395	48767	24		*	*		*	*
396	48768	150		*	*		*	*
397	48770	7		*	*		*	*
398	48801	176		*	*		*	*
399	48804	*		*	*		*	*
400	48806	22		*	*		*	*
401	48807	6		*	*		*	*
402	48808	45		*	*		*	*
403	48809	165		*	*		6	3.6
404	48811	52		*	*		*	*
405	48813	215		*	*		6	2.8
406	48815	28		*	*		*	*
407	48817	116		*	*		*	*
408	48818	26		*	*		*	*
409	48819	24		*	*		*	*
410	48820	96		*	*		*	*
411	48821	35		*	*		*	*
412	48822	12		*	*		*	*
413	48823	346		*	*		9	2.6
414	48827	142		*	*		*	*
415	48829	51		*	*		*	*
416	48830	*		*	*		*	*
417	48831	28		*	*		*	*
418	48832	9		*	*		*	*
419	48834	20		*	*		*	*
420	48835	10		*	*		*	*
421	48836	111		*	*		*	*
422	48837	115		*	*		*	*
423	48838	227		*	*		*	*
424	48840	104		*	*		*	*
425	48841	14		*	*		*	*
426	48842	251		*	*		*	*
427	48843	268		*	*		*	*
428	48845	*		*	*		*	*

	A	B	C	D	E	F	G	H
429	48846	316		*	*		15	4.7
430	48847	74		*	*		*	*
431	48848	59		*	*		*	*
432	48849	61		*	*		*	*
433	48850	42		*	*		*	*
434	48851	27		*	*		*	*
435	48852	*		*	*		*	*
436	48853	7		*	*		*	*
437	48854	234		*	*		*	*
438	48855	76		*	*		*	*
439	48856	13		*	*		*	*
440	48857	32		*	*		*	*
441	48858	419		*	*		7	1.7
442	48860	23		*	*		*	*
443	48861	12		*	*		*	*
444	48864	140		*	*		*	*
445	48865	33		*	*		*	*
446	48866	70		*	*		*	*
447	48867	617		9	1.5		24	3.9
448	48870	*		*	*		*	*
449	48871	11		*	*		*	*
450	48872	97		*	*		*	*
451	48873	11		*	*		*	*
452	48874	7		*	*		*	*
453	48875	111		*	*		*	*
454	48876	42		*	*		*	*
455	48877	31		*	*		*	*
456	48878	26		*	*		*	*
457	48879	166		*	*		*	*
458	48880	101		*	*		*	*
459	48881	52		*	*		*	*
460	48883	78		*	*		*	*
461	48884	58		*	*		*	*
462	48885	8		*	*		*	*
463	48886	20		*	*		*	*
464	48888	93		*	*		*	*
465	48889	12		*	*		*	*
466	48890	16		*	*		*	*
467	48891	30		*	*		*	*
468	48892	77		*	*		*	*
469	48893	52		*	*		*	*
470	48894	16		*	*		*	*
471	48895	82		*	*		*	*
472	48896	*		*	*		*	*
473	48897	9		*	*		*	*
474	48906	678		8	1.2		29	4.3
475	48910	826		6	0.7		17	2.1
476	48911	1252		9	0.7		30	2.4

	A	B	C	D	E	F	G	H
477	48912	298		*	*		12	4.0
478	48915	308		*	*		16	5.2
479	48917	408		*	*		12	2.9
480	48933	27		*	*		*	*
481	49001	518		11	2.1		30	5.8
482	49002	205		*	*		*	*
483	49004	199		*	*		*	*
484	49006	279		*	*		*	*
485	49007	242		7	2.9		19	7.9
486	49008	174		*	*		*	*
487	49009	391		*	*		*	*
488	49010	258		*	*		11	4.3
489	49011	32		*	*		*	*
490	49012	27		*	*		*	*
491	49013	79		*	*		*	*
492	49014	423		14	3.3		20	4.7
493	49015	516		6	1.2		12	2.3
494	49017	353		13	3.7		20	5.7
495	49021	76		*	*		*	*
496	49022	774		19	2.5		31	4.0
497	49024	313		*	*		*	*
498	49026	23		*	*		*	*
499	49027	*		*	*		*	*
500	49028	99		*	*		*	*
501	49029	17		*	*		*	*
502	49030	26		*	*		*	*
503	49031	52		*	*		*	*
504	49032	35		*	*		*	*
505	49033	9		*	*		*	*
506	49034	17		*	*		*	*
507	49036	374		*	*		15	4.0
508	49037	610		18	3.0		22	3.6
509	49038	71		*	*		*	*
510	49040	28		*	*		*	*
511	49042	84		*	*		*	*
512	49043	30		*	*		*	*
513	49045	70		*	*		*	*
514	49046	62		*	*		*	*
515	49047	187		*	*		*	*
516	49048	532		*	*		11	2.1
517	49050	23		*	*		*	*
518	49051	19		*	*		*	*
519	49052	11		*	*		*	*
520	49053	90		*	*		*	*
521	49055	58		*	*		*	*
522	49056	83		*	*		*	*
523	49057	123		*	*		*	*
524	49058	163		*	*		9	5.5

	A	B	C	D	E	F	G	H
525	49060	14		*	*		*	*
526	49061	12		*	*		*	*
527	49064	39		*	*		*	*
528	49065	54		*	*		*	*
529	49066	7		*	*		*	*
530	49067	35		*	*		*	*
531	49068	155		6	3.9		7	4.5
532	49070	24		*	*		*	*
533	49071	80		*	*		*	*
534	49072	34		*	*		*	*
535	49073	51		*	*		9	17.6
536	49075	7		*	*		*	*
537	49076	22		*	*		*	*
538	49078	95		*	*		*	*
539	49079	109		7	6.4		7	6.4
540	49080	154		*	*		*	*
541	49082	89		*	*		*	*
542	49083	59		*	*		*	*
543	49085	82		*	*		*	*
544	49087	46		*	*		*	*
545	49088	31		*	*		*	*
546	49089	25		*	*		*	*
547	49090	154		*	*		6	3.9
548	49091	370		*	*		10	2.7
549	49092	16		*	*		*	*
550	49093	342		*	*		17	5.0
551	49094	57		*	*		*	*
552	49095	14		*	*		*	*
553	49096	32		*	*		*	*
554	49097	92		*	*		*	*
555	49098	61		*	*		*	*
556	49099	80		*	*		*	*
557	49101	20		*	*		*	*
558	49102	7		*	*		*	*
559	49103	145		*	*		*	*
560	49106	27		*	*		*	*
561	49107	116		*	*		*	*
562	49111	59		*	*		*	*
563	49112	51		*	*		*	*
564	49113	17		*	*		*	*
565	49115	*		*	*		*	*
566	49116	*		*	*		*	*
567	49117	24		*	*		*	*
568	49119	*		*	*		*	*
569	49120	487		*	*		7	1.4
570	49125	9		*	*		*	*
571	49126	28		*	*		*	*
572	49127	54		*	*		*	*

	A	B	C	D	E	F	G	H
573	49128	29		*	*		*	*
574	49129	*		*	*		*	*
575	49130	12		*	*		*	*
576	49201	693		8	1.2		32	4.6
577	49202	534		*	*		28	5.2
578	49203	859		17	2.0		75	8.7
579	49220	33		*	*		*	*
580	49221	640		18	2.8		78	12.2
581	49224	153		*	*		14	9.2
582	49227	27		*	*		*	*
583	49228	45		*	*		*	*
584	49229	35		*	*		*	*
585	49230	96		*	*		*	*
586	49232	59		*	*		*	*
587	49233	30		*	*		*	*
588	49234	33		*	*		*	*
589	49235	29		*	*		*	*
590	49236	28		*	*		*	*
591	49237	53		*	*		*	*
592	49238	26		*	*		*	*
593	49240	78		*	*		*	*
594	49241	39		*	*		*	*
595	49242	289		*	*		9	3.1
596	49245	58		*	*		*	*
597	49246	40		*	*		*	*
598	49247	87		8	9.2		13	14.9
599	49248	8		*	*		*	*
600	49249	41		*	*		*	*
601	49250	106		*	*		*	*
602	49251	108		*	*		*	*
603	49252	50		*	*		*	*
604	49253	24		*	*		*	*
605	49254	45		*	*		*	*
606	49255	24		*	*		*	*
607	49256	54		*	*		7	13.0
608	49259	36		*	*		*	*
609	49261	*		*	*		*	*
610	49262	13		*	*		*	*
611	49263	*		*	*		*	*
612	49264	20		*	*		*	*
613	49265	39		*	*		*	*
614	49266	64		*	*		*	*
615	49267	22		*	*		*	*
616	49268	6		*	*		*	*
617	49269	73		*	*		*	*
618	49270	54		*	*		*	*
619	49271	38		*	*		*	*
620	49272	22		*	*		*	*

	A	B	C	D	E	F	G	H
621	49274	65		*	*		*	*
622	49276	*		*	*		*	*
623	49277	45		*	*		*	*
624	49279	*		*	*		*	*
625	49282	10		*	*		*	*
626	49283	52		*	*		*	*
627	49284	44		*	*		*	*
628	49285	81		*	*		*	*
629	49286	120		*	*		*	*
630	49287	13		*	*		*	*
631	49288	38		*	*		*	*
632	49289	*		*	*		*	*
633	49301	139		*	*		*	*
634	49302	45		*	*		*	*
635	49303	9		*	*		*	*
636	49304	50		*	*		*	*
637	49305	23		*	*		*	*
638	49306	67		*	*		*	*
639	49307	151		*	*		*	*
640	49309	9		*	*		*	*
641	49310	19		*	*		*	*
642	49312	6		*	*		*	*
643	49315	168		*	*		*	*
644	49316	160		*	*		*	*
645	49318	32		*	*		*	*
646	49319	222		*	*		*	*
647	49320	*		*	*		*	*
648	49321	299		*	*		*	*
649	49322	15		*	*		*	*
650	49323	44		*	*		*	*
651	49325	10		*	*		*	*
652	49326	21		*	*		*	*
653	49327	95		*	*		*	*
654	49328	21		*	*		*	*
655	49329	95		*	*		*	*
656	49330	113		*	*		*	*
657	49331	165		*	*		*	*
658	49332	19		*	*		*	*
659	49333	95		*	*		*	*
660	49335	*		*	*		*	*
661	49336	28		*	*		*	*
662	49337	78		*	*		*	*
663	49338	20		*	*		*	*
664	49339	21		*	*		*	*
665	49340	30		*	*		*	*
666	49341	272		*	*		*	*
667	49342	14		*	*		*	*
668	49343	64		*	*		*	*

	A	B	C	D	E	F	G	H
669	49344	37		*	*		*	*
670	49345	199		*	*		*	*
671	49346	26		*	*		*	*
672	49347	8		*	*		*	*
673	49348	77		*	*		*	*
674	49349	65		*	*		*	*
675	49401	83		*	*		*	*
676	49402	14		*	*		*	*
677	49403	82		*	*		*	*
678	49404	71		*	*		*	*
679	49405	16		*	*		*	*
680	49406	*		*	*		*	*
681	49408	131		*	*		*	*
682	49410	22		*	*		*	*
683	49411	19		*	*		*	*
684	49412	117		*	*		*	*
685	49415	74		*	*		*	*
686	49417	441		6	1.4		12	2.7
687	49418	239		*	*		*	*
688	49419	70		*	*		*	*
689	49420	188		*	*		*	*
690	49421	61		*	*		*	*
691	49423	728		*	*		36	4.9
692	49424	705		*	*		21	3.0
693	49425	47		*	*		*	*
694	49426	210		*	*		*	*
695	49428	134		*	*		*	*
696	49431	256		*	*		17	6.6
697	49435	27		*	*		*	*
698	49436	21		*	*		*	*
699	49437	75		*	*		*	*
700	49440	29		*	*		*	*
701	49441	489		17	3.5		33	6.7
702	49442	818		41	5.0		74	9.0
703	49444	550		14	2.5		33	6.0
704	49445	206		*	*		*	*
705	49446	40		*	*		*	*
706	49448	50		*	*		*	*
707	49449	36		*	*		*	*
708	49450	83		*	*		*	*
709	49451	57		*	*		*	*
710	49452	26		*	*		*	*
711	49453	13		*	*		*	*
712	49454	79		*	*		6	7.6
713	49455	122		*	*		*	*
714	49456	250		*	*		*	*
715	49457	125		*	*		*	*
716	49458	*		*	*		*	*

	A	B	C	D	E	F	G	H
717	49459	37		*	*		*	*
718	49460	88		*	*		*	*
719	49461	84		*	*		*	*
720	49464	269		*	*		*	*
721	49503	830		22	2.7		64	7.7
722	49504	813		29	3.6		73	9.0
723	49505	581		10	1.7		28	4.8
724	49506	433		8	1.8		38	8.8
725	49507	1309		42	3.2		145	11.1
726	49508	834		*	*		30	3.6
727	49509	726		*	*		13	1.8
728	49512	278		*	*		*	*
729	49519	480		*	*		13	2.7
730	49525	272		*	*		*	*
731	49534	174		*	*		*	*
732	49544	128		*	*		*	*
733	49546	418		*	*		8	1.9
734	49548	752		7	0.9		19	2.5
735	49601	216		*	*		*	*
736	49611	9		*	*		*	*
737	49612	11		*	*		*	*
738	49613	12		*	*		*	*
739	49614	23		*	*		*	*
740	49615	34		*	*		*	*
741	49616	34		*	*		*	*
742	49617	38		*	*		*	*
743	49618	*		*	*		*	*
744	49619	9		*	*		*	*
745	49620	53		*	*		*	*
746	49621	26		*	*		*	*
747	49622	27		*	*		*	*
748	49623	15		*	*		*	*
749	49625	21		*	*		*	*
750	49626	6		*	*		*	*
751	49627	*		*	*		*	*
752	49628	*		*	*		*	*
753	49629	14		*	*		*	*
754	49630	7		*	*		*	*
755	49631	92		*	*		*	*
756	49632	13		*	*		*	*
757	49633	35		*	*		*	*
758	49634	*		*	*		*	*
759	49635	41		*	*		*	*
760	49636	*		*	*		*	*
761	49637	76		*	*		*	*
762	49638	9		*	*		*	*
763	49639	43		*	*		*	*
764	49640	21		*	*		*	*

	A	B	C	D	E	F	G	H
765	49642	8		*	*		*	*
766	49643	120		*	*		*	*
767	49644	11		*	*		*	*
768	49645	27		*	*		*	*
769	49646	101		*	*		*	*
770	49648	19		*	*		*	*
771	49649	116		*	*		*	*
772	49650	65		*	*		*	*
773	49651	73		*	*		*	*
774	49653	25		*	*		*	*
775	49654	*		*	*		*	*
776	49655	28		*	*		*	*
777	49656	16		*	*		*	*
778	49657	32		*	*		*	*
779	49659	122		*	*		*	*
780	49660	165		*	*		9	5.5
781	49663	57		*	*		*	*
782	49664	19		*	*		*	*
783	49665	44		*	*		*	*
784	49666	*		*	*		*	*
785	49667	*		*	*		*	*
786	49668	48		*	*		*	*
787	49670	16		*	*		*	*
788	49675	8		*	*		*	*
789	49676	49		*	*		*	*
790	49677	115		*	*		*	*
791	49679	12		*	*		*	*
792	49680	34		*	*		*	*
793	49682	65		*	*		*	*
794	49683	28		*	*		*	*
795	49684	599		*	*		9	1.5
796	49685	30		*	*		*	*
797	49686	422		*	*		*	*
798	49688	29		*	*		*	*
799	49689	16		*	*		*	*
800	49690	78		*	*		*	*
801	49696	18		*	*		*	*
802	49701	14		*	*		*	*
803	49705	11		*	*		*	*
804	49706	79		*	*		*	*
805	49707	204		*	*		8	3.9
806	49709	23		*	*		*	*
807	49710	*		*	*		*	*
808	49712	92		*	*		*	*
809	49713	26		*	*		*	*
810	49715	45		*	*		*	*
811	49716	*		*	*		*	*
812	49718	*		*	*		*	*

	A	B	C	D	E	F	G	H
813	49719	9		*	*		*	*
814	49720	93		*	*		*	*
815	49721	165		*	*		*	*
816	49722	*		*	*		*	*
817	49724	10		*	*		*	*
818	49725	*		*	*		*	*
819	49726	*		*	*		*	*
820	49727	90		*	*		*	*
821	49728	*		*	*		*	*
822	49729	6		*	*		*	*
823	49730	23		*	*		*	*
824	49733	19		*	*		*	*
825	49735	252		*	*		*	*
826	49736	*		*	*		*	*
827	49738	62		*	*		*	*
828	49740	53		*	*		*	*
829	49743	*		*	*		*	*
830	49744	*		*	*		*	*
831	49745	16		*	*		*	*
832	49746	35		*	*		*	*
833	49747	12		*	*		*	*
834	49748	*		*	*		*	*
835	49749	36		*	*		*	*
836	49751	18		*	*		*	*
837	49752	*		*	*		*	*
838	49753	18		*	*		*	*
839	49755	14		*	*		*	*
840	49756	32		*	*		*	*
841	49757	*		*	*		*	*
842	49759	14		*	*		*	*
843	49760	8		*	*		*	*
844	49762	*		*	*		*	*
845	49764	8		*	*		*	*
846	49765	49		*	*		*	*
847	49766	12		*	*		*	*
848	49768	*		*	*		*	*
849	49769	25		*	*		*	*
850	49770	176		*	*		*	*
851	49774	15		*	*		*	*
852	49775	*		*	*		*	*
853	49776	18		*	*		*	*
854	49777	*		*	*		*	*
855	49779	44		*	*		*	*
856	49780	20		*	*		*	*
857	49781	69		*	*		*	*
858	49782	*		*	*		*	*
859	49783	261		*	*		*	*
860	49788	73		*	*		*	*

	A	B	C	D	E	F	G	H
861	49791	*		*	*		*	*
862	49792	*		*	*		*	*
863	49793	*		*	*		*	*
864	49795	33		*	*		*	*
865	49796	*		*	*		*	*
866	49799	27		*	*		*	*
867	49801	139		*	*		*	*
868	49802	74		*	*		*	*
869	49805	*		*	*		*	*
870	49806	*		*	*		*	*
871	49807	21		*	*		*	*
872	49808	*		*	*		*	*
873	49812	9		*	*		*	*
874	49814	9		*	*		*	*
875	49815	7		*	*		*	*
876	49816	*		*	*		*	*
877	49817	*		*	*		*	*
878	49818	6		*	*		*	*
879	49820	*		*	*		*	*
880	49821	11		*	*		*	*
881	49822	*		*	*		*	*
882	49825	*		*	*		*	*
883	49826	*		*	*		*	*
884	49827	9		*	*		*	*
885	49829	236		*	*		11	4.7
886	49831	15		*	*		*	*
887	49833	*		*	*		*	*
888	49834	*		*	*		*	*
889	49835	*		*	*		*	*
890	49836	9		*	*		*	*
891	49837	103		*	*		*	*
892	49838	6		*	*		*	*
893	49839	*		*	*		*	*
894	49840	9		*	*		*	*
895	49841	95		*	*		*	*
896	49847	16		*	*		*	*
897	49848	*		*	*		*	*
898	49849	118		*	*		6	5.1
899	49852	*		*	*		*	*
900	49853	10		*	*		*	*
901	49854	78		*	*		*	*
902	49855	179		*	*		*	*
903	49858	140		*	*		11	7.9
904	49861	*		*	*		*	*
905	49862	54		*	*		*	*
906	49863	*		*	*		*	*
907	49866	49		*	*		*	*
908	49868	78		*	*		*	*

	A	B	C	D	E	F	G	H
909	49870	49		*	*		*	*
910	49871	*		*	*		*	*
911	49872	*		*	*		*	*
912	49873	*		*	*		*	*
913	49874	10		*	*		*	*
914	49876	12		*	*		*	*
915	49877	*		*	*		*	*
916	49878	29		*	*		*	*
917	49879	*		*	*		*	*
918	49880	*		*	*		*	*
919	49881	*		*	*		*	*
920	49883	*		*	*		*	*
921	49884	9		*	*		*	*
922	49885	8		*	*		*	*
923	49886	*		*	*		*	*
924	49887	18		*	*		*	*
925	49891	8		*	*		*	*
926	49892	13		*	*		*	*
927	49893	18		*	*		*	*
928	49894	7		*	*		*	*
929	49895	9		*	*		*	*
930	49896	28		*	*		*	*
931	49901	6		*	*		*	*
932	49902	*		*	*		*	*
933	49903	*		*	*		*	*
934	49905	50		*	*		*	*
935	49908	57		*	*		*	*
936	49910	*		*	*		*	*
937	49911	28		*	*		*	*
938	49912	11		*	*		*	*
939	49913	142		*	*		9	6.3
940	49915	12		*	*		*	*
941	49916	40		*	*		*	*
942	49917	*		*	*		*	*
943	49918	*		*	*		*	*
944	49919	*		*	*		*	*
945	49920	50		*	*		*	*
946	49921	7		*	*		*	*
947	49922	12		*	*		*	*
948	49925	*		*	*		*	*
949	49927	*		*	*		*	*
950	49929	*		*	*		*	*
951	49930	127		*	*		*	*
952	49931	109		*	*		*	*
953	49934	14		*	*		*	*
954	49935	66		*	*		*	*
955	49938	86		*	*		*	*
956	49942	*		*	*		*	*

	A	B	C	D	E	F	G	H
957	49945	46		*	*		*	*
958	49946	71		*	*		*	*
959	49947	*		*	*		*	*
960	49948	*		*	*		*	*
961	49950	14		*	*		*	*
962	49952	*		*	*		*	*
963	49953	19		*	*		*	*
964	49955	9		*	*		*	*
965	49958	14		*	*		*	*
966	49959	*		*	*		*	*
967	49960	*		*	*		*	*
968	49961	*		*	*		*	*
969	49962	*		*	*		*	*
970	49963	19		*	*		*	*
971	49965	*		*	*		*	*
972	49967	*		*	*		*	*
973	49968	10		*	*		*	*
974	49969	23		*	*		*	*
975	49970	*		*	*		*	*
976	49971	7		*	*		*	*
977	Po Box or Unknown	358		8	---		15	---
978	Total	143,844		2,722	1.9		5,053	3.5
979								
980	*Suppressed due to small cell size							
981	^Includes highest venous blood lead level in 2014							
982	^^Includes highest venous, or if no venous, highest capillary blood lead level in 2014							
983	Source: MDHHS Data Warehouse							December 28, 2015

From: Scott, Robert L. (DHHS)
Sent: Tuesday, December 29, 2015 10:08 AM
To: Stanbury, Martha (DHHS)
Subject: flint file
Attachments: Updated Flint EBLL List for GCHD 121415.xlsx

Was sent to me 12/18/15.

Robert L. Scott
Childhood Lead Poisoning Prevention Program
Michigan Department of Health & Human Services
(517) 335-8178
fax (517) 335-8509

Children in PHI with Elevated Blood Lead Levels

Last Updated 12/14/2015

Most Recent PB Result	Most Recent Sample Type	Re-located	Provider Name	Retesting Status	Child Category	Original Pb Result	Original Sample Type	Status Code	PHN Assigned	1st phone call	2nd phone call	3rd phone call	Contact Successful	Date Letter Mailed or Delivered	Water Filter Initially	Water Filter Delivered	Certified Letter	Case Closed Date	Case Closed Reason
5	C		HURLEY MEDICAL CENTER	Needs Confirm	April14-Sept15	5	C	1	KN	11/6/2015	11/9/2015	12/4/2015	YES	12/16/2015	YES	NA			
6	C		GRAND BLANC PEDIATRIC CLINIC	Needs Confirm	April14-Sept15	6	C	1	KN	11/6/2015	11/9/2015	12/4/2015	UTR	12/4/2015	UTR	NA			
6	C		GENESEE CO HEALTH DEPT SAGINAW	Needs Confirm	April14-Sept15	6	C	1	KN	11/6/2015	NA	NA	YES	11/13/2015	NO	11/13/2015			
5	C		KINRA, NARESH, MD	Needs Confirm	April14-Sept15	5	C	1	KN	12/11/2015	12/16/2015	12/17/2015	UTR	12/17/2015	UTR	NA			
[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			
5	C		GENESEE CO HEALTH DEPT SAGINAW	Needs Confirm	April14-Sept15	5	C	1	KN	11/6/2015	NA	NA	UTR	11/18/2015	UTR	NA			
5	C		THE CHILDRENS OFFICE	Needs Confirm	April14-Sept15	5	C	1	KN	NA	NA	NA	UTR	11/9/2015	UTR	NA			
6	C		GENESEE CO HEALTH DEPT SAGINAW	Needs Confirm	Oct15toDate	6	C	1	ST	11/4/2015	12/7/2015	N/A		11/4/2015	YES				
7	C		GENESEE CO HEALTH DEPT SAGINAW	Needs Confirm	April14-Sept15	7	C	1	KN	11/9/2015	12/4/2015	NA	YES	12/7/2015	NO	12/7/2015			
10	C		GENESEE CO HEALTH DEPT SAGINAW	Needs Confirm	Oct15toDate	10	C	1	ST	10/21/2015	11/2/2015	NA	UTR	Address unk					
6	C		GENESEE CO HEALTH DEPT SAGINAW	Needs Confirm	April14-Sept15	6	C	1	ST	10/21/2015	11/2/2015	NA	UTR	Address unk					
8	C		GENESEE CO HEALTH DEPT SAGINAW	Needs Confirm	April14-Sept15	8	C	1	KN	11/6/2015	11/6/2015	11/16/2015	YES	11/20/2015	NO	11/20/2015			
6	C		HURLEY MEDICAL CENTER	Needs Confirm	April14-Sept15	6	C	1	KN	11/9/2015	NA	NA	YES	11/13/2015	NO	11/13/2015			
6	C		HURLEY MEDICAL CENTER	Needs Confirm	April14-Sept15	6	C	1	KN	11/9/2015	12/4/2015	12/16/2015							
14	C		HURLEY MEDICAL CENTER	Needs Confirm	April14-Sept15	14	C	1	KN	11/18/2015	12/2/2015	12/9/2015	UTR	12/9/2015	UTR	NA			
[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			
5	C		GENESEE CO HEALTH DEPT SAGINAW	Needs Confirm	Oct15toDate	5	C	1	KN	NA	NA	NA	NA	11/18/2015	NA	NA			
12	C		HASAN, KAMAL, DR	Needs Confirm	April14-Sept15	12	C	1	KN	11/18/2015	NA	NA	YES	11/18/2015	YES	NA			
8	C		GENESEE CO HEALTH DEPT SAGINAW	Needs Confirm	April14-Sept15	8	C	1	KN	11/9/2015	12/4/2015	NA	UTR	12/16/2015	UTR	NO			
5	C		GENESEE CO HEALTH DEPT SAGINAW	Needs Confirm	April14-Sept15	5	C	1	KN	11/9/2015	11/20/2015	NA	YES	11/25/2015	NO	NO			
7	C		HURLEY MEDICAL CENTER	Needs Confirm	April14-Sept15	7	C	1	KN	11/9/2015	12/9/2015	12/16/2015	YES	12/16/2015	NA	NA			
5	C		GENESEE CO HEALTH DEPT SAGINAW	Needs Confirm	April14-Sept15	5	C	1	KN	11/9/2015	NA	NA	YES	11/9/2015	YES	NA			
[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]									
8	C		GENESEE CO HEALTH DEPT SAGINAW	Needs Confirm	April14-Sept15	8	C	1	KN	11/9/2015	NA	NA	YES	11/13/2015	NO	11/13/2015			
6	C		GENESEE CO HEALTH DEPT SAGINAW	Needs Confirm	April14-Sept15	6	C	1	KN	11/9/2015	12/9/2015	12/9/2015	YES	12/9/2015	NO	12/9/2015			
9	C		GENESEE CO HEALTH DEPT SAGINAW	Needs Confirm	April14-Sept15	9	C	1	KN	11/9/2015	NA	NA	YES	11/13/2015	NO	11/13/2015			
5	C		GENESEE CO HEALTH DEPT SAGINAW	Needs Confirm	April14-Sept15	5	C	1	KN	11/9/2015	NA	NA	YES	11/9/2015	Has well	NO			
5	C		GENESEE CO HEALTH DEPT SAGINAW	Needs Confirm	April14-Sept15	5	C	1	KN	11/6/2015	12/4/2015	12/9/2015	UTR	12/9/2015	UTR	NA			
5	C		PRIME PEDS & ADOLESCENT	Needs Confirm	April14-Sept15	5	C	1	KN	11/6/2015	12/4/2015	NA	UTR	12/4/2015	UTR	NA			
5	C		GENESEE CO HEALTH DEPT SAGINAW	Needs Confirm	April14-Sept15	5	C	1	KN	11/6/2015	12/4/2015								
5	C		HURLEY MEDICAL CENTER	Needs Confirm	April14-Sept15	5	C	1	KN	11/6/2015	12/4/2015	NA	UTR	12/4/2015	UTR	NA			
5	C		HURLEY MEDICAL CENTER	Needs Confirm	April14-Sept15	5	C	1	JW	11/6/2015	12/4/2015	12/9/2015	YES	12/11/2015	NO	will P/U @ WIC			
7	C		HURLEY MEDICAL CENTER	Needs Confirm	April14-Sept15	7	C	1	JW	11/6/2015	12/4/2015	12/9/2015	YES	12/11/2015	NO	will P/U @ WIC			
7	C		GENESEE CO HEALTH DEPT SAGINAW	Needs Confirm	April14-Sept15	7	C	1	KN	11/6/2015	12/4/2015	NA	UTR	12/4/2015	UTR	NA			
7	C		GENESEE CO HEALTH DEPT SAGINAW	Needs Confirm	April14-Sept15	7	C	1	KN	11/9/2015	12/4/2015	NA	YES	12/7/2015	NO	12/7/2015			
6	C		GENESEE CO HEALTH DEPT SAGINAW	Needs Confirm	April14-Sept15	6	C	1	KN	11/9/2015	NA	NA	YES	11/9/2015	YES	NA			
9	C		GENESEE CO HEALTH DEPT SAGINAW	Needs Confirm	Oct15toDate	9	C	1	ST	11/16/2015	NA	NA	YES	11/16/2015	NO	11/19/2015			
5	C		GENESEE CO HEALTH DEPT SAGINAW	Needs Confirm	April14-Sept15	5	C	1	KN	11/6/2015	12/7/2015	NA	UTR	12/7/2015	UTR	NA			
5	C		GRAND BLANC PEDIATRIC CLINIC	Needs Confirm	April14-Sept15	5	C	1	KN	11/9/2015	11/9/2015	NA	YES	11/9/2015	YES	NA			
6	C		GENESEE CO HEALTH DEPT SAGINAW	Needs Confirm	April14-Sept15	6	C	1	KN	11/6/2015	12/7/2015	12/10/2015	UTR	12/10/2015	UTR	NA			
11	C		HASAN, KAMAL, DR	Needs Confirm	April14-Sept15	11	C	1	KN	11/19/2015	11/19/2015	NA	YES	11/19/2015	NO	11/20/2015			
5	C		GENESEE CO HEALTH DEPT SAGINAW	Needs Confirm	April14-Sept15	5	C	1	KN	11/6/2015	12/7/2015	NA	UTR	12/7/2015	UTR	NA			
5	C		HASAN, KAMAL, DR	Needs Confirm	Oct15toDate	5	C	1	KN	11/6/2015	12/7/2015	NA	YES	12/7/2015	YES	NA			
9	C		HASAN, KAMAL, DR	Needs Confirm	Oct15toDate	9	C	1	KN	11/6/2015	12/7/2015	NA	YES	12/7/2015	YES	NA			
8	C		GENESEE CO HEALTH DEPT SAGINAW	Needs Confirm	April14-Sept15	8	C	1	KN	11/9/2015	12/7/2015	NA	UTR	12/7/2015	UTR	NA			
5	C		GENESEE CO HEALTH DEPT SAGINAW	Needs Confirm	April14-Sept15	5	C	1	KN	11/9/2015	11/9/2015	NA	YES	11/13/2015	NO	11/13/2015			
5	C		GENESEE CO HEALTH DEPT SAGINAW	Needs Confirm	Oct15toDate	5	C	1	KN	11/9/2015	NA	NA	YES	11/9/2015	YES	NA			
5	C		HASAN, KAMAL, DR	Needs Confirm	April14-Sept15	5	C	1	KN	11/9/2015	12/7/2015								
5	C		GENESEE CO HEALTH DEPT SAGINAW	Needs Confirm	April14-Sept15	5	C	1	KN	11/9/2015	NA	NA	YES	11/9/2015	YES	NA			
6	C		GENESEE CO HEALTH DEPT SAGINAW	Needs Confirm	April14-Sept15	6	C	1	KN	11/13/2015	12/7/2015								
12	C		GENESEE CO HEALTH DEPT SAGINAW	Needs Confirm	April14-Sept15	12	C	1	KN	11/16/2015	NA	NA	UTR	Returned	UTR	NA			
14	C		HURLEY MEDICAL CENTER	Needs Confirm	April14-Sept15	14	C	1	KN	11/16/2015	12/7/2015	NA	YES	12/7/2015	YES	NA			
[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			
5	C		IMPERIAL, ALICIA F, MD -LINDEN	Needs Confirm	April14-Sept15	5	C	1	JW	11/16/2015	12/10/2015	NA	YES	11/16/2015	YES	NA			
6	C		GENESEE CO HEALTH DEPT SAGINAW	Needs Confirm	April14-Sept15	6	C	1	JW	11/16/2015	12/10/2015	NA	YES	11/16/2015 & 12/10/2015	NO states does not have Flint h2o	NO			
12	C		HURLEY MEDICAL CENTER	Needs Confirm	April14-Sept15	12	C	1	KN	11/16/2015	12/8/2015	12/11/2015	YES	12/11/2015	YES	NA			
5	C		GENESEE CO HEALTH DEPT SAGINAW	Needs Confirm	April14-Sept15	5	C	1	KN	11/16/2015	12/8/2015	NA	YES	12/8/2015	Moved to Mount Morris	NA			
5	C		HURLEY MEDICAL CENTER	Needs Confirm	April14-Sept15	5	C	1	KN	11/16/2015	NA	NA	YES	11/20/2015	YES	NA			
7	C		HURLEY MEDICAL CENTER	Needs Confirm	April14-Sept15	7	C	1	KN	11/16/2015	12/8/2015	NA	YES	12/8/2015	YES	NA			
5	C		GENESEE CO HEALTH DEPT SAGINAW	Needs Confirm	April14-Sept15	5	C	1	KN	11/16/2015	12/8/2015								
5	C		GENESEE CO HEALTH DEPT SAGINAW	Needs Confirm	April14-Sept15	5	C	1	KN	11/19/2015	11/19/2015	NA	YES	11/19/2015	UTR	NA			
7	C		HURLEY MEDICAL CENTER	Needs Confirm	April14-Sept15	7	C	1	KN	11/19/2015	12/8/2015	12/16/2015	UTR	12/16/2015					
7	C		HURLEY MEDICAL CENTER	Needs Confirm	April14-Sept15	7	C	1	KN	11/19/2015	12/8/2015	12/17/2015	UTR	12/17/2015	UTR	NA			
5	C		GENESEE CO HEALTH DEPT SAGINAW	Needs Confirm	April14-Sept15	5	C	1	KN	11/19/2015	NA	NA	UTR	11/19/2015	UTR	NA			
5	C		GENESEE CO HEALTH DEPT SAGINAW	Needs Confirm	April14-Sept15	5	C	1	KN	11/19/2015	12/8/2015	12/16/2015	UTR	12/16/2015	UTR	NA			
6	C		GENESEE CO HEALTH DEPT SAGINAW	Needs Confirm	April14-Sept15	6	C	1	KN	11/23/2015	12/8/2015	NA	YES	12/8/2015	Fenton	NA			
7	C		GENESEE CO HEALTH DEPT SAGINAW	Needs Confirm	April14-Sept15	7	C	1	KN	11/23/2015	12/8/2015	12/14/2015	UTR	12/14/2015	UTR	NA			
7	C		HURLEY MEDICAL CENTER	Needs Confirm	April14-Sept15	7	C	1	KN	11/19/2015	NA	NA	UTR	11/19/2015	UTR	NA			
[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		
6	C		KIRBY, MICHAEL, MD	Needs Confirm	April14-Sept15	6	C	1	JW	11/24/2015	NA	NA	YES	11/24/2015	YES	NA			
5	C		KIRBY, MICHAEL, MD	Needs Confirm	April14-Sept15	5	C	1	KN	11/24/2015	12/8/2015	NA	UTR	12/8/2015	UTR	NA			
5	C		GENESEE CO HEALTH DEPT SAGINAW	Needs Confirm	April14-Sept15	5	C	1	KN	11/24/2015	12/8/2015	12/16/2015							
8	C		GENESEE CO HEALTH DEPT SAGINAW	Needs Confirm	April14-Sept15	8	C	1	KN	11/24/2015	NA	NA	YES	11/24/2015	YES	NA			
6	C		GENESEE CO HEALTH DEPT SAGINAW	Needs Confirm	April14-Sept15	6	C	1	KN	11/24/2015	11/24/2015	NA	YES	11/24/2015	NO	*Needs*			
5	C		GENESEE CO HEALTH DEPT SAGINAW	Needs Confirm	April14-Sept15	5	C	1	JW	11/24/2015	NA	NA	YES	11/24/2015	NO	Declined			
5	C		GENESEE CO HEALTH DEPT SAGINAW	Needs Confirm	April14-Sept15	5	C	1	KN	11/30/2015	12/15/2015								
5	C		HURLEY MEDICAL CENTER	Needs Confirm	April14-Sept15	5	C	1	KN	11/30/2015	12/8/2015	12/16/2015							
6	C		HURLEY MEDICAL CENTER	Needs Confirm	April14-Sept15	10	C	1	JW	no phone	12/9/2015	NA	UTR	11/30/2015					
6	C		GENESEE CO HEALTH DEPT SAGINAW	Needs Confirm	April14-Sept15	6	C	1	KN	12/16/2015									
5	C		GENESEE CO HEALTH DEPT SAGINAW	Needs Confirm	April14-Sept15	5	C	1	JW	12/1/2015	NA	NA	YES	12/2/2015	no	p/u 12/02/15			
6	C		GENESEE CO HEALTH DEPT SAGINAW	Needs Confirm	April14-Sept15	6	C	1	JW	12/1/2015	NA	NA	YES	12/1/2015	NO	will P/U @ WIC			
6	C		GENESEE CO HEALTH DEPT SAGINAW	Needs Confirm	Oct15toDate	6	C	1	ST	10/21/2015	10/30/2015	12/7/2015		10/30/2015					
5	C		GENESEE CO HEALTH DEPT SAGINAW	Needs Confirm	Oct15toDate	5	C	1	JW	12/1/2015	NA	NA	YES	12/2/15 PU	NO	PU 12/2/105 WIC			
5	C		GENESEE CO HEALTH DEPT SAGINAW	Needs Confirm	April14-Sept15	5	C	1	JW	12/1/2015	12/9/2015	12/16/2015	UTR	12/16/2015	UTR	NA			
5	C		GENESEE CO HEALTH DEPT SAGINAW	Needs Confirm	April14-Sept15	5	C	1	JW	12/1/2015	12/3/2015	NA	YES	12/3/2015	NO	12/3/2015			
[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			
7	C		GENESEE CO HEALTH DEPT SAGINAW	Needs Confirm	April14-Sept15	7	C	1	KN	12/2/2015	12/8/2015	12/11/2015	UTR	12/11/2015	UTR	NA			
9	C		HURLEY MEDICAL CENTER	Needs Confirm	Oct15toDate	9	C	1	KN	12/3/2015	12/3/2015	NA	YES	12/3/2015	YES	NA			
6	C		MCLAREN OAKLAND LAKE ORION	Needs Confirm	April14-Sept15	6	C	1	JW	12/1/2015	NA	NA	YES	moved to Oakland co in May 2015					
5	V		GENESEE COMM HLTH CENTER	Not Due for Retest	April14-Sept15	6	V	3	KN	11/16/2015	11/30/2015	NA	YES	11/30/2015	UTR	NA			
11	V		HURLEY MEDICAL CENTER	Retest Due	April14-Sept15	11	V	2	KN	11/18/2015	11/20/2015	12/10/2015	YES	12/10/2015	Grand Blanc	NA			
5	V		GENESYS REGMED OUTREACH-CPU	Retest Due	April14-Sept15	5	V	2	KN	11/16/2015	11/18/2015	NA	YES	11/18/2015	YES	NA			
10	V		HURLEY MEDICAL CENTER	Retest Due	April14-Sept15	10	V	2	ST	10/21/2015	11/2/2015		UTR	Address unk	Yes per WIC	NA			
5	V		HURLEY MEDICAL CENTER	Retest Due	April14-Sept15	5	V	2	ST	10/21/2015	11/2/2015		UTR	Address unk	Yes per WIC	NA			
6	V		HURLEY MEDICAL CENTER	Not Due for Retest	April14-Sept15	6	V	3	KN	11/16/2015	11/18/2015	12/18/2015	UTR	Returned and new mail 12/10/15	UTR	NA			
5	V		DELROSARIO, EVELYN, MD	Retest Due	April14-Sept15	5	V	2	KN	11/16/2015	11/18/2015	12/9/2015	YES	12/9/2015	NO	12/9/2015			
5	V		HURLEY MEDICAL CENTER	Not Due for Retest	Oct15toDate	5	V	3	KN	12/8/2015	NA	NA	YES	12/8/2015	NO	Pending			
[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		
5	V		HURLEY MEDICAL CENTER	Retest Due	April14-Sept15	5	V	2	KN	11/17/2015	11/19/2015	11/23/2015	YES	11/23/2015	NO	11/13/2015			
5	V		HURLEY MEDICAL CENTER	Retest Due	April14-Sept15	5	V	2	KN	11/18/2015	NA	NA	YES	11/19/2015	NO	11/19/2015			
5	V		HURLEY MEDICAL CENTER	Not Due for Retest	April14-Sept15	5	V	3	KN	11/17/2015	NA	NA	YES	11/25/2015	YES	NA			
17	V		HOLLOWAY, MILTON G, MD	Retest Due	April14-Sept15	17	V	2	ST	11/13/2015	12/10/2015								
8	V		GENESYS REGMED OUTREACH-CPU	Retest Due	April14-Sept15	8	V	2	KN	11/18/2015	11/18/2015	NA	UTR	11/18/2015	UTR	NA			
5	V		HURLEY MEDICAL CENTER	Not Due for Retest	Oct15toDate	5	V	3	KN	11/18/2015	12/4/2015	NA	YES	12/8/2015	NO	12/18/2015			
10	V		HURLEY MEDICAL CENTER	Retest Due	April14-Sept15	10	V	2	KN	11/18/2015	NA	NA	UTR	11/18/2015	UTR	NA			
10	V		HURLEY MEDICAL CENTER	Not Due for Retest	April14-Sept15	12	V	3	KN	11/18/2015	NA	NA	YES	11/30/2015	YES	NA			
8	V		GENESEE CO HEALTH DEPT SAGINAW	Not Due for Retest	April14-Sept15	11	C	3	KN	11/18/2015	11/20/2015	11/24/2015	YES	11/24/2015	YES	NA			
[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]					
22	V		HURLEY MEDICAL CENTER	Retest Due	April14-Sept15	22	V	2	ST	11/19/2015	12/4/2015	NA	YES	12/4/2015	YES	NA			
11	V		HURLEY MEDICAL CENTER	Retest Due	April14-Sept15	11	V	2	ST	11/19/2015	12/4/2015	NA	YES	12/4/2015	YES	NA			
6	v		MCLAREN MEDICAL LAB	Retest Due	April14-Sept15	6	v	2	KN	11/19/2015	NA	NA	YES	11/19/2015	Has well	NO			
8	V		HURLEY MEDICAL CENTER	Not Due for Retest	Oct15toDate	8	V	3	ST	11/25/2015	12/2/2015	NA	YES	12/2/2015	Declined	NA			
6	V		HURLEY MEDICAL CENTER	Not Due for Retest	April14-Sept15	6	V	3	KN	11/20/2015	NA	NA	YES	11/20/2015	NO	12/2/2015			
6	V		HURLEY MEDICAL CENTER	Retest Due	April14-Sept15	6	V	2	KN	11/23/2015	12/2/2015	12/7/2015	UTR	12/7/2015	UTR	NA			
5	V		MCLAREN MEDICAL LAB	Needs Confirm	Oct15toDate	5		1	KN	11/19/2015	NA	NA	YES	11/19/2015	YES	NA			
5	V		HURLEY MEDICAL CENTER	Retest Due	April14-Sept15	5	V	2	KN	11/23/2015	12/9/2015	12/16/2015	YES	11/23/2015	YES	NA			
8	V		HURLEY MEDICAL CENTER	Not Due for Retest	Oct15toDate	8	V	3	KN	12/15/2015	NA	NA	YES	12/15/2015	YES	NA			
5	V		GENESYS REGMED OUTREACH-CPU	Retest Due	April14-Sept15	5	V	2	KN	11/23/2015	12/2/2015	NA	YES	12/3/2015	NO	12/3/2015			
22	V		HURLEY MEDICAL CENTER	Retest Due	April14-Sept15	22	V	2	ST	11/13/2015	12/4/2015								
[illegible]	[illegible]	Yes	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			
6	V		HURLEY MEDICAL CENTER	Retest Due	April14-Sept15	6	V	2	KN	11/23/2015	11/23/2015	NA	YES	11/23/2015	NO	Declined			
6	V		HURLEY MEDICAL CENTER	Retest Due	April14-Sept15	6	V	2	jw	11/23/2015	12/9/2015								
6	V		HURLEY MEDICAL CENTER	Retest Due	April14-Sept15	6	V	2	jw	11/23/2015	12/9/2015	12/14/2015	YES	12/14/2015	NO	P/U 12/14/15			
[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			
9	V		HURLEY MEDICAL CENTER	Retest Due	April14-Sept15	9	V	2	jw	11/23/2015	12/9/2015								
5	V		HURLEY MEDICAL CENTER	Retest Due	April14-Sept15	5	V	2	KN	11/24/2015	12/2/2015	12/7/2015	UTR	12/7/2015	UTR	NA			
[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			
[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			
6	V		HURLEY MEDICAL CENTER	Retest Due	April14-Sept15	6	V	2	KN	11/24/2015	NA	NA	YES	11/30/2015	NO	11/30/2015			
6	V		HURLEY MEDICAL CENTER	Retest Due	April14-Sept15	6	V	2	KN	11/24/2015	12/7/2015	NA	YES	12/7/2015	YES	NA			
[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			
11	V		HURLEY MEDICAL CENTER	Retest Due	April14-Sept15	11	V	2	KN	11/24/2015	12/2/2015								
5	V		ALLEGIANCE HEALTH	Retest Due	April14-Sept15	5	V	2	KN	11/24/2015	12/2/2015	12/4/2015	UTR	12/4/2015	UTR	NA			
[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			
[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			
7	V		HURLEY MEDICAL CENTER	Not Due for Retest	Oct15toDate	7	V	3	KN	11/19/2015	NA	NA	YES	11/19/2015	NO	Declined			
5	V		HURLEY MEDICAL CENTER	Retest Due	April14-Sept15	5	V	2	KN	11/5/2015	11/19/2015	11/24/2015	YES	12/11/2015	YES	NA	NA		
6	V		HURLEY MEDICAL CENTER	Retest Due	April14-Sept15	6	V	2	KN	11/24/2015	NA	NA	YES	11/24/2015	YES	NA			
7	V		HURLEY MEDICAL CENTER	Retest Due	April14-Sept15	7	V	2	KN	11/24/2015	12/2/2015	NA	UTR	12/2/2015	NO	NA			
6	V		HURLEY MEDICAL CENTER	Retest Due	April14-Sept15	6	V	2	KN	11/24/2015	11/24/2015	NA	YES	11/24/2015	YES	NA			
[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			
5	V		HURLEY MEDICAL CENTER	Not Due for Retest	April14-Sept15	5	V	3	KN	11/25/2015	12/2/2015	12/14/2015	YES	12/2/2015	YES	NA			
7	V		HURLEY MEDICAL CENTER	Retest Due	April14-Sept15	7	V	2	KN	11/25/2015	12/2/2015	12/7/2015	12/10/2015						
6	V		HURLEY MEDICAL CENTER	Retest Due	April14-Sept15	6	V	2	KN	11/25/2015	12/2/2015	12/7/2015	12/10/2015						
5	V		HURLEY MEDICAL CENTER	Retest Due	April14-Sept15	5	V	2	KN	11/25/2015	NA	NA	NO	11/25/2015	UTR	NA			
7	V		HURLEY MEDICAL CENTER	Retest Due	April14-Sept15	7	V	2	KN	11/25/2015	12/2/2015	12/7/2015	UTR	Returned	UTR	NA			
7	V		HURLEY MEDICAL CENTER	Retest Due	April14-Sept15	7	V	2	KN	11/25/2015	12/2/2015	12/11/2015							
6	V		HURLEY MEDICAL CENTER	Not Due for Retest	Oct15toDate	6	V	3	KN	11/25/2015	11/25/2015	NA	YES	11/25/2015	YES	NA			
6	V		WARDE MEDICAL LAB (CPU)	Retest Due	April14-Sept15	6	V	2	KN	11/25/2015	NA	NA	YES	11/25/2015	YES	NA			
6	V		MCLAREN MEDICAL LAB	Retest Due	April14-Sept15	6	V	2	KN	11/25/2015	12/2/2015	12/4/2015	UTR	12/4/2015	UTR	NA			
5	V		GENESYS REGMED OUTREACH-CPU	Retest Due	April14-Sept15	5	V	2	KN	11/25/2015	NA	NA	YES	11/25/2015	YES	NA			
5	V		HURLEY MEDICAL CENTER	Retest Due	April14-Sept15	5	V	2	JW	11/25/2015	12/3/2015	NA	UTR	12/3& 15/2015(new address)	UTR	NA			
8	V		HURLEY MEDICAL CENTER	Retest Due	April14-Sept15	8	V	2	JW	11/25/2015	12/2/2015	12/10/2015	YES	12/2/2015	YES	NA			
12	V	Yes	HURLEY MEDICAL CENTER	Not Due for Retest	Oct15toDate	18	C	3	ST	10/20/2015	10/22/2015					10/26/2015			
9	V		HURLEY MEDICAL CENTER	Retest Due	April14-Sept15	9	V	2	KN	11/30/2015	12/16/2015		UTR	11/30/2015	UTR	NA			
[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]						
5	V		GENESEE COMMUNITY HLTH CENTER	Not Due for Retest	April14-Sept15	5	V	3	KN	11/24/2015	12/2/2015	12/7/2015	YES	12/7/2015	NO	12/7/2015			
8	V		HURLEY MEDICAL CENTER	Retest Due	April14-Sept15	8	V	2	ST	9/8/2015	NA	NA	YES	11/13/2015	NO	10/30/2015			
27	V		HURLEY MEDICAL CENTER	Retest Due	April14-Sept15	27	V	2	ST	9/8/2015	NA	NA	YES	11/13/2015	NO	10/30/2015			
5	V		HURLEY MEDICAL CENTER	Retest Due	April14-Sept15	5	V	2	ST	9/8/2015	NA	NA	YES	11/13/2015	NO	10/30/2015			
28	V	Yes	CHILDRENS HOSPITAL OF MICHIGAN	Not Due for Retest	Oct15toDate	52	V	3	ST	11/23/2015	NA	NA	YES	11/24/2015	YES	NA			
9	V	Yes	HURLEY MEDICAL CENTER	Retest Due	April14-Sept15	9	V	2	KN	12/2/2015	12/7/2015	NA	YES	12/7/2015	YES	NA			
6	V		HURLEY MEDICAL CENTER	Retest Due	April14-Sept15	6	V	2	KN	12/2/2015	12/9/2015	NA	YES	12/9/2015	Pending				
7	V		HURLEY MEDICAL CENTER	Retest Due	April14-Sept15	7	V	2	KN	12/2/2015	12/9/2015	NA	YES	12/9/2015	Moved	NA	NA		
8	V		HURLEY MEDICAL CENTER	Retest Due	April14-Sept15	8	V	2	KN	12/2/2015	NA	NA	YES	12/2/2015	YES	NA			
5	V		STOKER, JOHN, L, DO	Retest Due	April14-Sept15	5	V	2	KN	12/2/2015	NA	NA	YES	12/2/2015	Beecher	NA			
23	V		HURLEY MEDICAL CENTER	Retest Due	April14-Sept15	23	V	2	ST	12/4/2015									
5	V	Yes	HURLEY MEDICAL CENTER	Not Due for Retest	April14-Sept15	12	C	3	KN	12/2/2015	12/7/2015	NA	YES	12/7/2015	YES	NA			
8	V		HURLEY MEDICAL CENTER	Retest Due	April14-Sept15	8	V	2	KN	12/2/2015	NA	NA	YES	12/2/2015					
5	V		HURLEY MEDICAL CENTER	Retest Due	April14-Sept15	5	V	2	KN	12/2/2015	12/2/2015	NA	YES	12/2/2015	moved	NA			
14	V		HURLEY MEDICAL CENTER	Not Due for Retest	April14-Sept15	25	V	3	ST	11/19/2015	12/4/2015	NA	YES	pending next results	YES	NA			

PHI PHI PHI PHI PHI PHI PHI PHI

SUMMARY:

# of children needing confirmation (BLL 5-14):	84
# of children needing confirmation (BLL >= 15):	0
# of confirmed cases needing retesting (BLL 5-14):	53
# of confirmed cases needing retesting (BLL>= 15):	5
# of confirmed cases, not currently due for retest:	23
# of children with most recent BLL <5:	15
# of children moved out of county:	5
Total:	185

Children in PHI with Elevated Blood Lead Levels

HHLPSS ID	Child ID	Most Recent Specimen Date	Most Recent PB Result	Most Recent Sample Type	Last Name
PHI	PHI	PHI	5	C	PHI
			5	V	
			5	V	
			7	V	
			6	V	
			14	V	
			10	V	
			9	V	
			6	V	
			6	V	
			1	V	

Last Updated 12/14/2015

First Name	Date of Birth	Guardian Last Name	Guardian First Name	Phone	Original House Number	Original Street Name
PHI						

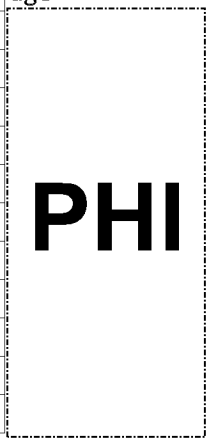
Original Apt	Original Patient City	Original Zip	Original Case Number (address)	Most Recent House Number	Most Recent Street Name	MR Apt	Most Recent Patient City	MR ZIP	MR Case Number (address)	Re-located
PHI										

Provider Name	Date Child was Added to List	Date New Test Added	Retesting Status	Child Category	Original Specimen Date
LAPEER PEDIATRICS-LAPEER	PHI				
HURLEY MEDICAL CENTER					
HURLEY MEDICAL CENTER					
HURLEY MEDICAL CENTER					
HURLEY MEDICAL CENTER					
GENESYS REG MED OUTREACH-CPU					
HURLEY MEDICAL CENTER					
HURLEY MEDICAL CENTER					
HURLEY MEDICAL CENTER					
DAVISON ROAD MEDICAL					
~~HURLEY MEDICAL CENTER~~					

Original Pb Result	Original Sample Type	Status Code	PHN Assigned	1st phone call	2nd phone call	3rd phone call	Contact Successful	Date Letter Mailed or Delivered	Water Filter Initially
5	C	1	KN	12/15/2015					
5	V	2	KN	12/15/2015	NA	NA	UTR	Returned	UTR
5	V	2	KN	12/15/2015	NA	NA	UTR	12/15/2015	UTR
7	V	2	KN	12/15/2015	NA	NA	UTR	12/15/2015	UTR
6	V	2	KN	12/15/2015					
14	V	3	ST	11/16/2015	12/7/2015		YES	12/7/2015	NO
10	V	3	KN	12/15/2015	NA	NA	YES	12/15/2015	NO
9	V	3	ST	11/13/2015	NA	NA	YES	11/18/2015	YES
6	V	3	KN	12/15/2015	NA	NA	YES	12/15/2015	NO
6	V	3	ST	12/9/2015				12/9/2015	YES
~~6~~	~~C~~	~~4~~	~~ST~~	~~11/18/2015~~	~~NA~~	~~NA~~	~~YES~~	~~11/12/2015~~	~~YES~~

Water Filter Delivered	PCP Follow up	First Home Visit to Open for CM	Medicaid Form Sent to Accounting - First	Second Home Visit	Medicaid Form Sent to Accounting - Second	Dropby Visit One	Dropby Visit Two	Certified Letter	Case Closed Date
	PHI								
NA									
NA									
NA									
12/9/2015									
12/15/2015									
NA									
12/15/2015									
NA									
NA									

Case Closed Reason	age



From: Peeler, Nancy (DHHS)
Sent: Tuesday, January 05, 2016 1:05 PM
To: Stanbury, Martha (DHHS)
Subject: Fwd: 010116 Edited FLINT BLOOD LEAD CM - weekly status tracking form v5 12.22.15.xlsx
Attachments: 010116 Edited FLINT BLOOD LEAD CM - weekly status tracking form v5 12.22.15.xlsx; ATT00001.htm

Received from GCHD this morning.

Sent from my iPad

Begin forwarded message:

> **From:** "Noble, Kim" <knoble@gchd.us>
> **Date:** January 5, 2016 at 7:57:11 AM EST
> **To:** "July, Jori" <jjuly@gchd.us>, "Lishinski, Karen (DHHS)" <LishinskiK@michigan.gov>, "Peeler, Nancy (DHHS)" <PeelerN@michigan.gov>, "LaRocco, Toni" <tlarocco@gchd.us>
> **Cc:** "Wenstrom, Janet" <jwenstrom@gchd.us>, "Cook, April" <acook@gchd.us>, "Taylor, Sherry" <STAYLOR@gchd.us>, "Taylor, Sherry" <STAYLOR@gchd.us>
> **Subject: 010116 Edited FLINT BLOOD LEAD CM - weekly status tracking form v5 12.22.15.xlsx**
>
> Hello
> Here is an updated file. Not much movement over last 2 weeks due to short weeks and holidays. No new file from Bob until this week. I added a column (B) to report week's lists numbers instead of the number being buried in the first column (A). It helped for the formulas. The columns shifted once to right to become C to O. We did open one child to case management during this time period.
> Thank you

Kim Noble RN, BSN
Public Health Nurse
Genesee County Health Department
G-3373 S. Saginaw Street
Burton, MI 48529
Telephone: 810- 237-4571
Fax: 810- 237-4612

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For a copy of the Health Department's Notice of Information Practices, contact the Health Department or visit the Health Department's website at http://www.gchd.us/

FLINT BLOOD LEAD CM

Weekly Status Tracking Form for week ending

	A	B
1	**Target Population**	**Total for Row**
2		
3		
4		
5		
6	All 0-5 year old children with elevated Capillary ≥ 5 from April 2014 – September 2015	77
7		
8	All 0-5 year old children with newly elevated Venous ≥ 5 from April 2014 – September 2015	83
9		
10	All 0-5 year old children with new elevated Capillary ≥ 5 since October 2015	11
11		
12	All 0-5 year old children with new elevated Venous ≥ 5 since October 2015	15
13		
14	**TOTALS**	
15	All **6-17** year old children with elevated Capillary or Venous > 5 since April 2014	12
16		
17		
18	** Column B will reflect the new, weekly numbers*	
19	Metrics included in contract (as amended 11.18.15):	
20	1. Number and percentage of target children with elevated blood lead levels of **≥ 5 ug/dL** for whom contact has been attempted.	
21	2. Number and percentage of target children with elevated blood lead levels of **≥ 5 ug/dL** that are successfully contacted and offered case management services.	
22	3. Number and percentage of target children receiving case management services.	
23	4. Number and percentage of target children receiving case management services residing in the City of Flint.	
24	5. Number of Medicaid claims filed for children enrolled in Medicaid who receive testing or nursing assessment visits.	
25		
26		
27		
28	*v5 12.22.15*	

FLINT BLOOD LEAD CM

Weekly Status Tracking Form for week ending

	C	D	E
1	**# for whom contact has been attempted**	**% for whom contact has been attempted** (Col.C/Col.B)	**# successfully contacted and offered CM**
2			
3			
4			
5			
6	77	100%	41
7			
8	83	100%	47
9			
10	11	100%	8
11			
12	15	100%	13
13			
14			
15	12	100%	6
16			
17			
18			
19			
20			
21			
22			
23			
24			
25			
26			
27			
28			

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FLINT BLOOD LEAD CM

Weekly Status Tracking Form for week ending

	F		G	H	
1	**% of total** (Col.E/Col.B)	**% of attempted** (Col.E/Col.C)	**# of children receiving CM**	**% of total** (Col.G/Col.B)	**% of contacted** (Col.G/Col.E)
2					
3					
4					
5					
6	53%		NA	#VALUE!	
7	53%			#VALUE!	
8	57%		19	23%	
9	57%			40%	
10	73%		NA	#VALUE!	
11	73%			#VALUE!	
12	87%		6	40%	
13	87%			46%	
14					
15	50%		2	17%	
16	50%			33%	
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					

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FLINT BLOOD LEAD CM

Weekly Status Tracking Form for week ending

	I	J	K	L
1	**# of children receiving CM who live in Flint**	**% of CM in Flint** (Col.I/Col.G)	**# of CM Medicaid claims filed**	**% for whom Medicaid claims filed** (Col. K / Col. G)
2				
3				
4				
5				
6	NA	#VALUE!	NA	#VALUE!
7				
8	19	100%	9	47%
9				
10	NA	#VALUE!	NA	#VALUE!
11				
12	6	100%	5	83%
13				
14				
15	2	100%	1	50%
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				

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	M	N	O
1	**# other disposition** (closed, moved)	**% with other disposition** (Col.M/Col.B)	
2			
3			**Disposition notes**
4			
5			
6	5	6%	
7			
8	14	17%	
9			
10	1	9%	
11			
12	3	20%	
13			
14			
15	1	8%	
16			
17			
18			
19			
20			
21			
22			
23			
24			
25			
26			
27			
28			

This Document is a Non-Responsive Attachment.

From: Bruneau, Michelle (DHHS)
Sent: Tuesday, January 05, 2016 2:53 PM
To: Scott, Robert L. (DHHS);Stanbury, Martha (DHHS)
Subject: RE: MCIR and Lead

Great! Thank you for the info. I'll help make sure it gets promoted.

><{{{'> www.michigan.gov/eatsafefish <'}}}><

Michelle Bruneau, MA
Michigan Department of Health & Human Services
Project Manager & Health Educator
(517) 335-8984
bruneaum@michigan.gov

From: Scott, Robert L. (DHHS)
Sent: Tuesday, January 05, 2016 2:43 PM
To: Stanbury, Martha (DHHS) <stanburym@michigan.gov>; Bruneau, Michelle (DHHS) <BruneauM@michigan.gov>
Subject: RE: MCIR and Lead

Yes, that's right. The percentage of missed matches is very low, so it's considered a good resource for providers---but we want to make it better.

From: Stanbury, Martha (DHHS)
Sent: Tuesday, January 05, 2016 1:57 PM
To: Bruneau, Michelle (DHHS) <BruneauM@michigan.gov>
Cc: Scott, Robert L. (DHHS) <ScottR9@michigan.gov>
Subject: RE: MCIR and Lead

It is pulled from the lead database in the warehouse. My understanding from Bob is that there are some concerns about the match in the warehouse, with a lot of lead reports that don't match with MICR. But unless Bob has other information, this probably is the best way for the provider to look for now. Bob – your thoughts?

From: Bruneau, Michelle (DHHS)
Sent: Tuesday, January 05, 2016 1:46 PM
To: Stanbury, Martha (DHHS) <stanburym@michigan.gov>
Cc: Dykema, Linda D. (DHHS) <DykemaL@michigan.gov>
Subject: MCIR and Lead

Sorry to interrupt your call, Martha…I just have a quick question…

One message that GCHD wanted to be included in outreach materials was that parents should request that their medical providers look in MCIR to see if/when their child was tested for lead.

Rachel Potter confirmed that there is that option in MCIR, but she wasn't sure how it was updated in the system – do doctors have to enter it directly or does it pull from the data warehouse? Are results saved to?

If we incorporate this request into the messaging, I just want to make sure that it will actually provide the answer they're looking for.

Thanks!

><{{{'> www.michigan.gov/eatsafefish <'}}}><

Michelle Bruneau, MA
Project Manager & Health Educator
Michigan Department of Health & Human Services
201 Townsend, 4th Fl
Lansing, MI 48913
Direct: (517) 335-8984
Toll free: 1-800-648-6942
Fax: (517) 335-8800
bruneaum@michigan.gov

From: Scott, Robert L. (DHHS)
Sent: Tuesday, January 05, 2016 2:56 PM
To: Stanbury, Martha (DHHS)
Subject: RE: IRB revision

OK, thanks!

From: Stanbury, Martha (DHHS)
Sent: Tuesday, January 05, 2016 1:29 PM
To: Scott, Robert L. (DHHS) <ScottR9@michigan.gov>
Subject: FW: IRB revision

Here's what Dr. HA submitted to our IRB that just got approved. It is saved in the flintwater shared folder under data requests/hurley.

From: Mona Hanna-Attisha [mailto:MHanna1@hurleymc.com]
Sent: Monday, January 04, 2016 5:46 PM
To: Stanbury, Martha (DHHS) <stanburym@michigan.gov>; Miller, Corinne (DHHS) <MillerC39@michigan.gov>; Jenny LaChance <jLachan1@hurleymc.com>
Subject: Fwd: IRB revision

Let us know if you need anything else. Thanks!

Mona Hanna-Attisha MD MPH FAAP
Hurley Children's Hospital
Michigan State University
mhanna1@hurleymc.com

Begin forwarded message:

> **From:** Jenny LaChance <jLachan1@hurleymc.com>
> **Date:** January 4, 2016 at 3:38:17 PM EST
> **To:** "'MDHHS-IRB@michigan.gov'" <MDHHS-IRB@michigan.gov>
> **Cc:** Mona Hanna-Attisha <MHanna1@hurleymc.com>
> **Subject: IRB revision**
>
> Dear MDHHS IRB,
>
> Please see attached our revised proposal on "Analysis of Pediatric Blood Lead Levels" in Flint, MI, with Dr. Mona Hanna-Attisha as PI.
>
> If you have any questions or need any changes, please let me know.
>
> Thanks,
> Jenny
>
> Jenny LaChance MS CCRC
> Hurley Research Center

810-262-6776
JLaChan1@hurleymc.com

Message

From: Dykema, Linda D. (DHHS) [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=61EF63A268374D20BB1AD24E4D6E1B1E-DYKEMA LINDA D.]
Sent: 12/7/2015 4:31:20 PM
To: Stanbury, Martha (DHHS) [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=9051f88309e84aea86fb48005135336d-Stanbury Martha]; McKane, Patricia (DHHS) [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=89bdaa1f3be34a5e983cfc72ae4c77a0-McKane Patricia]
CC: Miller, Corinne (DHHS) [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=2a1eb71cc5e443b3bb368d7f77bc5f5b-Miller Corinne]; Scott, Robert L. (DHHS) [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=1aefbcaada9a48ad8d643aa95e441df1-Scott Robert L.]
Subject: RE: 2014 lead data

I don't know that the reporter was given the county counts, but that's not really important since they want the zip code counts.

From: Stanbury, Martha (DHHS)
Sent: Monday, December 07, 2015 11:30 AM
To: McKane, Patricia (DHHS); Dykema, Linda D. (DHHS)
Cc: Miller, Corinne (DHHS); Scott, Robert L. (DHHS)
Subject: RE: 2014 lead data

The other reporter was given counts by county. But only for venous, as I understand it. So this needs to be rerun and then suppression applied. And we probably should give the same information to the other reporter. Patti – are you OK with this?

From: McKane, Patricia (DHHS)
Sent: Monday, December 07, 2015 11:15 AM
To: Dykema, Linda D. (DHHS)
Cc: Stanbury, Martha (DHHS); Miller, Corinne (DHHS)
Subject: Re: 2014 lead data

Is this what Bob has already done? I will try to run this before my 1:00 meeting.

Sent from my iPhone

On Dec 7, 2015, at 11:03 AM, Dykema, Linda D. (DHHS) <DykemaL@michigan.gov> wrote:

The request is for 2014 (so yes de-duped by year) and 2015 to date, by zip code for all of Michigan. And yes, I agree we should suppress counts less than 6.

From: Stanbury, Martha (DHHS)
Sent: Monday, December 07, 2015 11:00 AM
To: McKane, Patricia (DHHS); Dykema, Linda D. (DHHS)
Cc: Miller, Corinne (DHHS)
Subject: RE: 2014 lead data

But it seems to me that we should not release counts less than 6 – those cells should be suppressed. Your thoughts?

From: McKane, Patricia (DHHS)
Sent: Monday, December 07, 2015 10:55 AM
To: Dykema, Linda D. (DHHS)
Cc: Miller, Corinne (DHHS); Stanbury, Martha (DHHS)
Subject: Re: 2014 lead data

Do we need zip code from the file we deduplicated by year? Either way we can provide, just need to clarify.

Sent from my iPhone

On Dec 7, 2015, at 10:49 AM, Dykema, Linda D. (DHHS) <DykemaL@michigan.gov> wrote:

...and the beat goes on...

From: Eisner, Jennifer (DHHS)
Sent: Monday, December 07, 2015 10:48 AM
To: Stanbury, Martha (DHHS); Lasher, Geralyn (DHHS); Dykema, Linda D. (DHHS)
Cc: Wells, Eden (DHHS); Miller, Corinne (DHHS); Moran, Susan (DHHS); Minicuci, Angela (DHHS)
Subject: RE: 2014 lead data

Good morning:

Following up on this request from last week. We now have a second reporter, Ron Fonger with MLive, requesting the 2014 lead testing report by zip code. Do we have a timeframe on when we think this will be finalized and posted?

Thank you,

Jennifer Eisner

Public Information Officer

Michigan Department of Health and Human Services

Office: 517-241-2112 or EisnerJ@michigan.gov

Cell: PPI

From: Stanbury, Martha (DHHS)
Sent: Wednesday, December 02, 2015 5:01 PM
To: Lasher, Geralyn (DHHS) <lasherg@michigan.gov>; Dykema, Linda D. (DHHS) <DykemaL@michigan.gov>
Cc: Eisner, Jennifer (DHHS) <EisnerJ@michigan.gov>; Wells, Eden (DHHS) <WellsE3@michigan.gov>; Miller, Corinne (DHHS) <MillerC39@michigan.gov>; Moran, Susan (DHHS) <MoranS@michigan.gov>; Minicuci, Angela (DHHS) <MinicuciA@michigan.gov>
Subject: RE: 2014 lead data

It is true that those old reports do have unsuppressed data by zip code. Colin has weighed in recently on this with Bob Scott, so Bob has told me, advising that this should change. I support the need to implement a set of suppression rules for CLPP data. Coincidently, Corinne recently convened a workgroup to discuss the issue of data suppression for all of the BOE surveillance systems. (Note: different surveillance programs use different rules, for various reasons). We will need to discuss this issue with Corinne and, I would assume, Colin, and come up with an appropriate set of rules for CLPP before we release 2014 zipcode level counts.

From: Lasher, Geralyn (DHHS)
Sent: Wednesday, December 02, 2015 4:52 PM
To: Dykema, Linda D. (DHHS); Stanbury, Martha (DHHS)
Cc: Eisner, Jennifer (DHHS); Wells, Eden (DHHS); Miller, Corinne (DHHS); Moran, Susan (DHHS); Minicuci, Angela (DHHS)
Subject: RE: 2014 lead data

So does what the HHS privacy officer is telling us apply to the reports that have been posted on our website for some time with 2012 and 2013 data? I am not sure those tables that are currently posted have suppressed data.

http://www.michigan.gov/documents/mdhhs/CLPPP_2013_Data_Report_502175_7.pdf

http://www.michigan.gov/documents/mdch/2012AnnualDataReportOnBloodLeadLevels_419508_7.pdf

These reports are easily found at the CLPPP page from here http://www.michigan.gov/mdhhs/0,5885,7-339-73971_4911_4913---,00.html

From: Dykema, Linda D. (DHHS)
Sent: Wednesday, December 02, 2015 4:19 PM
To: Lasher, Geralyn (DHHS) <lasherg@michigan.gov>; Stanbury, Martha (DHHS) <stanburym@michigan.gov>
Cc: Eisner, Jennifer (DHHS) <EisnerJ@michigan.gov>; Wells, Eden (DHHS) <WellsE3@michigan.gov>; Miller, Corinne (DHHS) <MillerC39@michigan.gov>; Moran, Susan (DHHS) <MoranS@michigan.gov>; Minicuci, Angela (DHHS) <MinicuciA@michigan.gov>
Subject: RE: 2014 lead data
Importance: High

Okay! If the reporter is asking for 2014 zip code data for the state, here is the answer:

- We have those data – de-duplicated by year (as was the report for the Gov's office), BUT
- Only for cases that were confirmed by a venous blood draw (would not include capillary finger pokes that were included in the counts for the Gov's office, so the counts would not match), AND
- Many of the zip codes have a very small number of cases, so we would have to suppress the data for those zip codes per Colin Boes, HHS privacy officer.

The history behind the case definition is a longer story, but if we want to provide zip code data that matches the data provided in the "one-pager" that is now 3 pages, it will take time. Not sure how much until Patti McKane is involved.

Linda

From: Lasher, Geralyn (DHHS)
Sent: Wednesday, December 02, 2015 2:35 PM
To: Dykema, Linda D. (DHHS); Stanbury, Martha (DHHS)
Cc: Eisner, Jennifer (DHHS); Wells, Eden (DHHS); Miller, Corinne (DHHS); Moran, Susan (DHHS); Minicuci, Angela (DHHS)
Subject: RE: 2014 lead data
Importance: High

Well, let us know today what the timeframe is on the 2014 CLPPP zip code level data so we can answer the reporter. IF the answer is simply "it is still being worked on and I don't have a release date yet" that is fine, but someone needs to get us an answer today.

From: Dykema, Linda D. (DHHS)
Sent: Wednesday, December 02, 2015 1:29 PM
To: Lasher, Geralyn (DHHS) <lasherg@michigan.gov>
Cc: Eisner, Jennifer (DHHS) <EisnerJ@michigan.gov>; Wells, Eden (DHHS) <WellsE3@michigan.gov>; Miller, Corinne (DHHS) <MillerC39@michigan.gov>; Moran, Susan (DHHS) <MoranS@michigan.gov>; Minicuci, Angela (DHHS) <MinicuciA@michigan.gov>; Stanbury, Martha (DHHS) <stanburym@michigan.gov>
Subject: RE: 2014 lead data

Exactly. So if the call comes into your office, please go first to Martha rather than to staff so we can coordinate the response. And the '14 data are on our radar.

From: Lasher, Geralyn (DHHS)
Sent: Wednesday, December 02, 2015 1:22 PM
To: Dykema, Linda D. (DHHS)
Cc: Eisner, Jennifer (DHHS); Wells, Eden (DHHS); Miller, Corinne (DHHS); Moran, Susan (DHHS); Minicuci, Angela (DHHS); Stanbury, Martha (DHHS)
Subject: Re: 2014 lead data

Thanks Linda, but the media call originated in our office.

the bigger issue here is this is data that is routinely available on the MDHHS web site and before the '14 data is posted and/or provided to a reporter, we want to ensure that the program and Epi agree it is correct. I would not want to be in a situation where epi looks at the past data posted and says "we don't think that is accurate".

Sent from my iPad

On Dec 2, 2015, at 1:13 PM, Dykema, Linda D. (DHHS) <DykemaL@michigan.gov> wrote:

Hi Jennifer,

Martha has instructed Bob and Jessica that they must inform her should they get any further media calls. Martha will then alert the PIO office and other PHCSA leadership so that we can ensure consistency in the lead data and information HHS is making public. Should the inquiry come to you first, please work through Martha and we'll make sure you get what you need. Thanks

Linda

From: Eisner, Jennifer (DHHS)
Sent: Tuesday, December 01, 2015 5:36 PM
To: Wells, Eden (DHHS); Miller, Corinne (DHHS); Moran, Susan (DHHS); Lasher, Geralyn (DHHS); Dykema, Linda D. (DHHS); Minicuci, Angela (DHHS)
Subject: FW: 2014 lead data

All –

A reporter with Bridge Magazine is requesting the statewide 2014 (and if possible, 2015) CLPPP data. Bob sent me the attached county-level info for 2014 which I have not shared yet, as it's not the final report.

We would like to touch base to make sure the data has been finalized and reviewed by epi before it's posted online.

Eden – we'll reach out to you in the morning to discuss the media request. Beyond the data, the reporter is also interested in discussing home lead investigations.

Jennifer Eisner

Public Information Officer

Michigan Department of Health and Human Services

Office: 517-241-2112 or EisnerJ@michigan.gov

Cell: PPI

From: Scott, Robert L. (DHHS)
Sent: Tuesday, December 01, 2015 12:51 PM
To: Eisner, Jennifer (DHHS) <EisnerJ@michigan.gov>
Subject: 2014 lead data

Please see three attached files.

Robert L. Scott

Childhood Lead Poisoning Prevention Program

Michigan Department of Health & Human Services

(517) 335-8178

fax (517) 335-8509

Message

From: McKane, Patricia (DHHS) [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=89BDAA1F3BE34A5E983CFC72AE4C77A0-MCKANE PATRICIA]
Sent: 12/7/2015 7:32:10 PM
To: Stanbury, Martha (DHHS) [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=9051f88309e84aea86fb48005135336d-Stanbury Martha]
CC: Scott, Robert L. (DHHS) [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=1aefbcaada9a48ad8d643aa95e441df1-Scott Robert L.]
Subject: Re: 2014 lead data

I'm in a meeting. I will run it by zip later so we can compare. Again I doubt that I can finish it tonight. If we extracted by different variables that may be the reason, but I won't know until we can look at it.

Sent from my iPhone

On Dec 7, 2015, at 2:24 PM, Stanbury, Martha (DHHS) <stanburym@michigan.gov> wrote:
Bob and Patti – Can you explain why Bob's total for 2014 (143,123 – see attached) is bigger than Patti's (141,355) . Is this because bob uses report date and Patti used specimen date?

From: Scott, Robert L. (DHHS)
Sent: Monday, December 07, 2015 2:06 PM
To: Stanbury, Martha (DHHS)
Cc: McKane, Patricia (DHHS); Dykema, Linda D. (DHHS)
Subject: RE: 2014 lead data

Here's what I have (please see attached).

From: Stanbury, Martha (DHHS)
Sent: Monday, December 07, 2015 2:03 PM
To: Scott, Robert L. (DHHS) <ScottR9@michigan.gov>
Cc: McKane, Patricia (DHHS) <McKaneP@michigan.gov>; Dykema, Linda D. (DHHS) <DykemaL@michigan.gov>
Subject: FW: 2014 lead data
Importance: High

Do you have this done already, but just that the small cells haven't been suppressed?

From: Dykema, Linda D. (DHHS)
Sent: Monday, December 07, 2015 1:52 PM
To: McKane, Patricia (DHHS); Lasher, Geralyn (DHHS); Eisner, Jennifer (DHHS)
Cc: Stanbury, Martha (DHHS); Miller, Corinne (DHHS); Scott, Robert L. (DHHS)
Subject: RE: 2014 lead data
Importance: High

I talked with Jennifer Eisner and here is what we need:

Only the 2014 data (not 2015 since we don't typically release a year's data before the year is completed), by zip code for all of Michigan with small cells suppressed. And only confirmed venous tests as CLPPP has done for previous years: we'll explain that we're including capillary tests in the Flint reports in an effort to capture all possible EBLL children.

Could I please have an estimate of when this can be done?

From: Dykema, Linda D. (DHHS)
Sent: Monday, December 07, 2015 12:08 PM
To: McKane, Patricia (DHHS); Lasher, Geralyn (DHHS); Eisner, Jennifer (DHHS)
Cc: Stanbury, Martha (DHHS); Miller, Corinne (DHHS); Scott, Robert L. (DHHS)
Subject: RE: 2014 lead data
Importance: High

Ok, I deleted all the chatter in-between.

I believe the request is for annual 2014 and 2015 (not by quarter) for all Michigan zip codes (suppressing cells less than 6). The data provided should match what we're reporting to the Director/Governor, so retain the highest test whether venous or capillary.

Jennifer/Geralyn: is that accurate?

From: McKane, Patricia (DHHS)
Sent: Monday, December 07, 2015 11:56 AM
To: Dykema, Linda D. (DHHS)
Cc: Stanbury, Martha (DHHS); Miller, Corinne (DHHS); Scott, Robert L. (DHHS)
Subject: Re: 2014 lead data

To clarify you want 2014 by zip code and quarter with retaining highest test? Or only highest venous test?
Im still in a meeting and may not get this done today. Will also talk to Yan to see if she is available.
Patti

Sent from my iPhone

From: Eisner, Jennifer (DHHS)
Sent: Tuesday, December 01, 2015 5:36 PM
To: Wells, Eden (DHHS); Miller, Corinne (DHHS); Moran, Susan (DHHS); Lasher, Geralyn (DHHS); Dykema, Linda D. (DHHS); Minicuci, Angela (DHHS)
Subject: FW: 2014 lead data

All –

A reporter with Bridge Magazine is requesting the statewide 2014 (and if possible, 2015) CLPPP data. Bob sent me the attached county-level info for 2014 which I have not shared yet, as it's not the final report.

We would like to touch base to make sure the data has been finalized and reviewed by epi before it's posted online.

Eden – we'll reach out to you in the morning to discuss the media request. Beyond the data, the reporter is also interested in discussing home lead investigations.

Jennifer Eisner
Public Information Officer
Michigan Department of Health and Human Services
Office: 517-241-2112 or EisnerJ@michigan.gov
Cell: PPI

From: Scott, Robert L. (DHHS)
Sent: Tuesday, December 01, 2015 12:51 PM
To: Eisner, Jennifer (DHHS) <EisnerJ@michigan.gov>
Subject: 2014 lead data

Please see three attached files.

Robert L. Scott
Childhood Lead Poisoning Prevention Program
Michigan Department of Health & Human Services
(517) 335-8178
fax (517) 335-8509

<2014 zips.xlsx>

Message

From: McKane, Patricia (DHHS) [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=89BDAA1F3BE34A5E983CFC72AE4C77A0-MCKANE PATRICIA]
Sent: 12/7/2015 7:33:38 PM
To: Scott, Robert L. (DHHS) [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=1aefbcaada9a48ad8d643aa95e441df1-Scott Robert L.]
CC: Stanbury, Martha (DHHS) [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=9051f88309e84aea86fb48005135336d-Stanbury Martha]
Subject: Re: 2014 lead data

We use INTCK function in SAS to calculate the age. I believe it calculates to days and we ask SAS for years.

Sent from my iPhone

On Dec 7, 2015, at 2:30 PM, Scott, Robert L. (DHHS) <ScottR9@michigan.gov> wrote:
I used specimen date.

Maybe a slight difference in the way we calculated age at test? I used this: (Specimen Date – Date of Birth)/365.25 and then included all children < 6.00 years of age.

From: Stanbury, Martha (DHHS)
Sent: Monday, December 07, 2015 2:24 PM
To: Scott, Robert L. (DHHS) <ScottR9@michigan.gov>; McKane, Patricia (DHHS) <McKaneP@michigan.gov>
Subject: FW: 2014 lead data

Bob and Patti – Can you explain why Bob's total for 2014 (143,123 – see attached) is bigger than Patti's (141,355) . Is this because bob uses report date and Patti used specimen date?

From: Scott, Robert L. (DHHS)
Sent: Monday, December 07, 2015 2:06 PM
To: Stanbury, Martha (DHHS)
Cc: McKane, Patricia (DHHS); Dykema, Linda D. (DHHS)
Subject: RE: 2014 lead data

Here's what I have (please see attached).

From: Stanbury, Martha (DHHS)
Sent: Monday, December 07, 2015 2:03 PM
To: Scott, Robert L. (DHHS) <ScottR9@michigan.gov>
Cc: McKane, Patricia (DHHS) <McKaneP@michigan.gov>; Dykema, Linda D. (DHHS) <DykemaL@michigan.gov>
Subject: FW: 2014 lead data
Importance: High

Do you have this done already, but just that the small cells haven't been suppressed?

From: Dykema, Linda D. (DHHS)
Sent: Monday, December 07, 2015 1:52 PM
To: McKane, Patricia (DHHS); Lasher, Geralyn (DHHS); Eisner, Jennifer (DHHS)
Cc: Stanbury, Martha (DHHS); Miller, Corinne (DHHS); Scott, Robert L. (DHHS)
Subject: RE: 2014 lead data
Importance: High

I talked with Jennifer Eisner and here is what we need:

Only the 2014 data (not 2015 since we don't typically release a year's data before the year is completed), by zip code for all of Michigan with small cells suppressed. And only confirmed venous tests as CLPPP has done for previous years: we'll explain that we're including capillary tests in the Flint reports in an effort to capture all possible EBLL children.

Could I please have an estimate of when this can be done?

From: Dykema, Linda D. (DHHS)
Sent: Monday, December 07, 2015 12:08 PM
To: McKane, Patricia (DHHS); Lasher, Geralyn (DHHS); Eisner, Jennifer (DHHS)
Cc: Stanbury, Martha (DHHS); Miller, Corinne (DHHS); Scott, Robert L. (DHHS)
Subject: RE: 2014 lead data
Importance: High

Ok, I deleted all the chatter in-between.

I believe the request is for annual 2014 and 2015 (not by quarter) for all Michigan zip codes (suppressing cells less than 6). The data provided should match what we're reporting to the Director/Governor, so retain the highest test whether venous or capillary.

Jennifer/Geralyn: is that accurate?

From: McKane, Patricia (DHHS)
Sent: Monday, December 07, 2015 11:56 AM
To: Dykema, Linda D. (DHHS)
Cc: Stanbury, Martha (DHHS); Miller, Corinne (DHHS); Scott, Robert L. (DHHS)
Subject: Re: 2014 lead data

To clarify you want 2014 by zip code and quarter with retaining highest test? Or only highest venous test?
Im still in a meeting and may not get this done today. Will also talk to Yan to see if she is available.
Patti

Sent from my iPhone

From: Eisner, Jennifer (DHHS)
Sent: Tuesday, December 01, 2015 5:36 PM
To: Wells, Eden (DHHS); Miller, Corinne (DHHS); Moran, Susan (DHHS); Lasher, Geralyn (DHHS); Dykema, Linda D. (DHHS); Minicuci, Angela (DHHS)
Subject: FW: 2014 lead data

All –

A reporter with Bridge Magazine is requesting the statewide 2014 (and if possible, 2015) CLPPP data. Bob sent me the attached county-level info for 2014 which I have not shared yet, as it's not the final report.

We would like to touch base to make sure the data has been finalized and reviewed by epi before it's posted online.

Eden – we'll reach out to you in the morning to discuss the media request. Beyond the data, the reporter is also interested in discussing home lead investigations.

Jennifer Eisner
Public Information Officer
Michigan Department of Health and Human Services
Office: 517-241-2112 or EisnerJ@michigan.gov
Cell: PPI

From: Scott, Robert L. (DHHS)
Sent: Tuesday, December 01, 2015 12:51 PM
To: Eisner, Jennifer (DHHS) <EisnerJ@michigan.gov>
Subject: 2014 lead data

Please see three attached files.

Robert L. Scott
Childhood Lead Poisoning Prevention Program
Michigan Department of Health & Human Services
(517) 335-8178
fax (517) 335-8509

From: Scott, Robert L. (DHHS)
Sent: Tuesday, December 15, 2015 9:58 AM
To: Stanbury, Martha (DHHS)
Subject: RE: amendment to Hanna-Attisha DUA
Attachments: Study Proposal IRB BLL MHA revised 10 1 15.docx; Abbreviated IRB app Hanna-Attisha.doc; HIPAA waiver Hanna-Attisha 100115.pdf; IRBNetDocument approval amendment 4.pdf

These four documents went to Ian Horste for IRB review. The Study Proposal refers to future data sets (such as they are asking for now), but the other documents do not include dates (for the data sets) at all.

From: Stanbury, Martha (DHHS)
Sent: Monday, December 14, 2015 5:07 PM
To: Scott, Robert L. (DHHS) <ScottR9@michigan.gov>
Subject: FW: amendment to Hanna-Attisha DUA

Do you have a copy of Mona's full IRB application? (I have just seen the approval – attached). I'll look at it, and based on what it says, I can email Ian and ask how it can be amended as per the amended DUA. Thanks for letting me know.

From: Miller, Corinne (DHHS)
Sent: Monday, December 14, 2015 4:17 PM
To: Stanbury, Martha (DHHS) <stanburym@michigan.gov>
Cc: Dykema, Linda D. (DHHS) <DykemaL@michigan.gov>
Subject: FW: amendment to Hanna-Attisha DUA

Make sure the IRB paperwork is aligned with the amended DUA, specifically regarding the date. The original IRB application likely states that data through September 15, 2015 will be provided and thus you want to be sure the IRB is also amended (as needed) so you are covered when data beyond 9/15 is provided.

From: Stanbury, Martha (DHHS)
Sent: Monday, December 14, 2015 12:48 PM
To: Dykema, Linda D. (DHHS) <DykemaL@michigan.gov>; Miller, Corinne (DHHS) <MillerC39@michigan.gov>
Subject: RE: amendment to Hanna-Attisha DUA

Here is the original DUA and the IRB approval, if these help.

From: Dykema, Linda D. (DHHS)
Sent: Monday, December 14, 2015 12:45 PM
To: Miller, Corinne (DHHS) <MillerC39@michigan.gov>
Cc: Stanbury, Martha (DHHS) <stanburym@michigan.gov>
Subject: FW: amendment to Hanna-Attisha DUA

Do you or Colin need to review? Do you need to see the original to know the answer?

From: Stanbury, Martha (DHHS)
Sent: Friday, December 11, 2015 10:03 AM

To: Dykema, Linda D. (DHHS) <DykemaL@michigan.gov>
Cc: Scott, Robert L. (DHHS) <ScottR9@michigan.gov>
Subject: amendment to Hanna-Attisha DUA

The amendment to the DUA is attached, with Dr. Hanna-Attisha's signature. Please forward if it needs Corinne's or Colin's review. Otherwise you can sign on Monday, if it is OK with you. Bob and I are fine with it.

Martha Stanbury, MSPH
Division of Environmental Health
Michigan Department of Health and Human Services
PO Box 30195, Lansing, MI 48909
517-335-8364
stanburym@michigan.gov

STUDY PROPOSAL TEMPLATE *You may attach additional pages if needed, or recreate form using prescribed headings and subheadings.*

Study Title: Analysis of Pediatric Blood Lead Levels

Study Team Members: (Names, Degrees, Affiliations, Study Team Roles)

Mona Hanna-Attisha MD MPH, Director Pediatric Residency Program, Hurley Children's Hospital at Hurley Medical Center and Assistant Professor, Department of Pediatrics and Human Development, Michigan State University College of Human Medicine, Principal Investigator

Jenny LaChance MS CCRC, Hurley Medical Center Research Department, Research Analyst and Co-Investigator

Rick Sadler, PhD, Assistant Professor of Family Medicine, Division of Public Health, College of Human Medicine, Michigan State University, Research Analyst and Co-Investigator

Allison Schnepp MD, Pediatric Resident, Hurley Children's Hospital at Hurley Medical Center, Co-Investigator

I. INTRODUCTION

The INTRODUCTION provides problem identification and justification. It serves to clarify the purpose of your study intentions—and the potential benefit of conducting the work.

1. **Purpose** or **Statement of the Problem**

(Describe why the problem is important; the scope/severity of the problem.)

In April of 2014, the City of Flint changed their water supply from the Detroit river to the Flint river. Flint had Safe Drinking Water Act violations for trihalomethanes after switching water sources. In response, the City of Flint dramatically increased chlorine disinfection, thus changing the oxidation reduction potential and allowing the metal on the lead pipes to leach into the water without necessary corrosion control. Researchers from Virginia Tech University have reported increases in water lead levels (WLL); however, it is unknown if there have been any changes in blood lead levels (BLL). Lead is a potent neurotoxin that leads to irreversible brain damage in vulnerable populations, especially children. Lead screening is routinely done by pediatricians and by county health departments for children who reside in high-risk populations and for children insured by Medicaid. Hurley Children's Clinic cares for the largest number of high-risk Medicaid children in Genesee county and Hurley Medical Center laboratory runs the majority of blood lead tests in the county.

2. **Background** or **Review of the Literature**

(Provide a critical appraisal of existing knowledge and how your work may help to fill identified gaps.)

According to the Advisory Committee on Childhood Lead Poisoning Prevention, "no measurable level of blood lead is known to be without deleterious effects, and once engendered, the effects appears to be irreversible." [i] The consequences of lead poisoning impact many biological processes, most notably intelligence, behavior and overall life achievement[ii]. Increases in blood lead levels from 1 to 4 ug/dL has been associated with a change in mean IQ of approximately -2.3 to -5.2 IQ points.[iii] Considering the irreversible and life-altering impact of lead exposure, primary prevention has been advocated to eliminate exposure.

With the removal of lead from gasoline and paint, the incidence of lead toxicity has decreased over the decades[iv]; however, the role of lead in drinking water has played an increasingly prominent role as other sources of lead exposure have reduced and with increased knowledge of the impact of low level lead toxicity[v]. In 2001, Washington DC changed their treatment chemical which caused lead plumbing corrosion and left thousands of children with lifelong health risks from elevated lead levels.[vi] In April of 2014, the City of Flint changed their water source from the Detroit to the Flint river. The Detroit water system contained anti-corrosion chemicals, but the new Flint water source did not.[vii] Tests of the Flint water by Virginia Tech University Professor Marc Edwards and his team have revealed elevated lead levels in Flint drinking water.[viii]

3. **Specific Aims**

(Specific aims should be few in number and very succinct, not more than one or two sentences per aim. Number your aims so that these can be traced to the Project Design and Data Analysis sections of your Methods.)

1) Calculate the mean blood lead level (BLL) of Flint children (who receive Flint water) under the age of five years in different time intervals before and after water switch beginning from January 1, 2013 to current.

2) Calculate the percentage of Flint children (who receive Flint water) under the age of five years with elevated blood lead (EBL) in different time intervals before and after water switch beginning from January 1, 2013 to current.

4. **Significance** or **Study Rationale**

(Describe long-range objectives.)

With no reported changes in blood lead level data, it is unclear if the change in Flint water source has impacted pediatric lead exposure. Information about the change in the mean and the change in the percentage of elevated blood lead levels from a large sample of potentially exposed impacted children has tremendous public policy, public health and socioeconomic implications.

II. METHODS

The METHODS is a 'blueprint' of your study plan. It outlines the steps that you will undertake in order to successfully conduct the study.

1. Setting

(Where will the work be conducted? Identify and describe the setting or settings.)

City of Flint; City of Flint will be determined by residence of the following zip codes: 48501 to 48507. Additionally, recipients of Flint water will identified with GIS or other software assistance. This is the area that primarily was affected by the change in water source. The city of Flint has a population just below 100,000 (99,002 estimated in 2014) and 8% are below age 5. In Flint, 41.5% of residents are below the poverty level (compared to 16.8% in Michigan).

2. Subjects

(Describe population/sample; demographic profile/characteristics; subject inclusion and exclusion criteria; anticipated number and the likelihood of recruiting number.)

All children less than five years old, with an emphasis on children less than 15 months old, with blood lead levels who live in the city of Flint. Additionally, children less than 5 years who had lead levels through Hurley Laboratory who do not live in the city will be analyzed as a comparison group.

3. Project Design

(Describe how you will conduct the project. Describe study personnel; subject recruitment and informed consent processes; intervention descriptions; resources/materials; equipment. Provide a tentative time line for conducting project work.)

This is a retrospective study of blood lead levels. This project will be conducted through the request of various data sets (as described below). No informed consent will be needed. There will be no intervention as part of the study. The principal investigator will request data from the below sources. Jenny LaChance will be primarily responsible for getting data into a format that can be analyzed with statistical software. Both investigators with Dr. Sadler will review, analyze, and disseminate data. Dr. Schnepp will assist with review of analsyis and dissemination of information. Our tentative timeline is that data would be received starting after IRB approval (~September 2015). Once we have data, we will start analysis. Because different data sets may be received at different times, we may be received data for the next 6-12 months while analyzing other data sets. Once we have results, findings may be presented or published for up to 5 years.

Data sets

Blood lead levels for all Hurley Children's Clinic patients aged less than five years will be obtained from Epic EMR. A report will be requested to include patient's medical record number, full address, date of birth, date of blood draw, zip code, full address, and blood lead level.

Blood lead levels for all patients aged less than five years will be obtained from the Hurley lab electronic system. A report will be requested to include patient's medical record number, date of birth, date of blood draw, zip code, full address, blood lead level, and primary medical doctor.

Blood lead levels for all patients in Flint (and Genesee County if available) aged less than five years will be obtained from MDHHS Childhood Lead Poisoning Prevention Program database (which sends data to the MDHHS Data Warehouse) from the state of Michigan. A report will be requested to include child ID number, date of birth, date of blood draw, address with zip code, blood lead level, and specimen type.

Blood lead levels for all patients aged less than five years will be obtained from the Greater Flint Health Coalition's Children's Healthcare Access Program (CHAP). CHAP sites include Hurley Children's Clinic, Mott Children's Health Center, Hamilton Health Center and Akpinar Pediatrics. A report will be requested to include patient's medical record number, date of birth, date of blood draw, zip code, blood lead level, and primary medical doctor.

Additionally, demographic data will be requested when available. Demographic variables may include gender, race, and insurance type, if available. Finally, ward or risk level of lead (based on water data) may be determined from GIS or address information.

Lastly, water service line information (lead/no lead, etc) will be incorporated into data sets as possible. This information will be received by the city of Flint.

4. Data Collection

(Describe the data collection/storage plan. Include all data collection tools and process with the proposal. State how you will assure confidentiality.)

Data will be collected and stored on secure/encrypted memory sticks (or desktop of Hurley computers) received from Hurley's Informational Technology department. State of Michigan will provide data in a secure electronic format that will then be stored on encrypted memory sticks or desktop of Hurley computers. Patient medical record numbers/Child ID numbers are only obtained to identify the same patient with multiple lead levels. After identification of duplicates, medical record numbers/Child ID numbers will be removed. Date of birth and date of lead level will be used to calculate age at time of lead lab result and timing in relation to the change in water source. Addresses will be used to determine who lives within the area served by Flint water. GIS or other software may assist with this.

Date of birth will removed from data files once age has been calculated at time of lead level blood draw. Date of lead level blood draw will be kept in raw data file (but not analysis file) until 1-year post dissemination in case there is a need to redefine pre/post based on other information learned or requests from others. Addresses must be kept with data file and GIS analysis file as these are the basis for the GIS analysis. Addresses will be destroyed 1 year post dissemination as this allows time for other researchers to question work and for us to produce other information if necessary based on commentary/questions. At that time, only GIS maps that were created will be kept.

5. Sample Size

(For comparative research, this should be a formal sample size calculation, which the Research Center can help calculate. For descriptive or pilot studies, justify based on precision of the estimate, pragmatic issues based on resources, number of patients available, etc. or other factors.)*

Sample size of pre-switch first-time lead levels for children five years and less: estimated 800 from Hurley lab data and estimated at 2500 from state data.

Sample size of post-switch (one year post to current) first-time lead levels for children five years and less: estimated 800 from Hurley lab data and estimated at 2500 from state data.

If there is a 5% increase in elevated lead levels from 3% to 8%, then this sample will have adequate power. With an alpha of 0.05 and a power 0.80, 882 pre subjects and 221 post subjects would be needed.

*If you are conducting descriptive or exploratory work as opposed to an experimental study, you may provide a subject number justification as opposed to a power analysis.

4. Data Analysis

(Describe statistical techniques to be applied in order to answer your research question or test your hypothesis; plan for interpretation and dissemination; person responsible. For descriptive studies, precision of the primary specific aim should be included.)*

Descriptive statistics will be used to calculate blood lead level means (or geometric means) and percentage of children with elevated blood lead levels. Comparisons will be made with independent t-test/1 way ANOVAs and chi-squared analysis for groups and subgroups (age, risk level, etc) Additionally, regression modeling may be used to look at the impact of specific area and.or demographics on lead levels, if appropriate. Finally, GIS analysis may assist with identification and analysis of those who receive water and incidence of EBL and levels of lead.

Jenny LaChance and Rick Sadler will be primarily responsible for data analysis.

*You are encouraged to seek statistical consultation through a university or hospital research department.

III. REFERENCES or BIBLIOGRAPHY

See below

IV. APPENDICES

There is no data tool for this study as all data will received electronically (from different sources.) Please see included an excel spreadsheet that shows the variables that may be requested.

---

[i] Low Level Lead Exposure Harms Children: A Renewed Call for Primary Prevention. Report of the Advisory Committee on Childhood Lead Poisoning Prevention of the Centers for Disease Control and Prevention. January 4, 2012.

[ii] Centers for Disease Control and Prevention. Preventing Lead Poisoning in Young Children. CDC, Atlanta: 2005.

[iii] Healey, N., H. Jones-Otazo, M. Walker & A. Knafla. 2010. Toxicological Review and Recommended Toxicological Reference Values for Environmental Lead Exposure in Canada. FINAL REPORT. Prepared under contract to Health Canada. Prepared for the Contaminated Sites Division, Safe Environments Directorate, Healthy Environment and Consumer Safety Branch, Health Canada, Ottawa.

[iv] Shannon, M.W., Etiology of Childhood Lead Poisoning. In Lead poisoning in childhood, 1996, P. Brookes Pub. Co. (Baltimore). Edited by Siegfried M. Pueschel, James G. Linakis, Angela C. Anderson, 1996.

[v] US EPA. Safe Drinking Water Act Lead and Copper Rule (LCR). In Federal Register, Vol. 56, pp 26460-26564, 1991.

[vi] https://en.wikipedia.org/wiki/Lead_contamination_in_Washington,_D.C._drinking_water accessed on September 13, 2015.

[vii] http://www.deadlinedetroit.com/articles/12697/scary_leaded_water_and_one_flint_family_s_toxic_nightmare#.VfYm6eeZZJN accessed on September 13, 2015.

[viii] http://flintwaterstudy.org/ accessed on September 13, 2015.

The Michigan Department of Community Health
Institutional Review Board for the Protection of Human Research Subjects
Capitol View Building, 7th Floor, 201 Townsend Street, Lansing, MI 48913
E-mail: MDCH-IRB@michigan.gov Phone: (517) 241-1928 Fax: (517) 241-1200

MDCH IRB ABBREVIATED INITIAL REVIEW APPLICATION

SECTION 1 – PROJECT IDENTIFICATION

1.1

Project Title:	Analysis of Pediatric Blood Lead Levels in Flint, MI

Note: The project title provided above should appear on each document submitted to the MDCH IRB for this study review.

1.2

Responsible MDCH Employee Name:	Robert L. Scott
Phone:	517-335-8178
E-mail:	scottr9@michigan.gov
ID Mail Address:	WSB 4th floor

Note: The Responsible MDCH Employee must be a Civil Service employee of MDCH and should be the employee most responsible for the Department's role in this project. To serve as the responsible MDCH employee you must have completed CITI human research protections training within the past 3 years.

1.3

Responsible MDCH Employee's Signature:	

Note: If this document is submitted from the e-mail address of the Responsible MDCH Employee, a hard copy with signature is not required.

1.4

Responsible MDCH Employee's Administration:	Population Health and Community Services
Bureau or Office:	Family, Maternal and Child Health
Bureau or Office Director/Supervisor:	Rashmi Travis
E-mail for this supervisory contact:	travisr@michigan.gov
ID Mail Address for this supervisory contact:	CVB, 6th floor

The Bureau Director (or equivalent supervisor) listed above will receive copies of IRB determinations.

1.5

Principle Investigator:	Mona Hanna-Attisha MD MPH
Organization:	Hurley Medical Center
Phone:	810-262-7257
E-mail:	mhanna1@hurleymc.com

Note: Contact information is requested for use if the Responsible MDCH Employee is not available.

1.6

Is this project federally funded?	☐ Yes ☒ No
If "Yes", specify the federal agency:	

1.7

Non-Federal funding source(s) if applicable:	

1.8

Is this project subject to FDA regulations?	☐ Yes ☒ No	
If "Yes", please specify below which FDA-regulated test articles will be used:		
☐ No test article used		
☐ Drug or biologic used	IND#:	Trial Phase:
☐ Device used	IND#:	Risk Level: Choose One

1.9

What date do you plan to begin this project?	As soon as IRB approval; est Sept/Oct 2015
What date do you plan to complete this project?	Sept 2016 with dissemination to possibly continue

1.10

Will another organization's IRB review this project?	☒ Yes ☐ No
If "Yes", please list the organization(s) here:	Hurley Medical Center

1.11

Describe any conflicts of interest that could be perceived to compromise the integrity of the project:
NA

INSTRUCTIONS FOR SUBMITTING YOUR APPLICATION

Note: This abbreviated application should only be used when another institution is providing IRB review of this project in addition to MDCH. MDCH will perform a full review of the protocol as submitted to the other institution's IRB and may request modifications. Approval by another institution's IRB does not guarantee approval at MDCH.

To submit your application:

1. Verify all elements of section 1are complete
2. Attach all materials submitted to the other organization's IRB to this abbreviated application.
3. If approval has already been granted by another IRB, attach the notice of approval.
4. Ensure approval by the Responsible MDCH Employee (*note: Responsible MDCH Employee's should perform a programmatic review to ensure MDCH involvement in the project is appropriate, and should serve as the first line in identifying and addressing human research protection issues that may be pertinent to the project)*
5. The Responsible MDCH Employee should indicate approval and submit the complete application by e-mailing all documents from his or her MDCH e-mail account to: MDCH-IRB@michigan.gov, or by signing the application and mailing all materials (ID mail or otherwise) to:

   MDCH Institutional Review Board
   Capitol View Building, 7th Floor
   201 Townsend Street
   Lansing, Michigan 48913

Completion of the non-abbreviated MDCH IRB Initial Review Application (DCH-1277) is required for IRB Review at MDCH when MDCH is the only organization involved in the project, or when MDCH has primary responsibility for the project. Do not submit this abbreviated application if no other IRB will review this protocol.

Study Title: Analysis of Pediatric Blood Lead Levels in Flint, MI

Responsible Department Employee: Robert L. Scott

Primary Investigator: Mona Hanna-Attisha MD MPH

Research Staff Requiring Access to Protected Health Information (PHI):
Mona Hanna-Attisha MD, MPH; Jenny LaChance MS; Richard Sadler PhD; Allison Schnepp MD

Name(s) of Covered Entity(ies) and Location(s) Where PHI Will Be Reviewed:
--Hurley Medical Center, One Hurley Plaza, Flint, MI 48503
--Division of Public Health, College of Human Medicine, Michigan State University, 200 East 1st Street Room 337, Flint, MI 48502

PHI Required and Intended Use:
Child ID number, date of birth, date of blood draw, address with zip code.

Child ID number is required so that we can remove duplicate entries when one child has multiple lead level results.
Date of birth and date of draw are needed to calculate age at time of blood draw.
Date of blood draw is also needed to determine time period in relation to water switch (pre/post).
Address with zipcode is needed for GIS (geographic information system) analysis and to determine if child lives in potentially high risk area for lead.

Does the use or disclosure of the PHI involve more than minimal risk to the privacy of the potential subjects? (please select one answer) __ YES X NO
Data will be kept very secure through the use of encrypted thumb drives (or on hospital secure computers in individual researchers' offices) and only seen by 4 researchers. Data will be with one of the researchers or in a locked office at all times. Identifiers will be removed for files for analysis as not needed and all identifiable data destroyed once not needed.

Describe your plan to destroy identifiers at the earliest opportunity consistent with conducting the research. (All identifier links must be destroyed for minimal risk research. For other research, unless there is a health or research justification for retaining the identifiers or such retention is otherwise required by law. If retention of identifiers is required, explain the reason and indicate that the identifiers will be stored and retained.)

Child ID number is required so that we can remove duplicate entries when one child has multiple lead level results. Once duplicates have been removed, child ID number will be deleted from raw data file.

Date of birth is required so we can determine the age of the child at time of blood lead level. Date of birth will be removed from the raw data file once the age has been calculated.

Date of lead level blood draw will be kept in raw data file (but not analysis file) until 1-year post dissemination in case there is a need to redefine pre/post based on other information learned or requests from others.

Addresses must be kept with raw data file and GIS analysis file as these are the basis for the GIS analysis. GIS software uses addresses in its calculations. Addresses will be destroyed 1 year post dissemination as this allows time for other researchers to question work (i.e., peer response) and for us to produce other information if necessary based on commentary/questions. After 1 year post dissemination, only GIS maps that were created will be kept.

Describe your plan to adequately protect the identifiers from improper use and disclosure (Check all that apply and explain other protective measures you will use):

X Names and other direct identifiers of individuals will be removed at the earliest possible time if consistent with research design
X Protected health information (PHI) will be kept in locked storage when not in use
X Records of research subjects or potential subjects will be kept separate from other patient records
X Access to records will be restricted to those persons directly involved in the research
NA Records of individuals not selected to participate in research will be destroyed as soon as possible
X If researcher discloses PHI to a third party (e.g. a research sponsor, data analyst, centralized database, etc.) researcher has received written assurances that the third party will maintain confidentiality of the PHI

Describe why the study could not practicably be conducted without access to and use of the protected health information (PHI) requested:

Child ID number is required so that we can remove duplicate entries when one child has multiple lead level results.
Date of birth and date of draw are needed to calculate age at time of blood draw.
Date of blood draw is also needed to determine time period in relation to water switch.
Address with zipcode is needed for GIS analysis and to determine if child lives in potentially high risk area for lead

All of the above are needed to assess the change in lead levels in children in Flint, MI. Without each of these elements, we wouldn't be able to assess the impact. Without the Child ID number we wouldn't be able to remove duplicates from the data. Without date of birth (and date of blood draw), we wouldn't know the child's age at time of blood draw. Without the date of blood draw, we wouldn't be able to determine if the child's

lead level represents the pre or post time period in relation to the water swtich. Finally, without the addresses, we wouldn't be able to use GIS software to examine the trends and patterns of blood lead levels in the city and how they may have changed pre/post the water switch. The addresses are especially important as these can also helpguide efforts for change and interventions in specific areas and may allow us to see the relation to lead service lines (once that information is available from City of Flint.)

Describe why the study could not practicably be conducted without this Waiver of Authorization:
Without the waiver, we could not identify if the child lived in an area with Flint water, if the child was younger and therefore potentially more vulnerable, if the data is unique lead result for 1 child. Finally, without the waiver we would not be able to determine if the lead value was from before or after the water switch.

This study could not be practically conducted without Waiver of Authorization. The number of subjects would be greatly reduced if authorization was not waived for several reasons:

1) At best, possibly 75% of Flint children (and even less of non-Flint children) have their labs processed at Hurley.
2) Of the patients whose labs were processed at Hurley, the contact information on file is often outdated or wrong.
3) Finally, a considerable percentage of subjects may not return calls/contacts even if the information on file was correct for them.

It is critical for this issue that we have the most data to get an accurate assessment of the impact of the water change on children's lead levels. This will help to determine risk and prioritize response. A biased sample may make any issues seem worse or better than the actual situation.

(A greatly reduced sample size would also lead to power issues with the analysis as the sample size with authorization would likely not be adequate for the analysis considering the percentage of children with elevated blood levels.)

Statement of the Primary Investigator:
I affirm that:

- *The requested access, use or disclosure of PHI is necessary for the purposes of the proposed research;*
- *The requested access, use or disclosure of PHI is solely for the purpose for which waiver is being requested;*
- *The waiver of authorization will not adversely affect the welfare or privacy rights of the research subjects;*
- *The benefits of research outweigh the risks to the privacy rights of the research subjects;*
- *The requested information constitutes the minimum necessary data to accomplish the goals of the research; and,*

- *The protected health information will not be re-used or disclosed to any other person or entity, except as required by law, for the authorized oversight of the research study, or for other research for which the use or disclosure of protected health information would be permitted by the HIPAA Privacy Rule.*

Primary Investigator's Signature

10/1/15

Date

One Hurley Plaza
Flint, Michigan 48503

DATE:	October 1, 2015
TO:	Mona Hanna-Attisha, MD MPH
FROM:	Hurley Medical Center Institutional Review Board
STUDY TITLE:	[807433-5] Analysis of Pediatric Blood Lead Levels
VERSION #:	*#4, Dated 10/01/2015*
SUBMISSION TYPE:	Revision
ACTION:	APPROVED
APPROVAL DATE:	October 1, 2015
EXPIRATION DATE:	September 15, 2016
REVIEW TYPE:	Expedited Review

Dear Dr. Hanna-Attisha:

As Chair of the Hurley Medical Institutional Review Board, an **expedited review** was conducted to consider the changes to the following documents for the above-referenced prospective human subjects research project:

- Letter - Letter with changes (UPDATED: 10/1/2015)
- Proposal - revised proposal (UPDATED: 10/1/2015)

Following my review, it was determined that this request for expedited review represents a minor modification, and the amendment to the above documents would not pose any increased risk to research participants.

This preliminary determination will be reviewed at the next full IRB meeting. Your attendance is not required.

A stamped copy of the revised informed consent document is attached for your convenience.

Best wishes in your investigative research endeavors.

Sincerely,

Harland Verrill Ph.D.
Chair, Institutional Review Board

This letter has been electronically signed in accordance with all applicable regulations, and a copy is retained within Hurley Medical Center's records.

Generated on IRBNet

From: MDHHS-IRB
Sent: Tuesday, December 15, 2015 4:36 PM
To: Scott, Robert L. (DHHS)
Cc: Stanbury, Martha (DHHS)
Subject: RE: For your review (Hurley amendment)
Attachments: HIPAA waiver Hanna-Attisha 100115.pdf

Hello Bob and Martha,

I want to send a note right away as I'm actually not sure this proposed revision is as straight forward as I thought it might be earlier (when I spoke with Martha). This IRB application was approved while thinking of this research as retrospective and involving data that had already been collected. Our IRB approved of the research with a waiver of the requirement for informed consent and a waiver of authorization for the Department to disclose protected health information to Hurley. The justification that permitted approval of those waivers (attached) included the following language:

"This study could not be practically conducted without Waiver of Authorization. The number of subjects would be greatly reduced if authorization was not waived for several reasons:

1) At best, possibly 75% of Flint children (and even less non-Flint children) have their labs processed at Hurley.
2) Of the patients whose labs were processed at Hurley, the contact information on file is often outdated or wrong.
3) Finally, a considerable percentage of subjects may not return calls/contacts even if the information on file was correct for them.

It is critical for this issue that we have the most data to get an accurate assessment of the impact of the water change on children's lead levels. This will help to determine risk and prioritize response. A biased sample may make any issues seem worse or better than the actual situation.

(A greatly reduced sample size would also lead to power issues with the analysis as the sample size with authorization would likely not be adequate for the analysis considering the percentage of children with elevated blood levels.)"

This language doesn't clearly support a waiver that pertains to prospective data collection. Although the issue of a biased sample may still be compelling, problems with contact information being outdated or wrong are not applicable if the potential to interact with subjects at the time of lead testing is present (that is, if the test hasn't occurred yet).

This isn't to say that a waiver of informed consent or a waiver of authorization to disclose protected health information isn't possible, but a new justification that accounts for the fact that the desired data is now to be collected prospectively is necessary. Our IRB requests that the attached document be updated to reflect this change in the research. It appears that for potentially 75% of subjects, the researcher/her institution will have an opportunity at the time blood is sampled to obtain informed consent and authorization from Hurley patients (or parents) for the use of the test result and other patient information (address specifically) in research. If a consent process is appropriate, one should be proposed. Alternatively, a justification for why that can't occur, and/or why MDHHS must still provide identifiable data to the researcher without authorization from subjects is needed for the research to proceed.

I'm available and very willing to discuss any questions related to this. I certainly understand the interest in making data available to study this important issue. I'm also sensitive that children involved in this research have rights under the Common Rule regulations/HIPAA that prohibit the use of their identifiable information in research without consent of a parent, or without an approved waiver of the requirement for informed consent. Aside from having the researcher

respond with an informed consent proposal or a revised version of the attached document, let me know if you have questions or concerns at this point.

Thank you,
-Ian

Ian A. Horste, MPH
Institutional Review Board Administrator/Chair
Michigan Department of Health and Human Services
517-241-0806
www.michigan.gov/irb

This message, including any attachments is intended solely for the use of the named recipient(s) and may contain confidential and/or privileged information. Any unauthorized review, use, disclosure, or distribution of any confidential and/or privileged information contained in this e-mail is expressly prohibited. If you are not the intended recipient, please contact the sender by reply e-mail and destroy any and all copies of the original message.

From: Scott, Robert L. (DHHS)
Sent: Tuesday, December 15, 2015 10:59 AM
To: MDHHS-IRB <MDHHS-IRB@michigan.gov>
Cc: Stanbury, Martha (DHHS) <stanburym@michigan.gov>
Subject: For your review (Hurley amendment)

Ian,

Please see attached.

Thanks,
Bob

Robert L. Scott
Childhood Lead Poisoning Prevention Program
Michigan Department of Health & Human Services
(517) 335-8178
fax (517) 335-8509

Study Title: Analysis of Pediatric Blood Lead Levels in Flint, MI

Responsible Department Employee: Robert L. Scott

Primary Investigator: Mona Hanna-Attisha MD MPH

Research Staff Requiring Access to Protected Health Information (PHI):
Mona Hanna-Attisha MD, MPH; Jenny LaChance MS; Richard Sadler PhD; Allison Schnepp MD

Name(s) of Covered Entity(ies) and Location(s) Where PHI Will Be Reviewed:
--Hurley Medical Center, One Hurley Plaza, Flint, MI 48503
--Division of Public Health, College of Human Medicine, Michigan State University, 200 East 1st Street Room 337, Flint, MI 48502

PHI Required and Intended Use:
Child ID number, date of birth, date of blood draw, address with zip code.

Child ID number is required so that we can remove duplicate entries when one child has multiple lead level results.
Date of birth and date of draw are needed to calculate age at time of blood draw.
Date of blood draw is also needed to determine time period in relation to water switch (pre/post).
Address with zipcode is needed for GIS (geographic information system) analysis and to determine if child lives in potentially high risk area for lead.

Does the use or disclosure of the PHI involve more than minimal risk to the privacy of the potential subjects? (please select one answer) __ YES X NO
Data will be kept very secure through the use of encrypted thumb drives (or on hospital secure computers in individual researchers' offices) and only seen by 4 researchers. Data will be with one of the researchers or in a locked office at all times. Identifiers will be removed for files for analysis as not needed and all identifiable data destroyed once not needed.

Describe your plan to destroy identifiers at the earliest opportunity consistent with conducting the research. (All identifier links must be destroyed for minimal risk research. For other research, unless there is a health or research justification for retaining the identifiers or such retention is otherwise required by law. If retention of identifiers is required, explain the reason and indicate that the identifiers will be stored and retained.)

Child ID number is required so that we can remove duplicate entries when one child has multiple lead level results. Once duplicates have been removed, child ID number will be deleted from raw data file.

Date of birth is required so we can determine the age of the child at time of blood lead level. Date of birth will be removed from the raw data file once the age has been calculated.

Date of lead level blood draw will be kept in raw data file (but not analysis file) until 1-year post dissemination in case there is a need to redefine pre/post based on other information learned or requests from others.

Addresses must be kept with raw data file and GIS analysis file as these are the basis for the GIS analysis. GIS software uses addresses in its calculations. Addresses will be destroyed 1 year post dissemination as this allows time for other researchers to question work (i.e., peer response) and for us to produce other information if necessary based on commentary/questions. After 1 year post dissemination, only GIS maps that were created will be kept.

Describe your plan to adequately protect the identifiers from improper use and disclosure (Check all that apply and explain other protective measures you will use):

X Names and other direct identifiers of individuals will be removed at the earliest possible time if consistent with research design
X Protected health information (PHI) will be kept in locked storage when not in use
X Records of research subjects or potential subjects will be kept separate from other patient records
X Access to records will be restricted to those persons directly involved in the research
NA Records of individuals not selected to participate in research will be destroyed as soon as possible
X If researcher discloses PHI to a third party (e.g. a research sponsor, data analyst, centralized database, etc.) researcher has received written assurances that the third party will maintain confidentiality of the PHI

Describe why the study could not practicably be conducted without access to and use of the protected health information (PHI) requested:

Child ID number is required so that we can remove duplicate entries when one child has multiple lead level results.
Date of birth and date of draw are needed to calculate age at time of blood draw.
Date of blood draw is also needed to determine time period in relation to water switch.
Address with zipcode is needed for GIS analysis and to determine if child lives in potentially high risk area for lead

All of the above are needed to assess the change in lead levels in children in Flint, MI. Without each of these elements, we wouldn't be able to assess the impact. Without the Child ID number we wouldn't be able to remove duplicates from the data. Without date of birth (and date of blood draw), we wouldn't know the child's age at time of blood draw. Without the date of blood draw, we wouldn't be able to determine if the child's

lead level represents the pre or post time period in relation to the water swtich. Finally, without the addresses, we wouldn't be able to use GIS software to examine the trends and patterns of blood lead levels in the city and how they may have changed pre/post the water switch. The addresses are especially important as these can also helpguide efforts for change and interventions in specific areas and may allow us to see the relation to lead service lines (once that information is available from City of Flint.)

Describe why the study could not practicably be conducted without this Waiver of Authorization:
Without the waiver, we could not identify if the child lived in an area with Flint water, if the child was younger and therefore potentially more vulnerable, if the data is unique lead result for 1 child. Finally, without the waiver we would not be able to determine if the lead value was from before or after the water switch.

This study could not be practically conducted without Waiver of Authorization. The number of subjects would be greatly reduced if authorization was not waived for several reasons:

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It is critical for this issue that we have the most data to get an accurate assessment of the impact of the water change on children's lead levels. This will help to determine risk and prioritize response. A biased sample may make any issues seem worse or better than the actual situation.

(A greatly reduced sample size would also lead to power issues with the analysis as the sample size with authorization would likely not be adequate for the analysis considering the percentage of children with elevated blood levels.)

Statement of the Primary Investigator:
I affirm that:

- *The requested access, use or disclosure of PHI is necessary for the purposes of the proposed research;*
- *The requested access, use or disclosure of PHI is solely for the purpose for which waiver is being requested;*
- *The waiver of authorization will not adversely affect the welfare or privacy rights of the research subjects;*
- *The benefits of research outweigh the risks to the privacy rights of the research subjects;*
- *The requested information constitutes the minimum necessary data to accomplish the goals of the research; and,*

- *The protected health information will not be re-used or disclosed to any other person or entity, except as required by law, for the authorized oversight of the research study, or for other research for which the use or disclosure of protected health information would be permitted by the HIPAA Privacy Rule.*

Primary Investigator's Signature

10/1/15

Date

From: MDHHS-IRB
Sent: Tuesday, December 22, 2015 1:47 PM
To: Stanbury, Martha (DHHS)
Cc: Scott, Robert L. (DHHS);Dykema, Linda D. (DHHS);Mona Hanna-Attisha
Subject: RE: For your review (Hurley amendment)
Attachments: Study Proposal IRB BLL MHA revised 10 1 15.docx

Hello Martha,

Thank you again for the prompt and thorough response to the IRB comments. Your most recent e-mail was very helpful to my understanding of the proposed revision. What I think has caused confusion to this point, is that the originally approved study protocol (submitted to the MDHHS IRB on 10/1/2015) included only a limited analysis of pediatric blood lead data. In fact, a power analysis had been performed with the initial proposal indicating only a relatively small population sample would be required for the researchers to address the proposed aims. Because no revised protocol is yet available to me, it was my understanding with this revision that the scope of the research proposed had only changed with respect to the time frame to be studied.

It appears, however, given the description provided with your last e-mail, that the researchers now intend to perform a much more detailed characterization of the pediatric population in Flint. The request for a prospective waiver of informed consent that has been submitted reads much more appropriately for a descriptive study. I think what would be most helpful here, and what would likely allow our board to view a waiver request positively, is a revised research protocol that captures the new design of the research to be conducted at Hurley Medical Center.

I've attached the protocol that is currently approved in case that is a helpful reference. Please note that our IRB acknowledges the minimal risk nature of this proposal, we agree that there is the potential for benefit to this research, and we think the data security measures proposed should protect the data requested. At this point, we simply want to verify that the privacy rights of subjects under HIPAA are appropriately respected. If it is not necessary to disclose protected health information for this research without authorization from subjects, then we don't want to violate that right. If it is necessary to disclose protected health information without authorization for this research to occur, then we can approve the waiver and this revision to the research. I look forward to reviewing an updated research protocol. Do not hesitate to contact me with any questions or concerns.

Thank you,
-Ian

Ian A. Horste, MPH
Institutional Review Board Administrator/Chair
Michigan Department of Health and Human Services
517-241-0806
www.michigan.gov/irb

This message, including any attachments is intended solely for the use of the named recipient(s) and may contain confidential and/or privileged information. Any unauthorized review, use, disclosure, or distribution of any confidential and/or privileged information contained in this e-mail is expressly prohibited. If you are not the intended recipient, please contact the sender by reply e-mail and destroy any and all copies of the original message.

From: Stanbury, Martha (DHHS)
Sent: Monday, December 21, 2015 2:56 PM
To: MDHHS-IRB <MDHHS-IRB@michigan.gov>
Cc: Scott, Robert L. (DHHS) <ScottR9@michigan.gov>; Dykema, Linda D. (DHHS) <DykemaL@michigan.gov>; Mona Hanna-Attisha <MHanna1@hurleymc.com>
Subject: RE: For your review (Hurley amendment)

Hello Ian: Thank you for your comments. In the attached document I have prepared some remarks that hopefully address your concerns. I look forward to hearing from you on this. Regards, Martha

Martha Stanbury, MSPH
Division of Environmental Health
Michigan Department of Health and Human Services
PO Box 30195, Lansing, MI 48909
517-335-8364
stanburym@michigan.gov

From: MDHHS-IRB
Sent: Monday, December 21, 2015 10:54 AM
To: Stanbury, Martha (DHHS) <stanburym@michigan.gov>
Cc: Scott, Robert L. (DHHS) <ScottR9@michigan.gov>
Subject: RE: For your review (Hurley amendment)

Hello Martha,

Thanks to you and to Dr. Hanna-Attisha for the very prompt response to my initial inquiry. I appreciate the comments provided. It does not appear (at this point) the threshold for impracticability of obtaining authorization and therefore the threshold for approval of a prospective waiver of authorization has been met. I'm hopeful the following questions will be helpful in thinking through alternative approaches to this research or the details of the waiver request:

1. Is it not possible for MDHHS to receive data from Hurley that allows MDHHS to perform the removal of duplicate test results? If MDHHS (the non-research entity and the entity holding the more inclusive data set) received information from Hurley that allowed for duplicate data to be screened out of prospective data transfers, MDHHS would appear to only need to send address, age, test date and result (that is, less protected health information than proposed) to the researchers. This would minimize the risk of providing additional identifying information (Child ID Number) about non-Hurley patients to the researchers. Understanding that the retrospective data transfer included a large number of records that perhaps prohibited MDHHS from performing this function prior to data transfer, it appears any subsequent data exchanges will be relatively small in comparison. Minimization of risks is important to IRB approval generally. If MDHHS involvement at this level is not possible, please document that.
2. There are two weaknesses with the current justification for the waiver related to the impracticability of conducting the research without the waiver.
    a. The case is made that obtaining authorization would be difficult, but it is not clear this meets the threshold of impracticability. The researcher does not indicate how many potential subjects will be included in the prospective research. If there are hundreds of subjects being tested each day, it would seem more likely that coordination across Hurley practitioners and/or others would be difficult to the point of impossible. If there are relatively few tests performed per day, then coordination typical of routine clinical research should not be an issue. Also, the opportunity to obtain authorization does not appear limited to the time of the testing. It appears there is additional opportunity to obtain

authorization during follow-up contact with subjects (presumably contact information for subjects won't be as likely to change in the matter of days following a test as it might over the course of years as was discussed in the approved waiver request for the retrospective data).

b. It is not clear what sample size is needed for the researcher to conduct the proposed analysis. The argument that a sample that excludes the 25% of children not tested at Hurley would bias study results would be better supported with a routine power analysis documenting that greater than 75% response rate is needed. The current justification includes a claim that population-level data is required. Given the relative rarity of elevated blood lead levels among the general population, it appears reasonable that a somewhat large sample will be needed to provide accurate characterizations of differing rates by geography and over a certain time scale, but to state that the analysis couldn't be conducted without population level data is certainly not supported in the documentation provided. A discussion that demonstrates the need for a minimum response rate and additional proof that such a response would not be achieved if authorization from each subject was required would be helpful in documenting why the research cannot be conducted without an approved waiver.

Thank you for considering these points. I look forward to a response addressing these concerns. Regards,
-Ian

Ian A. Horste, MPH
Institutional Review Board Administrator/Chair
Michigan Department of Health and Human Services
517-241-0806
www.michigan.gov/irb

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From: Stanbury, Martha (DHHS)
Sent: Friday, December 18, 2015 1:23 PM
To: MDHHS-IRB <MDHHS-IRB@michigan.gov>
Cc: Scott, Robert L. (DHHS) <ScottR9@michigan.gov>
Subject: RE: For your review (Hurley amendment)

Hello Ian: Attached is the HIPAA waiver form amended that has been signed by Dr. Hanna-Attisha, which hopefully addresses your concerns. Please let Bob and me know. Many thanks, Martha

---

From: MDHHS-IRB
Sent: Tuesday, December 15, 2015 4:36 PM
To: Scott, Robert L. (DHHS) <ScottR9@michigan.gov>
Cc: Stanbury, Martha (DHHS) <stanburym@michigan.gov>
Subject: RE: For your review (Hurley amendment)

Hello Bob and Martha,

I want to send a note right away as I'm actually not sure this proposed revision is as straight forward as I thought it might be earlier (when I spoke with Martha). This IRB application was approved while thinking of this research as retrospective and involving data that had already been collected. Our IRB approved of the research with a waiver of the requirement for informed consent and a waiver of authorization for the Department to disclose protected health

information to Hurley. The justification that permitted approval of those waivers (attached) included the following language:

"This study could not be practically conducted without Waiver of Authorization. The number of subjects would be greatly reduced if authorization was not waived for several reasons:

1) At best, possibly 75% of Flint children (and even less non-Flint children) have their labs processed at Hurley.
2) Of the patients whose labs were processed at Hurley, the contact information on file is often outdated or wrong.
3) Finally, a considerable percentage of subjects may not return calls/contacts even if the information on file was correct for them.

It is critical for this issue that we have the most data to get an accurate assessment of the impact of the water change on children's lead levels. This will help to determine risk and prioritize response. A biased sample may make any issues seem worse or better than the actual situation.

(A greatly reduced sample size would also lead to power issues with the analysis as the sample size with authorization would likely not be adequate for the analysis considering the percentage of children with elevated blood levels.)"

This language doesn't clearly support a waiver that pertains to prospective data collection. Although the issue of a biased sample may still be compelling, problems with contact information being outdated or wrong are not applicable if the potential to interact with subjects at the time of lead testing is present (that is, if the test hasn't occurred yet).

This isn't to say that a waiver of informed consent or a waiver of authorization to disclose protected health information isn't possible, but a new justification that accounts for the fact that the desired data is now to be collected prospectively is necessary. Our IRB requests that the attached document be updated to reflect this change in the research. It appears that for potentially 75% of subjects, the researcher/her institution will have an opportunity at the time blood is sampled to obtain informed consent and authorization from Hurley patients (or parents) for the use of the test result and other patient information (address specifically) in research. If a consent process is appropriate, one should be proposed. Alternatively, a justification for why that can't occur, and/or why MDHHS must still provide identifiable data to the researcher without authorization from subjects is needed for the research to proceed.

I'm available and very willing to discuss any questions related to this. I certainly understand the interest in making data available to study this important issue. I'm also sensitive that children involved in this research have rights under the Common Rule regulations/HIPAA that prohibit the use of their identifiable information in research without consent of a parent, or without an approved waiver of the requirement for informed consent. Aside from having the researcher respond with an informed consent proposal or a revised version of the attached document, let me know if you have questions or concerns at this point.

Thank you,
-Ian

Ian A. Horste, MPH
Institutional Review Board Administrator/Chair
Michigan Department of Health and Human Services
517-241-0806
www.michigan.gov/irb

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From: Scott, Robert L. (DHHS)
Sent: Tuesday, December 15, 2015 10:59 AM
To: MDHHS-IRB <MDHHS-IRB@michigan.gov>
Cc: Stanbury, Martha (DHHS) <stanburym@michigan.gov>
Subject: For your review (Hurley amendment)

Ian,

Please see attached.

Thanks,
Bob

Robert L. Scott
Childhood Lead Poisoning Prevention Program
Michigan Department of Health & Human Services
(517) 335-8178
fax (517) 335-8509

STUDY PROPOSAL TEMPLATE *You may attach additional pages if needed, or recreate form using prescribed headings and subheadings.*

Study Title: Analysis of Pediatric Blood Lead Levels

Study Team Members: (Names, Degrees, Affiliations, Study Team Roles)

Mona Hanna-Attisha MD MPH, Director Pediatric Residency Program, Hurley Children's Hospital at Hurley Medical Center and Assistant Professor, Department of Pediatrics and Human Development, Michigan State University College of Human Medicine, Principal Investigator

Jenny LaChance MS CCRC, Hurley Medical Center Research Department, Research Analyst and Co-Investigator

Rick Sadler, PhD, Assistant Professor of Family Medicine, Division of Public Health, College of Human Medicine, Michigan State University, Research Analyst and Co-Investigator

Allison Schnepp MD, Pediatric Resident, Hurley Children's Hospital at Hurley Medical Center, Co-Investigator

I. INTRODUCTION

The INTRODUCTION provides problem identification and justification. It serves to clarify the purpose of your study intentions—and the potential benefit of conducting the work.

1. **Purpose** or **Statement of the Problem**

(Describe why the problem is important; the scope/severity of the problem.)

In April of 2014, the City of Flint changed their water supply from the Detroit river to the Flint river. Flint had Safe Drinking Water Act violations for trihalomethanes after switching water sources. In response, the City of Flint dramatically increased chlorine disinfection, thus changing the oxidation reduction potential and allowing the metal on the lead pipes to leach into the water without necessary corrosion control. Researchers from Virginia Tech University have reported increases in water lead levels (WLL); however, it is unknown if there have been any changes in blood lead levels (BLL). Lead is a potent neurotoxin that leads to irreversible brain damage in vulnerable populations, especially children. Lead screening is routinely done by pediatricians and by county health departments for children who reside in high-risk populations and for children insured by Medicaid. Hurley Children's Clinic cares for the largest number of high-risk Medicaid children in Genesee county and Hurley Medical Center laboratory runs the majority of blood lead tests in the county.

2. **Background** or **Review of the Literature**

(Provide a critical appraisal of existing knowledge and how your work may help to fill identified gaps.)

According to the Advisory Committee on Childhood Lead Poisoning Prevention, "no measurable level of blood lead is known to be without deleterious effects, and once engendered, the effects appears to be irreversible." [i] The consequences of lead poisoning impact many biological processes, most notably intelligence, behavior and overall life achievement[ii]. Increases in blood lead levels from 1 to 4 ug/dL has been associated with a change in mean IQ of approximately -2.3 to -5.2 IQ points.[iii] Considering the irreversible and life-altering impact of lead exposure, primary prevention has been advocated to eliminate exposure.

With the removal of lead from gasoline and paint, the incidence of lead toxicity has decreased over the decades[iv]; however, the role of lead in drinking water has played an increasingly prominent role as other sources of lead exposure have reduced and with increased knowledge of the impact of low level lead toxicity[v]. In 2001, Washington DC changed their treatment chemical which caused lead plumbing corrosion and left thousands of children with lifelong health risks from elevated lead levels.[vi] In April of 2014, the City of Flint changed their water source from the Detroit to the Flint river. The Detroit water system contained anti-corrosion chemicals, but the new Flint water source did not.[vii] Tests of the Flint water by Virginia Tech University Professor Marc Edwards and his team have revealed elevated lead levels in Flint drinking water.[viii]

3. **Specific Aims**

(Specific aims should be few in number and very succinct, not more than one or two sentences per aim. Number your aims so that these can be traced to the Project Design and Data Analysis sections of your Methods.)

1) Calculate the mean blood lead level (BLL) of Flint children (who receive Flint water) under the age of five years in different time intervals before and after water switch beginning from January 1, 2013 to current.

2) Calculate the percentage of Flint children (who receive Flint water) under the age of five years with elevated blood lead (EBL) in different time intervals before and after water switch beginning from January 1, 2013 to current.

4. **Significance** or **Study Rationale**

(Describe long-range objectives.)

With no reported changes in blood lead level data, it is unclear if the change in Flint water source has impacted pediatric lead exposure. Information about the change in the mean and the change in the percentage of elevated blood lead levels from a large sample of potentially exposed impacted children has tremendous public policy, public health and socioeconomic implications.

II. METHODS

The METHODS is a 'blueprint' of your study plan. It outlines the steps that you will undertake in order to successfully conduct the study.

1. Setting

(Where will the work be conducted? Identify and describe the setting or settings.)

City of Flint; City of Flint will be determined by residence of the following zip codes: 48501 to 48507. Additionally, recipients of Flint water will identified with GIS or other software assistance. This is the area that primarily was affected by the change in water source. The city of Flint has a population just below 100,000 (99,002 estimated in 2014) and 8% are below age 5. In Flint, 41.5% of residents are below the poverty level (compared to 16.8% in Michigan).

2. Subjects

(Describe population/sample; demographic profile/characteristics; subject inclusion and exclusion criteria; anticipated number and the likelihood of recruiting number.)

All children less than five years old, with an emphasis on children less than 15 months old, with blood lead levels who live in the city of Flint. Additionally, children less than 5 years who had lead levels through Hurley Laboratory who do not live in the city will be analyzed as a comparison group.

3. Project Design

(Describe how you will conduct the project. Describe study personnel; subject recruitment and informed consent processes; intervention descriptions; resources/materials; equipment. Provide a tentative time line for conducting project work.)

This is a retrospective study of blood lead levels. This project will be conducted through the request of various data sets (as described below). No informed consent will be needed. There will be no intervention as part of the study. The principal investigator will request data from the below sources. Jenny LaChance will be primarily responsible for getting data into a format that can be analyzed with statistical software. Both investigators with Dr. Sadler will review, analyze, and disseminate data. Dr. Schnepp will assist with review of analsyis and dissemination of information. Our tentative timeline is that data would be received starting after IRB approval (~September 2015). Once we have data, we will start analysis. Because different data sets may be received at different times, we may be received data for the next 6-12 months while analyzing other data sets. Once we have results, findings may be presented or published for up to 5 years.

Data sets

Blood lead levels for all Hurley Children's Clinic patients aged less than five years will be obtained from Epic EMR. A report will be requested to include patient's medical record number, full address, date of birth, date of blood draw, zip code, full address, and blood lead level.

Blood lead levels for all patients aged less than five years will be obtained from the Hurley lab electronic system. A report will be requested to include patient's medical record number, date of birth, date of blood draw, zip code, full address, blood lead level, and primary medical doctor.

Blood lead levels for all patients in Flint (and Genesee County if available) aged less than five years will be obtained from MDHHS Childhood Lead Poisoning Prevention Program database (which sends data to the MDHHS Data Warehouse) from the state of Michigan. A report will be requested to include child ID number, date of birth, date of blood draw, address with zip code, blood lead level, and specimen type.

Blood lead levels for all patients aged less than five years will be obtained from the Greater Flint Health Coalition's Children's Healthcare Access Program (CHAP). CHAP sites include Hurley Children's Clinic, Mott Children's Health Center, Hamilton Health Center and Akpinar Pediatrics. A report will be requested to include patient's medical record number, date of birth, date of blood draw, zip code, blood lead level, and primary medical doctor.

Additionally, demographic data will be requested when available. Demographic variables may include gender, race, and insurance type, if available. Finally, ward or risk level of lead (based on water data) may be determined from GIS or address information.

Lastly, water service line information (lead/no lead, etc) will be incorporated into data sets as possible. This information will be received by the city of Flint.

4. Data Collection

(Describe the data collection/storage plan. Include all data collection tools and process with the proposal. State how you will assure confidentiality.)

Data will be collected and stored on secure/encrypted memory sticks (or desktop of Hurley computers) received from Hurley's Informational Technology department. State of Michigan will provide data in a secure electronic format that will then be stored on encrypted memory sticks or desktop of Hurley computers. Patient medical record numbers/Child ID numbers are only obtained to identify the same patient with multiple lead levels. After identification of duplicates, medical record numbers/Child ID numbers will be removed. Date of birth and date of lead level will be used to calculate age at time of lead lab result and timing in relation to the change in water source. Addresses will be used to determine who lives within the area served by Flint water. GIS or other software may assist with this.

Date of birth will removed from data files once age has been calculated at time of lead level blood draw. Date of lead level blood draw will be kept in raw data file (but not analysis file) until 1-year post dissemination in case there is a need to redefine pre/post based on other information learned or requests from others. Addresses must be kept with data file and GIS analysis file as these are the basis for the GIS analysis. Addresses will be destroyed 1 year post dissemination as this allows time for other researchers to question work and for us to produce other information if necessary based on commentary/questions. At that time, only GIS maps that were created will be kept.

5. Sample Size

(For comparative research, this should be a formal sample size calculation, which the Research Center can help calculate. For descriptive or pilot studies, justify based on precision of the estimate, pragmatic issues based on resources, number of patients available, etc. or other factors.)*

Sample size of pre-switch first-time lead levels for children five years and less: estimated 800 from Hurley lab data and estimated at 2500 from state data.

Sample size of post-switch (one year post to current) first-time lead levels for children five years and less: estimated 800 from Hurley lab data and estimated at 2500 from state data.

If there is a 5% increase in elevated lead levels from 3% to 8%, then this sample will have adequate power. With an alpha of 0.05 and a power 0.80, 882 pre subjects and 221 post subjects would be needed.

*If you are conducting descriptive or exploratory work as opposed to an experimental study, you may provide a subject number justification as opposed to a power analysis.

4. Data Analysis

(Describe statistical techniques to be applied in order to answer your research question or test your hypothesis; plan for interpretation and dissemination; person responsible. For descriptive studies, precision of the primary specific aim should be included.)*

Descriptive statistics will be used to calculate blood lead level means (or geometric means) and percentage of children with elevated blood lead levels. Comparisons will be made with independent t-test/1 way ANOVAs and chi-squared analysis for groups and subgroups (age, risk level, etc) Additionally, regression modeling may be used to look at the impact of specific area and.or demographics on lead levels, if appropriate. Finally, GIS analysis may assist with identification and analysis of those who receive water and incidence of EBL and levels of lead.

Jenny LaChance and Rick Sadler will be primarily responsible for data analysis.

*You are encouraged to seek statistical consultation through a university or hospital research department.

III. REFERENCES or BIBLIOGRAPHY

See below

IV. APPENDICES

There is no data tool for this study as all data will received electronically (from different sources.) Please see included an excel spreadsheet that shows the variables that may be requested.

---

[i] Low Level Lead Exposure Harms Children: A Renewed Call for Primary Prevention. Report of the Advisory Committee on Childhood Lead Poisoning Prevention of the Centers for Disease Control and Prevention. January 4, 2012.

[ii] Centers for Disease Control and Prevention. Preventing Lead Poisoning in Young Children. CDC, Atlanta: 2005.

[iii] Healey, N., H. Jones-Otazo, M. Walker & A. Knafla. 2010. Toxicological Review and Recommended Toxicological Reference Values for Environmental Lead Exposure in Canada. FINAL REPORT. Prepared under contract to Health Canada. Prepared for the Contaminated Sites Division, Safe Environments Directorate, Healthy Environment and Consumer Safety Branch, Health Canada, Ottawa.

[iv] Shannon, M.W., Etiology of Childhood Lead Poisoning. In Lead poisoning in childhood, 1996, P. Brookes Pub. Co. (Baltimore). Edited by Siegfried M. Pueschel, James G. Linakis, Angela C. Anderson, 1996.

[v] US EPA. Safe Drinking Water Act Lead and Copper Rule (LCR). In Federal Register, Vol. 56, pp 26460-26564, 1991.

[vi] https://en.wikipedia.org/wiki/Lead_contamination_in_Washington,_D.C._drinking_water accessed on September 13, 2015.

[vii] http://www.deadlinedetroit.com/articles/12697/scary_leaded_water_and_one_flint_family_s_toxic_nightmare#.VfYm6eeZZJN accessed on September 13, 2015.

[viii] http://flintwaterstudy.org/ accessed on September 13, 2015.

From: Stanbury, Martha (DHHS)
Sent: Tuesday, December 08, 2015 12:10 PM
To: Scott, Robert L. (DHHS)
Subject: FW: 12042015 FLINT BLOOD LEAD CM - weekly status tracking form v4 11.24.15.xlsx
Attachments: 12042015 FLINT BLOOD LEAD CM - weekly status tracking form v4 11.24.15.xlsx

How do the numbers on the attached match up with the numbers on the spreadsheet they gave you yesterday?

From: Wells, Eden (DHHS)
Sent: Tuesday, December 08, 2015 9:44 AM
To: Dykema, Linda D. (DHHS)
Cc: Stanbury, Martha (DHHS); Miller, Corinne (DHHS)
Subject: Fw: 12042015 FLINT BLOOD LEAD CM - weekly status tracking form v4 11.24.15.xlsx

Case Tracking Report from GCHD---so that Toni doesn't have to read off it during today's call,

E

From: LaRocco, Toni <tlarocco@gchd.us>
Sent: Tuesday, December 8, 2015 9:21 AM
To: Wells, Eden (DHHS)
Subject: FW: 12042015 FLINT BLOOD LEAD CM - weekly status tracking form v4 11.24.15.xlsx

Toni L LaRocco MS, RN
Director of Nursing Services
Genesee County Health Department
810.237.4544
tlarocco@gchd.us

"Gratitude unlocks the fullness of life. It turns what we have into enough, and more. It turns denial into acceptance, chaos to order, confusion to clarity. It can turn a meal into a feast, a house into a home, a stranger into a friend. Gratitude makes sense of our past, brings peace for today, and creates a vision for tomorrow." – Melody Beattie

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From: Noble, Kim
Sent: Tuesday, December 8, 2015 9:05 AM

To: Taylor, Sherry; July, Jori; LaRocco, Toni; Lishinski, Karen (DHHS); peelern@michigan.gov
Cc: Wenstrom, Janet
Subject: 12042015 FLINT BLOOD LEAD CM - weekly status tracking form v4 11.24.15.xlsx

Good morning
Here is our weekly status report for the week ending 12/4/15.
Thank you
Kim
Kim Noble RN, BSN
Public Health Nurse
Genesee County Health Department
G-3373 S. Saginaw Street
Burton, MI 48529
Telephone: 810- 237-4571
Fax: 810- 237-4612
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Genesee County Childhood Elevated Lead Case Management Weekly Report
For week ending 12/4/2015

	A	B
1	**Target Population**	**# for whom contact has been attempted**
2		
3		
4		
5		
6	All children with elevated Capillary ≥ 5 from April 2014 – September 2015 (row total = **75**)	75
7		
8	All children with newly elevated Venous ≥ 5 from April 2014 – September 2015 (row total = **70**)	70
9		
10	All children with new elevated Capillary ≥ 5 since October 2015 (row total = **15**)	15
11		
12	All children with new elevated Venous ≥ 5 since October 2015 (row total = **11**)	11
13		
14	**TOTALS**	
15		
16	** X will reflect the new, weekly numbers*	
17	Metrics included in contract (as amended 11.18.15):	
18	1. Number and percentage of target children with elevated blood lead levels of **≥ 5 ug/dL** for whom contact has been attempted.	
19	2. Number and percentage of target children with elevated blood lead levels of **≥ 5 ug/dL** that are successfully contacted and offered case management services.	
20	3. Number and percentage of target children receiving case management services.	
21	4. Number and percentage of target children receiving case management services residing in the City of Flint.	
22	5. Number of Medicaid claims filed for children enrolled in Medicaid who receive testing or nursing assessment visits.	
23		
24		
25		
26	*v3 11.23.15*	

Genesee County Childhood Elevated Lead Case Management Weekly Report
For week ending 12/4/2015

	C	D	E	F	G
1	**% for whom contact has been attempted** (Col. B / total for row)	**# successfully contacted and offered CM**	**% of total**	**# of children receiving CM**	**% of total**
2			**% of attempted**		**% of contacted**
3			(Col. D / total for row		(Col. F / total for row
4			AND		AND
5			Col. D / Col. B)		Col. F / Col. D)
6	100%	26	35%	NA	#VALUE!
7			35%		#VALUE!
8	100%	29	41%	6	9%
9			41%		21%
10	100%	8	53%	NA	#VALUE!
11			53%		#VALUE!
12	100%	5	45%	4	44%
13			45%		80%
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Genesee County Childhood Elevated Lead Case Management Weekly Report
For week ending 12/4/2015

	H	I	J	K	L	M
1	**# of children receiving CM who live in Flint**	**% of CM in Flint**	**# of CM Medicaid claims filed**	**% for whom Medicaid claims filed** (Col. J / Col. F)		
2		(Col. H / Col. F)			**# other**	**% with other**
3					**disposition**	**disposition**
4					(closed, moved)	(Col. L / 75)
5						
6	NA	#VALUE!	NA	#VALUE!	1	1%
7						
8	6	100%	3	50%	0	0%
9						
10	NA	#VALUE!	NA	#VALUE!	0	0%
11						
12	4	100%	0	0%	0	0%
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Genesee County Childhood Elevated Lead Case Management Weekly Report
For week ending 12/4/2015

	N
1	
2	
3	**Disposition notes**
4	
5	
6	I child moved out of county; 3 water filters were delivered to homes; 16 deliveries of letters for lead education to daycares
7	
8	2 visits were nonbillable because children were not home during visit, 1 other visit was not billable as child does not have Medicaid; 1 visit was billable second visit to family
9	
10	
11	
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26	

From: Stanbury, Martha (DHHS)
Sent: Monday, December 14, 2015 8:59 AM
To: Scott, Robert L. (DHHS)
Subject: FW: # of kids =>6 w elevated BLL

Please see below. This means you need to add the older kids to the spreadsheet. Let's discuss.

From: Dykema, Linda D. (DHHS)
Sent: Monday, December 14, 2015 8:24 AM
To: Stanbury, Martha (DHHS) <stanburym@michigan.gov>
Cc: Scott, Robert L. (DHHS) <ScottR9@michigan.gov>
Subject: RE: # of kids =>6 w elevated BLL

Thanks for pursuing this. I concur with the resolution.

From: Stanbury, Martha (DHHS)
Sent: Friday, December 11, 2015 4:49 PM
To: Dykema, Linda D. (DHHS) <DykemaL@michigan.gov>
Cc: Scott, Robert L. (DHHS) <ScottR9@michigan.gov>
Subject: FW: # of kids =>6 w elevated BLL

This email trail is the result of my attending a meeting with Nancy, Rashmi and Brenda to discuss their new Medicaid plan, and at the end of that meeting we discussed the problem that was being raised with GCHD wanting to include some kids for follow-up that were outside the criteria given to them in the contract. Rashmi et al asked for what the numbers would look like for kids outside of Flint and older than 5 that had elevated BL. I provided (using Patti's spreadsheet) and this is Rashmi's conclusions.

From: Travis, Rashmi (DHHS)
Sent: Friday, December 11, 2015 4:25 PM
To: Stanbury, Martha (DHHS) <stanburym@michigan.gov>; Fink, Brenda (DHHS) <FinkB@michigan.gov>; Peeler, Nancy (DHHS) <PeelerN@michigan.gov>
Cc: Moran, Susan (DHHS) <MoranS@michigan.gov>
Subject: RE: # of kids =>6 w elevated BLL

Thanks, Martha. So, given that this amounts to about 15 kids at the most over the course of 2 years, we would recommend to GCHD the following:
-We (Bob Scott) will provide kids 6-18 yrs in the defined zip code and add those to the list already provided to the GCHD
-For those kids requiring case management, GCHD will provide case management, bill Medicaid (for those kids who are on Medicaid), and then use the money we sent via the contract for any differences in costs that are not covered.
-I just confirmed with Sue that this would be our recommendation

Next steps:
-We will discuss with GCHD on our next call
-Martha and Nancy will connect with Bob on adding those kids (6-18 yrs) on the list
-Nancy will connect with Karen about educating the nurses at GCHD about this "change"

If anyone has any questions on the recommendations above, please let me or Nancy know.
Thanks,
Rashmi

From: Stanbury, Martha (DHHS)
Sent: Friday, December 11, 2015 3:12 PM
To: Fink, Brenda (DHHS) <FinkB@michigan.gov>; Peeler, Nancy (DHHS) <PeelerN@michigan.gov>; Travis, Rashmi (DHHS) <TravisR@michigan.gov>
Subject: # of kids =>6 w elevated BLL

As per our discussion just now, in 2014, 913 kids age 6 -17 were tested in Genesee and 6 had a BLL =>5. (This includes Flint and is whole year, not april-Dec)
For Flint alone in 2014,428 were tested and 5 had BLL =>5 in 2014. (i.e. 5 of the 6 elevated lived in flint)

For 2015 through November, 1,197 were tested in Genesee and 10 were elevated.
For flint alone in 2015, 765 were tested and 8 were elevated.

I hope this helps.

Martha Stanbury, MSPH
Division of Environmental Health
Michigan Department of Health and Human Services
PO Box 30195, Lansing, MI 48909
517-335-8364
stanburym@michigan.gov

From: Stanbury, Martha (DHHS)
Sent: Tuesday, December 15, 2015 4:31 PM
To: Scott, Robert L. (DHHS)
Cc: Maqsood, Junaid (DHHS)
Subject: FW: Tom Talbot's Geographic Masking Tool

Let's discuss tomorrow.

From: Maqsood, Junaid (DHHS)
Sent: Tuesday, December 15, 2015 4:25 PM
To: Cameron, Lorraine (DHHS) <cameronl@michigan.gov>; Largo, Thomas W. (DHHS) <largot@michigan.gov>
Cc: Roos, Jillian (DHHS) <RoosJ@michigan.gov>; Stanbury, Martha (DHHS) <stanburym@michigan.gov>
Subject: RE: Tom Talbot's Geographic Masking Tool

Thanks Tom. What you're saying makes a lot of sense. From the map, it seems like GCHD wants to highlight the number of cases with BLL between 5 and 9 ug/dL (inclusive) and those with BLL 10 ug/dL or greater. This would be difficult to portray in a single choropleth map. I'm not entirely sure what message GCHD wants to get across with the map but two choropleth maps would be a simpler solution to randomizing the points across the city of Flint.

From: Cameron, Lorraine (DHHS)
Sent: Tuesday, December 15, 2015 1:35 PM
To: Largo, Thomas W. (DHHS) <largot@michigan.gov>; Maqsood, Junaid (DHHS) <MaqsoodJ@michigan.gov>
Cc: Roos, Jillian (DHHS) <RoosJ@michigan.gov>; Stanbury, Martha (DHHS) <stanburym@michigan.gov>
Subject: RE: Tom Talbot's Geographic Masking Tool

Thanks Tom

From: Largo, Thomas W. (DHHS)
Sent: Tuesday, December 15, 2015 1:34 PM
To: Cameron, Lorraine (DHHS) <cameronl@michigan.gov>; Maqsood, Junaid (DHHS) <MaqsoodJ@michigan.gov>
Cc: Roos, Jillian (DHHS) <RoosJ@michigan.gov>; Stanbury, Martha (DHHS) <stanburym@michigan.gov>
Subject: RE: Tom Talbot's Geographic Masking Tool

This portion of what's written under "Geographic Aggregation Tool" - join neighboring geographic areas together until a user defined population and/or number of cases is reached – is what I was getting at during our meeting this morning. That is, you expand a geographic area until a certain minimal number of cases are contained, then indicate the number of cases within that section (or have a variety of ranges of cases and create a choropleth map).

From: Cameron, Lorraine (DHHS)
Sent: Tuesday, December 15, 2015 11:12 AM
To: Maqsood, Junaid (DHHS) <MaqsoodJ@michigan.gov>
Cc: Roos, Jillian (DHHS) <RoosJ@michigan.gov>; Largo, Thomas W. (DHHS) <largot@michigan.gov>; Stanbury, Martha (DHHS) <stanburym@michigan.gov>
Subject: Tom Talbot's Geographic Masking Tool

http://www.albany.edu/faculty/ttalbot/

Hi Junaid,

I can't locate my copy of Tom's tools that he handed out at CSTE a few years back, but they are described at his web page under "Geographic Aggregation and Masking Tools" . I was thinking the GAT would be useful for the lead data, and it looks like there is both R and SAS code.

Hope this is helpful.
Lorri

PS if you can't download them from his website I bet they are in the Tracking website.

From: Stanbury, Martha (DHHS)
Sent: Wednesday, December 16, 2015 11:13 AM
To: Scott, Robert L. (DHHS)
Subject: FW: For your review (Hurley amendment)
Attachments: HIPAA waiver Hanna-Attisha 100115.pdf

I discussed this with Linda and I will try to write a justification for Mona and then have her review it.

From: MDHHS-IRB
Sent: Tuesday, December 15, 2015 4:36 PM
To: Scott, Robert L. (DHHS) <ScottR9@michigan.gov>
Cc: Stanbury, Martha (DHHS) <stanburym@michigan.gov>
Subject: RE: For your review (Hurley amendment)

Hello Bob and Martha,

I want to send a note right away as I'm actually not sure this proposed revision is as straight forward as I thought it might be earlier (when I spoke with Martha). This IRB application was approved while thinking of this research as retrospective and involving data that had already been collected. Our IRB approved of the research with a waiver of the requirement for informed consent and a waiver of authorization for the Department to disclose protected health information to Hurley. The justification that permitted approval of those waivers (attached) included the following language:

"This study could not be practically conducted without Waiver of Authorization. The number of subjects would be greatly reduced if authorization was not waived for several reasons:

1) At best, possibly 75% of Flint children (and even less non-Flint children) have their labs processed at Hurley.
2) Of the patients whose labs were processed at Hurley, the contact information on file is often outdated or wrong.
3) Finally, a considerable percentage of subjects may not return calls/contacts even if the information on file was correct for them.

It is critical for this issue that we have the most data to get an accurate assessment of the impact of the water change on children's lead levels. This will help to determine risk and prioritize response. A biased sample may make any issues seem worse or better than the actual situation.

(A greatly reduced sample size would also lead to power issues with the analysis as the sample size with authorization would likely not be adequate for the analysis considering the percentage of children with elevated blood levels.)"

This language doesn't clearly support a waiver that pertains to prospective data collection. Although the issue of a biased sample may still be compelling, problems with contact information being outdated or wrong are not applicable if the potential to interact with subjects at the time of lead testing is present (that is, if the test hasn't occurred yet).

This isn't to say that a waiver of informed consent or a waiver of authorization to disclose protected health information isn't possible, but a new justification that accounts for the fact that the desired data is now to be collected prospectively is necessary. Our IRB requests that the attached document be updated to reflect this change in the research. It appears that for potentially 75% of subjects, the researcher/her institution will have an opportunity at the time blood is sampled to obtain informed consent and authorization from Hurley patients (or parents) for the use of the test result and other patient information (address specifically) in research. If a consent process is appropriate, one should be

proposed. Alternatively, a justification for why that can't occur, and/or why MDHHS must still provide identifiable data to the researcher without authorization from subjects is needed for the research to proceed.

I'm available and very willing to discuss any questions related to this. I certainly understand the interest in making data available to study this important issue. I'm also sensitive that children involved in this research have rights under the Common Rule regulations/HIPAA that prohibit the use of their identifiable information in research without consent of a parent, or without an approved waiver of the requirement for informed consent. Aside from having the researcher respond with an informed consent proposal or a revised version of the attached document, let me know if you have questions or concerns at this point.

Thank you,
-Ian

Ian A. Horste, MPH
Institutional Review Board Administrator/Chair
Michigan Department of Health and Human Services
517-241-0806
www.michigan.gov/irb

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From: Scott, Robert L. (DHHS)
Sent: Tuesday, December 15, 2015 10:59 AM
To: MDHHS-IRB <MDHHS-IRB@michigan.gov>
Cc: Stanbury, Martha (DHHS) <stanburym@michigan.gov>
Subject: For your review (Hurley amendment)

Ian,

Please see attached.

Thanks,
Bob

Robert L. Scott
Childhood Lead Poisoning Prevention Program
Michigan Department of Health & Human Services
(517) 335-8178
fax (517) 335-8509

Study Title: Analysis of Pediatric Blood Lead Levels in Flint, MI

Responsible Department Employee: Robert L. Scott

Primary Investigator: Mona Hanna-Attisha MD MPH

Research Staff Requiring Access to Protected Health Information (PHI):
Mona Hanna-Attisha MD, MPH; Jenny LaChance MS; Richard Sadler PhD; Allison Schnepp MD

Name(s) of Covered Entity(ies) and Location(s) Where PHI Will Be Reviewed:
--Hurley Medical Center, One Hurley Plaza, Flint, MI 48503
--Division of Public Health, College of Human Medicine, Michigan State University, 200 East 1st Street Room 337, Flint, MI 48502

PHI Required and Intended Use:
Child ID number, date of birth, date of blood draw, address with zip code.

Child ID number is required so that we can remove duplicate entries when one child has multiple lead level results.
Date of birth and date of draw are needed to calculate age at time of blood draw.
Date of blood draw is also needed to determine time period in relation to water switch (pre/post).
Address with zipcode is needed for GIS (geographic information system) analysis and to determine if child lives in potentially high risk area for lead.

Does the use or disclosure of the PHI involve more than minimal risk to the privacy of the potential subjects? (please select one answer) __ YES X NO
Data will be kept very secure through the use of encrypted thumb drives (or on hospital secure computers in individual researchers' offices) and only seen by 4 researchers. Data will be with one of the researchers or in a locked office at all times. Identifiers will be removed for files for analysis as not needed and all identifiable data destroyed once not needed.

Describe your plan to destroy identifiers at the earliest opportunity consistent with conducting the research. (All identifier links must be destroyed for minimal risk research. For other research, unless there is a health or research justification for retaining the identifiers or such retention is otherwise required by law. If retention of identifiers is required, explain the reason and indicate that the identifiers will be stored and retained.)

Child ID number is required so that we can remove duplicate entries when one child has multiple lead level results. Once duplicates have been removed, child ID number will be deleted from raw data file.

Date of birth is required so we can determine the age of the child at time of blood lead level. Date of birth will be removed from the raw data file once the age has been calculated.

Date of lead level blood draw will be kept in raw data file (but not analysis file) until 1-year post dissemination in case there is a need to redefine pre/post based on other information learned or requests from others.

Addresses must be kept with raw data file and GIS analysis file as these are the basis for the GIS analysis. GIS software uses addresses in its calculations. Addresses will be destroyed 1 year post dissemination as this allows time for other researchers to question work (i.e., peer response) and for us to produce other information if necessary based on commentary/questions. After 1 year post dissemination, only GIS maps that were created will be kept.

Describe your plan to adequately protect the identifiers from improper use and disclosure (Check all that apply and explain other protective measures you will use):

X Names and other direct identifiers of individuals will be removed at the earliest possible time if consistent with research design
X Protected health information (PHI) will be kept in locked storage when not in use
X Records of research subjects or potential subjects will be kept separate from other patient records
X Access to records will be restricted to those persons directly involved in the research
NA Records of individuals not selected to participate in research will be destroyed as soon as possible
X If researcher discloses PHI to a third party (e.g. a research sponsor, data analyst, centralized database, etc.) researcher has received written assurances that the third party will maintain confidentiality of the PHI

Describe why the study could not practicably be conducted without access to and use of the protected health information (PHI) requested:

Child ID number is required so that we can remove duplicate entries when one child has multiple lead level results.
Date of birth and date of draw are needed to calculate age at time of blood draw.
Date of blood draw is also needed to determine time period in relation to water switch.
Address with zipcode is needed for GIS analysis and to determine if child lives in potentially high risk area for lead

All of the above are needed to assess the change in lead levels in children in Flint, MI. Without each of these elements, we wouldn't be able to assess the impact. Without the Child ID number we wouldn't be able to remove duplicates from the data. Without date of birth (and date of blood draw), we wouldn't know the child's age at time of blood draw. Without the date of blood draw, we wouldn't be able to determine if the child's

lead level represents the pre or post time period in relation to the water swtich. Finally, without the addresses, we wouldn't be able to use GIS software to examine the trends and patterns of blood lead levels in the city and how they may have changed pre/post the water switch. The addresses are especially important as these can also helpguide efforts for change and interventions in specific areas and may allow us to see the relation to lead service lines (once that information is available from City of Flint.)

Describe why the study could not practicably be conducted without this Waiver of Authorization:
Without the waiver, we could not identify if the child lived in an area with Flint water, if the child was younger and therefore potentially more vulnerable, if the data is unique lead result for 1 child. Finally, without the waiver we would not be able to determine if the lead value was from before or after the water switch.

This study could not be practically conducted without Waiver of Authorization. The number of subjects would be greatly reduced if authorization was not waived for several reasons:

1) At best, possibly 75% of Flint children (and even less of non-Flint children) have their labs processed at Hurley.
2) Of the patients whose labs were processed at Hurley, the contact information on file is often outdated or wrong.
3) Finally, a considerable percentage of subjects may not return calls/contacts even if the information on file was correct for them.

It is critical for this issue that we have the most data to get an accurate assessment of the impact of the water change on children's lead levels. This will help to determine risk and prioritize response. A biased sample may make any issues seem worse or better than the actual situation.

(A greatly reduced sample size would also lead to power issues with the analysis as the sample size with authorization would likely not be adequate for the analysis considering the percentage of children with elevated blood levels.)

Statement of the Primary Investigator:
I affirm that:

- *The requested access, use or disclosure of PHI is necessary for the purposes of the proposed research;*
- *The requested access, use or disclosure of PHI is solely for the purpose for which waiver is being requested;*
- *The waiver of authorization will not adversely affect the welfare or privacy rights of the research subjects;*
- *The benefits of research outweigh the risks to the privacy rights of the research subjects;*
- *The requested information constitutes the minimum necessary data to accomplish the goals of the research; and,*

- *The protected health information will not be re-used or disclosed to any other person or entity, except as required by law, for the authorized oversight of the research study, or for other research for which the use or disclosure of protected health information would be permitted by the HIPAA Privacy Rule.*

Primary Investigator's Signature

10/1/15

Date

From: Stanbury, Martha (DHHS)
Sent: Thursday, December 17, 2015 12:12 PM
To: Scott, Robert L. (DHHS)
Subject: FW: Flint Situation/ Medicaid Data

fyi

From: Kwasnik, Monica (DHHS)
Sent: Wednesday, December 16, 2015 2:12 PM
To: Bouters, Janese (DHHS) <BoutersJ@michigan.gov>; Miller, Corinne (DHHS) <MillerC39@michigan.gov>; Wells, Eden (DHHS) <WellsE3@michigan.gov>; McKane, Patricia (DHHS) <McKaneP@michigan.gov>; Peng, Qian (DHHS) <PengQ@michigan.gov>; Slawinski, Heather (DHHS) <SlawinskiH@michigan.gov>; Stanbury, Martha (DHHS) <stanburym@michigan.gov>; Kreiner, Meta (DHHS) <KreinerM@michigan.gov>
Cc: Rockefeller, Cheryl (DHHS) <RockefellerC@michigan.gov>; Ganzevoort, Virginia (DHHS) <GanzevoortV@michigan.gov>
Subject: RE: Flint Situation/ Medicaid Data

Admin Quarterly PMR October 20...

PMR Specifications FY 2016 FIN...

Hello,
It was great to speak to you all this afternoon regarding Blood Lead Testing. As discussed, I have attached 2 documents.

The first document is the Blood Lead Testing results page from the October Performance Monitoring Report (PMR). You will notice that while the standard is set at 81%, all plans received a pass even if their scores fell below that standard. We discovered last quarter that the measure was inadvertently excluding children in the Children's Special Health Care Services program. That was correct and the plans' score reflect that change. Because it was an administrative error, we gave the plans a pass for the quarter.

The second document is the PMR specification for the Blood Lead measure. It includes details about age and enrollment criteria.

Please let me know if you have any questions about these documents, but while we are the keepers of the reports, Daisy is the genius behind the queries. You may wish to forward your questions to all of us and we can determine who has the expertise to answer them.

Lastly, I was wondering if any of you could forward the letter/inquiry from the Governor's Task Force on this issue. It would be helpful to me to see what the actual 'ask' was so I can most effectively contribute.
Thanks.
Monica

-----Original Appointment-----
From: Bouters, Janese (DHHS)
Sent: Monday, December 14, 2015 11:43 AM

To: Bouters, Janese (DHHS); Miller, Corinne (DHHS); Wells, Eden (DHHS); McKane, Patricia (DHHS); Peng, Qian (DHHS); Kwasnik, Monica (DHHS); Slawinski, Heather (DHHS); Stanbury, Martha (DHHS); Kreiner, Meta (DHHS)
Cc: Rockefeller, Cheryl (DHHS); Ganzevoort, Virginia (DHHS)
Subject: Flint Situation/ Medicaid Data
When: Wednesday, December 16, 2015 1:30 PM-2:30 PM (UTC-05:00) Eastern Time (US & Canada).
Where: 877-873-8017; 7931338

Scheduling per Corinne Miller's request.

Corinne will dial in as the host. Those located in Capitol View Bldg. are welcome to join the call in her office.

877-873-8017
Passcode: 7931338
Dec 16th (Wed)
1-2PM

Thank you!

Janese Bouters
Executive Secretary to Corinne Miller
Bureau of Disease Control, Prevention and Epidemiology
Michigan Department of Health & Human Services
201 Townsend Street
Lansing, Michigan 48913
Phone: (517) 335-8731
Fax: (517) 335-8263
<< OLE Object: Picture (Device Independent Bitmap) >>

Blood Lead Testing for Two Year Olds

Measure
Percentage of two year old children that have had at least one blood lead test on or before their second birthday.

Standard
81% for continuously enrolled children

Measurement Period
July 2015 – September 2015

Data Source
MDHHS Data Warehouse

Measurement Frequency
Monthly

Summary[2]
The plan-wide weighted average was 77%, four percentage points below the standard for the measure. All MHPs met or exceeded the standard in July, August, and September.

Table 4: Blood Lead Testing for Two Year Olds

MHP	Standard	Cont. Enrolled Result			Standard Achieved		
		Jul	Aug	Sep	Jul	Aug	Sep
AET	81%	76%	75%	75%	*Yes	*Yes	*Yes
BCC	81%	67%	67%	66%	*Yes	*Yes	*Yes
HAR	81%	68%	68%	63%	*Yes	*Yes	*Yes
HPP	81%	85%	85%	86%	*Yes	*Yes	*Yes
MCL	81%	82%	82%	82%	*Yes	*Yes	*Yes
MER	81%	79%	79%	79%	*Yes	*Yes	*Yes
MID	81%	70%	71%	70%	*Yes	*Yes	*Yes
MOL	81%	73%	73%	73%	*Yes	*Yes	*Yes
PHP	81%	78%	77%	80%	*Yes	*Yes	*Yes
PRI	81%	81%	81%	81%	*Yes	*Yes	*Yes
THC	81%	68%	69%	69%	*Yes	*Yes	*Yes
UNI	81%	75%	75%	75%	*Yes	*Yes	*Yes
UPP	81%	87%	87%	87%	*Yes	*Yes	*Yes

[2] ****All plans will receive a pass this quarter for the Blood Lead Testing for Two Year Olds measure due to the addition of the CSHCS population.***

Blood Lead Testing for 2 Year Olds

MEASURE
The percentage of continuously enrolled two (2) year old children have had at least one (1) blood lead test on/or before their second birthday.
MINIMUM STANDARD
The minimum standard is at least **81%**.

ELIGIBLE POPULATION	
Age	Two years old as of the first day of the measurement month.
Continuous Enrollment	Enrolled in same plan for the measurement month and 12 months preceding 2nd birthday.
Allowable Gap	No more than a one (1) month gap in enrollment.
Anchor Date	Enrolled in the health plan as of the last day of the measurement month.
ADMINISTRATIVE SPECIFICATIONS	
Denominator	The eligible population.
Numerator	Children with at least one blood lead test on/or before their second birthday.
DATA ELEMENTS	
Data extracted utilizing the Unique Client Identifier (UCI) link between the Lead Statewide Database and Medicaid Beneficiary Database.	

Month of Performance Report	Month of Extract	Measurement Month	2 Year Old Birth Dates
Jan 2016	Nov 2015	Oct 2015	10/01/12 – 9/30/13
Jan 2016	Dec 2015	Nov 2015	11/01/12 – 10/31/13
Jan 2016	Jan 2016	Dec 2015	12/01/12 – 11/30/13
Apr 2016	Feb 2016	Jan 2016	1/01/13 – 12/31/13
Apr 2016	Mar 2016	Feb 2016	2/01/13 – 1/31/14
Apr 2016	Apr 2016	Mar 2016	3/01/13 – 2/28/14
Jul 2016	May 2016	Apr 2016	4/01/13 - 3/31/14
Jul 2016	Jun 2016	May 2016	5/01/13 - 4/30/14
Jul 2016	Jul 2016	Jun 2016	6/01/13 - 5/31/14
Oct 2016	Aug 2016	Jul 2016	7/01/13 – 6/30/14
Oct 2016	Sep 2016	Aug 2016	8/01/13 – 7/31/14
Oct 2016	Oct 2016	Sep 2016	9/01/13 – 8/31/14

MDHHS established a schedule to increase the standard for the *Blood Lead Testing for 2 Year Olds* measure. The goal of the schedule was to provide HMOs the necessary time and opportunity to adjust their outreach efforts as a means to prepare for future changes in the standard.

The following table details the schedule for the two year old standard with continuous enrollment.

Timeframe	Percent of Children Tested ≤ 2nd Birthday
October 2011	80%
October 2012	80%
October 2013	80%
October 2014	81%
October 2015	81%

PROCESS

The plan-specific percentages are represented in the Medicaid Managed Care Performance Monitoring Reports, which are electronically transmitted to each plan.

Note:

- According to the Michigan Administrative Rules, the results of blood lead analyses are to be reported to MDHHS within five (5) business days of test completion.
- Ninety percent of all test results are loaded into the MDHHS data warehouse within one month from the time each specimen is drawn.

MEASUREMENT FREQUENCY

Monthly

Blood Lead Data Extract for 10 Months to 3 Year Olds

MEASURE	
The Extract is an electronic data file of enrolled children, aged ten (10) months to three (3) years, distributed to each health plan. All specimen dates and blood lead test results are provided, plus those beneficiaries without a blood lead test. Plans should utilize this file to determine those children who have and have not been tested, and to assist in targeting outreach efforts.	
ELIGIBLE POPULATION	
Age	Ten (10) months to three (3) years old as of the first day of the measurement month.
Continuous Enrollment	N/A
Allowable Gap	N/A
Anchor Date	Enrolled in the health plan as of the last day of the measurement month.
ADMINISTRATIVE SPECIFICATIONS	
Denominator	N/A
Numerator	N/A
DATA ELEMENTS	
Data extract utilizing the Unique Client Identifier (UCI) link between the Lead Statewide Database and CHAMPS. The UCI is unable to form a link between these two sources if name, gender, or date of birth is incorrect or missing. There is one record for each specimen date and one record for each child who has not been tested.	

Month of Extract	Measurement Month	10 Months to 3 Year Old Birth Dates
October 2015	October 2015	10/01/11 – 12/31/14
November 2015	November 2015	11/01/11 – 01/31/15
December 2015	December 2015	12/01/11 – 02/29/15
January 2016	January 2016	01/01/12 – 03/31/15
February 2016	February 2016	02/01/12 – 04/30/15
March 2016	March 2016	03/01/12 – 05/31/15
April 2016	April 2016	04/01/12 – 06/30/15
May 2016	May 2016	05/01/12 – 07/31/15
June 2016	June 2016	06/01/12 – 08/31/15
July 2016	July 2016	07/01/12 – 09/30/15
August 2016	August 2016	08/01/12 – 10/31/15
September 2016	September 2016	09/01/12 – 11/30/15

Data fields included in the extract:

- Provider ID
- Beneficiary ID
- Beneficiary Name (Last, First, Middle)
- Beneficiary Date of Birth
- Beneficiary Street Address
- Beneficiary City & Zip Code
- Beneficiary County Code & Name
- Specimen Date(s)
- Lead (Pb) Result(s)

PROCESS

The Excel data file is zipped and password-encrypted, then automatically transmitted to each health plan.

Notes:

- Ninety percent of all blood lead test results are loaded into CHAMPS within one month from the time the specimen is drawn.
- To assure the accuracy of the UCI-CHAMPS linkage, it is essential that blood lead information (which is the responsibility of the provider who draws or orders the test) include: 1) the correct name, 2) date of birth, 3) gender, and 4) Beneficiary ID.

If discrepancies are identified, please contact Qian (Daisy) Peng at pengq@michigan.gov or 517-241-1388.

MEASUREMENT FREQUENCY

Monthly

From: Stanbury, Martha (DHHS)
Sent: Sunday, December 27, 2015 2:06 PM
To: Scott, Robert L. (DHHS)
Subject: FW: UPDATE: Flint map randomization
Attachments: Flint EBLL 2010-2014 Randomized GeoRef 2015Dec22.pdf

Let's discuss. (Does it look strange to have so many points outside of Flint proper?)

From: Maqsood, Junaid (DHHS)
Sent: Tuesday, December 22, 2015 4:07 PM
To: Scott, Robert L. (DHHS) <ScottR9@michigan.gov>; Stanbury, Martha (DHHS) <stanburym@michigan.gov>
Subject: RE: UPDATE: Flint map randomization

Here's another version of the map. I used a slightly different randomization method that Ed mentioned. Either this map or the one I sent in my previous e-mail is fine to use.

From: Maqsood, Junaid (DHHS)
Sent: Tuesday, December 22, 2015 2:12 PM
To: Scott, Robert L. (DHHS) <ScottR9@michigan.gov>; Stanbury, Martha (DHHS) <stanburym@michigan.gov>
Subject: UPDATE: Flint map randomization

Martha and Bob,

Attached is a new map of EBLL cases in Flint randomized by a method used by Ed Hartwick. It's better than the previous map I generated where cases were scattered at random throughout the city. In the revised map, cases were shifted slightly from their original point so some of the clustering still holds up. This is probably the final map that GCHD could use for their presentation.

Let me know if you have any questions or if you want to discuss.

Thank you,
Junaid

From: Scott, Robert L. (DHHS)
Sent: Wednesday, December 16, 2015 2:43 PM
To: Maqsood, Junaid (DHHS) <MaqsoodJ@michigan.gov>; Stanbury, Martha (DHHS) <stanburym@michigan.gov>
Subject: RE: Flint map with randomized points

OK, thanks.

From: Maqsood, Junaid (DHHS)
Sent: Wednesday, December 16, 2015 2:26 PM
To: Stanbury, Martha (DHHS) <stanburym@michigan.gov>; Scott, Robert L. (DHHS) <ScottR9@michigan.gov>
Subject: RE: Flint map with randomized points

I'm going to try to randomize points by City (Flint) and zip code(only zip codes in city of Flint) rather than just zip code -- perhaps the output will be better? I will get the new map out sometime tomorrow.

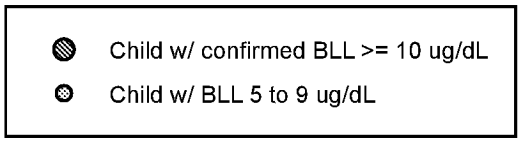
From: Maqsood, Junaid (DHHS)
Sent: Wednesday, December 16, 2015 1:33 PM
To: Stanbury, Martha (DHHS) <stanburym@michigan.gov>; Scott, Robert L. (DHHS) <ScottR9@michigan.gov>
Subject: Flint map with randomized points

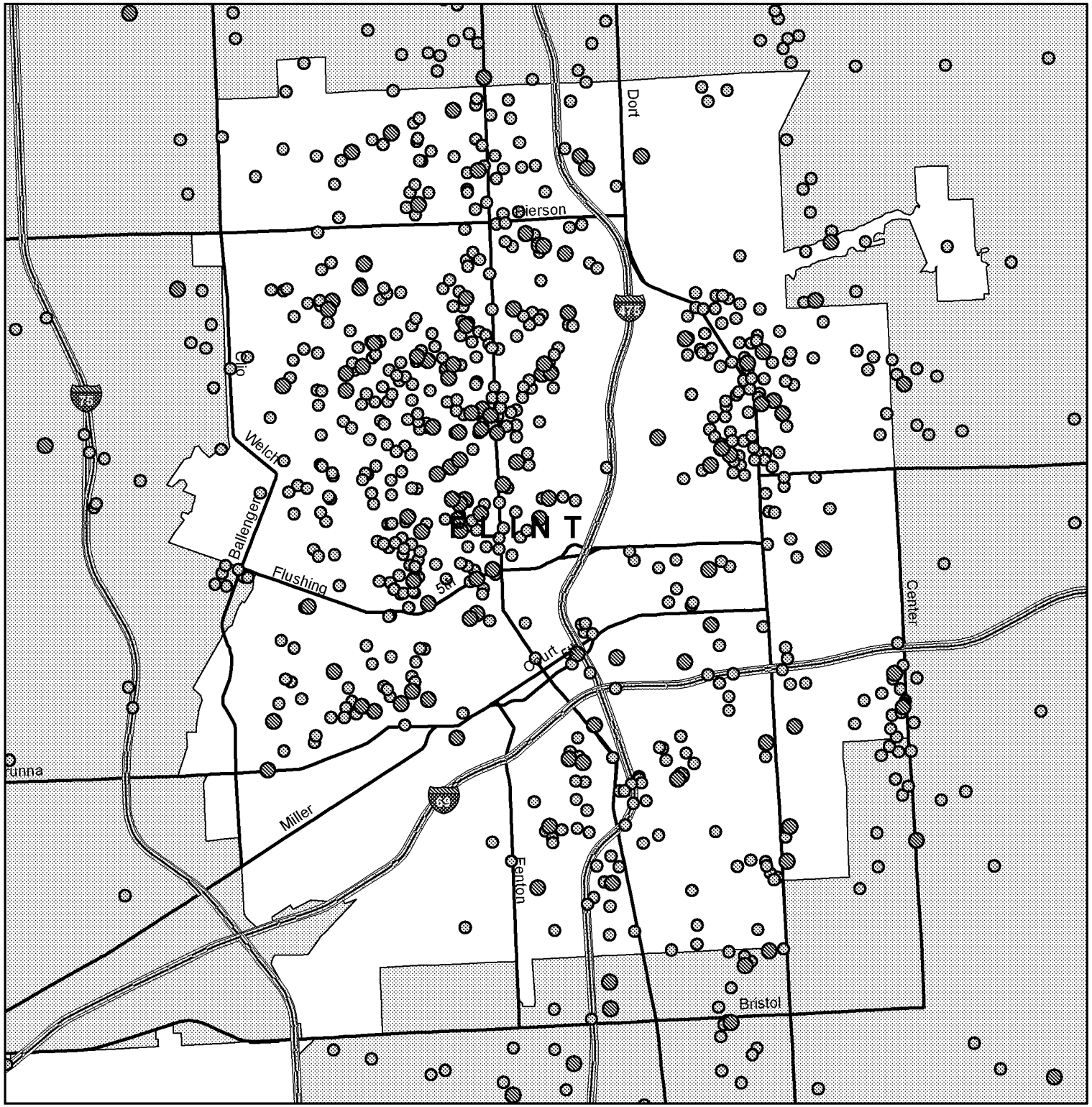
Martha and Bob,

Attached is the map of Flint with points randomized by zip code, meaning I calculated the # of cases with BLL between 5 and 9 ug/dL (inclusive) and with BLL ≥10 ug/dL for each zip code and plotted the same number of cases per zip code in random locations within the zip code boundary. Unfortunately, as we originally suspected, the clustering of cases depicted in the original map (also attached) is lost with this randomization.

Junaid

Flint Area
Children with Elevated Blood Lead Levels
2010-2014





Source: MDCH Data Warehouse,
Lead Specimen table

December 22, 2015

From: Stanbury, Martha (DHHS)
Sent: Sunday, December 27, 2015 4:36 PM
To: Scott, Robert L. (DHHS)
Subject: FW: 2014 lead data

Importance: High

Given that your numbers and Patti's are now almost the same (hurrah!) can you generate the list for 2014 and 2015 as per the instructions below?

From: Dykema, Linda D. (DHHS)
Sent: Monday, December 07, 2015 1:52 PM
To: McKane, Patricia (DHHS) <McKaneP@michigan.gov>; Lasher, Geralyn (DHHS) <lasherg@michigan.gov>; Eisner, Jennifer (DHHS) <EisnerJ@michigan.gov>
Cc: Stanbury, Martha (DHHS) <stanburym@michigan.gov>; Miller, Corinne (DHHS) <MillerC39@michigan.gov>; Scott, Robert L. (DHHS) <ScottR9@michigan.gov>
Subject: RE: 2014 lead data
Importance: High

I talked with Jennifer Eisner and here is what we need:

Only the 2014 data (not 2015 since we don't typically release a year's data before the year is completed), by zip code for all of Michigan with small cells suppressed. And only confirmed venous tests as CLPPP has done for previous years: we'll explain that we're including capillary tests in the Flint reports in an effort to capture all possible EBLL children.

Could I please have an estimate of when this can be done?

From: Dykema, Linda D. (DHHS)
Sent: Monday, December 07, 2015 12:08 PM
To: McKane, Patricia (DHHS); Lasher, Geralyn (DHHS); Eisner, Jennifer (DHHS)
Cc: Stanbury, Martha (DHHS); Miller, Corinne (DHHS); Scott, Robert L. (DHHS)
Subject: RE: 2014 lead data
Importance: High

Ok, I deleted all the chatter in-between.

I believe the request is for annual 2014 and 2015 (not by quarter) for all Michigan zip codes (suppressing cells less than 6). The data provided should match what we're reporting to the Director/Governor, so retain the highest test whether venous or capillary.

Jennifer/Geralyn: is that accurate?

From: McKane, Patricia (DHHS)
Sent: Monday, December 07, 2015 11:56 AM

To: Dykema, Linda D. (DHHS)
Cc: Stanbury, Martha (DHHS); Miller, Corinne (DHHS); Scott, Robert L. (DHHS)
Subject: Re: 2014 lead data

To clarify you want 2014 by zip code and quarter with retaining highest test? Or only highest venous test? Im still in a meeting and may not get this done today. Will also talk to Yan to see if she is available.
Patti

Sent from my iPhone

From: Eisner, Jennifer (DHHS)
Sent: Tuesday, December 01, 2015 5:36 PM
To: Wells, Eden (DHHS); Miller, Corinne (DHHS); Moran, Susan (DHHS); Lasher, Geralyn (DHHS); Dykema, Linda D. (DHHS); Minicuci, Angela (DHHS)
Subject: FW: 2014 lead data

All –

A reporter with Bridge Magazine is requesting the statewide 2014 (and if possible, 2015) CLPPP data. Bob sent me the attached county-level info for 2014 which I have not shared yet, as it's not the final report.

We would like to touch base to make sure the data has been finalized and reviewed by epi before it's posted online.

Eden – we'll reach out to you in the morning to discuss the media request. Beyond the data, the reporter is also interested in discussing home lead investigations.

Jennifer Eisner
Public Information Officer
Michigan Department of Health and Human Services
Office: 517-241-2112 or EisnerJ@michigan.gov
Cell: PPI

From: Scott, Robert L. (DHHS)
Sent: Tuesday, December 01, 2015 12:51 PM
To: Eisner, Jennifer (DHHS) <EisnerJ@michigan.gov>
Subject: 2014 lead data

Please see three attached files.

Robert L. Scott
Childhood Lead Poisoning Prevention Program
Michigan Department of Health & Human Services
(517) 335-8178

fax (517) 335-8509

From: Stanbury, Martha (DHHS)
Sent: Tuesday, January 05, 2016 10:15 AM
To: Scott, Robert L. (DHHS)
Subject: RE: Sit Rep report 192 Kids

Thanks Bob.

From: Scott, Robert L. (DHHS)
Sent: Tuesday, January 05, 2016 10:04 AM
To: Dykema, Linda D. (DHHS) <DykemaL@michigan.gov>; Moran, Susan (DHHS) <MoranS@michigan.gov>; Stanbury, Martha (DHHS) <stanburym@michigan.gov>
Cc: Lishinski, Karen (DHHS) <LishinskiK@michigan.gov>
Subject: RE: Sit Rep report 192 Kids

I currently have 187 children on the Master List for Flint.

Of those 187 children (based on a match from the Warehouse):
156 are Medicaid-eligible now and at time of EBLL (83%)
18 were Medicaid-eligible at time of EBLL, but not currently (10%)
7 were Medicaid-eligible previously, but not at time of EBLL or currently (4%)
6 were never Medicaid-eligible (3%)

From: Dykema, Linda D. (DHHS)
Sent: Monday, January 04, 2016 4:29 PM
To: Moran, Susan (DHHS) <MoranS@michigan.gov>; Stanbury, Martha (DHHS) <stanburym@michigan.gov>
Cc: Scott, Robert L. (DHHS) <ScottR9@michigan.gov>
Subject: RE: Sit Rep report 192 Kids

Copying Bob Scott for a response (Martha is working away from the office this afternoon).

From: Moran, Susan (DHHS)
Sent: Monday, January 04, 2016 4:21 PM
To: Dykema, Linda D. (DHHS) <DykemaL@michigan.gov>; Stanbury, Martha (DHHS) <stanburym@michigan.gov>
Subject: Sit Rep report 192 Kids

On sit rep report, we report 181 kids (age 0-5) with elevated lead level and 11 lids (age 6-17).
Of these 192 kids, how many have Medicaid coverage? This may be a Bob Scott question, but would like answer asap so let me know if we need Medicaid to assist in determining.

From: Stanbury, Martha (DHHS)
Sent: Tuesday, January 05, 2016 1:29 PM
To: Scott, Robert L. (DHHS)
Subject: FW: IRB revision
Attachments: Study Proposal IRB BLL 12 11 15 ms comments 12 30 15 and JLL revision on 1 4 16.docx; ATT00001.htm

Here's what Dr. HA submitted to our IRB that just got approved. It is saved in the flintwater shared folder under data requests/hurley.

From: Mona Hanna-Attisha [mailto:MHanna1@hurleymc.com]
Sent: Monday, January 04, 2016 5:46 PM
To: Stanbury, Martha (DHHS) <stanburym@michigan.gov>; Miller, Corinne (DHHS) <MillerC39@michigan.gov>; Jenny LaChance <JLachan1@hurleymc.com>
Subject: Fwd: IRB revision

Let us know if you need anything else. Thanks!

Mona Hanna-Attisha MD MPH FAAP
Hurley Children's Hospital
Michigan State University
mhanna1@hurleymc.com

Begin forwarded message:

> **From:** Jenny LaChance <JLachan1@hurleymc.com>
> **Date:** January 4, 2016 at 3:38:17 PM EST
> **To:** "'MDHHS-IRB@michigan.gov'" <MDHHS-IRB@michigan.gov>
> **Cc:** Mona Hanna-Attisha <MHanna1@hurleymc.com>
> **Subject: IRB revision**
>
> Dear MDHHS IRB,
>
> Please see attached our revised proposal on "Analysis of Pediatric Blood Lead Levels" in Flint, MI, with Dr. Mona Hanna-Attisha as PI.
>
> If you have any questions or need any changes, please let me know.
>
> Thanks,
> Jenny
>
> Jenny LaChance MS CCRC
> Hurley Research Center
> 810-262-6776
> JLaChan1@hurleymc.com

STUDY PROPOSAL TEMPLATE *You may attach additional pages if needed, or recreate form using prescribed headings and subheadings.*

Study Title: Analysis of Pediatric Blood Lead Levels

Study Team Members: (Names, Degrees, Affiliations, Study Team Roles)

Mona Hanna-Attisha MD MPH, Director Pediatric Residency Program, Hurley Children's Hospital at Hurley Medical Center and Assistant Professor, Department of Pediatrics and Human Development, Michigan State University College of Human Medicine, Principal Investigator

Jenny LaChance MS CCRC, Hurley Medical Center Research Department, Research Analyst and Co-Investigator

Rick Sadler, PhD, Assistant Professor of Family Medicine, Division of Public Health, College of Human Medicine, Michigan State University, Research Analyst and Co-Investigator

Allison Schnepp MD, Pediatric Resident, Hurley Children's Hospital at Hurley Medical Center, Co-Investigator

I. INTRODUCTION

The INTRODUCTION provides problem identification and justification. It serves to clarify the purpose of your study intentions—and the potential benefit of conducting the work.

1. **Purpose** or **Statement of the Problem**

(Describe why the problem is important; the scope/severity of the problem.)

In April of 2014, the City of Flint changed their water supply from the Detroit river to the Flint river. Flint had Safe Drinking Water Act violations for trihalomethanes after switching water sources. In response, the City of Flint dramatically increased chlorine disinfection, thus changing the oxidation reduction potential and allowing the metal on the lead pipes to leach into the water without necessary corrosion control. Researchers from Virginia Tech University have reported increases in water lead levels (WLL); however, it is unknown if there have been any changes in blood lead levels (BLL). Lead is a potent neurotoxin that leads to irreversible brain damage in vulnerable populations, especially children. Lead screening is routinely done by pediatricians and by county health departments for children who reside in high-risk populations and for children insured by Medicaid. Hurley Children's Clinic cares for the largest number of high-risk Medicaid children in Genesee county and Hurley Medical Center laboratory runs the majority of blood lead tests in the county.

2. **Background** or **Review of the Literature**

(Provide a critical appraisal of existing knowledge and how your work may help to fill identified gaps.)

According to the Advisory Committee on Childhood Lead Poisoning Prevention, "no measurable level of blood lead is known to be without deleterious effects, and once engendered, the effects appears to be irreversible." [i] The consequences of lead poisoning impact many biological processes, most notably intelligence, behavior and overall life achievement[ii]. Increases in blood lead levels from 1 to 4 ug/dL has been associated with a change in mean IQ of approximately -2.3 to -5.2 IQ points.[iii] Considering the irreversible and life-altering impact of lead exposure, primary prevention has been advocated to eliminate exposure.

With the removal of lead from gasoline and paint, the incidence of lead toxicity has decreased over the decades[iv]; however, the role of lead in drinking water has played an increasingly prominent role as other sources of lead exposure have reduced and with increased knowledge of the impact of low level lead toxicity[v]. In 2001, Washington DC changed their treatment chemical which caused lead plumbing corrosion and left thousands of children with lifelong health risks from elevated lead levels.[vi] In April of 2014, the City of Flint changed their water source from the Detroit to the Flint river. The Detroit water system contained anti-corrosion chemicals, but the new Flint water source did not.[vii] Tests of the Flint water by Virginia Tech University Professor Marc Edwards and his team have revealed elevated lead levels in Flint drinking water.[viii]

3. **Specific Aims**

(Specific aims should be few in number and very succinct, not more than one or two sentences per aim. Number your aims so that these can be traced to the Project Design and Data Analysis sections of your Methods.)

1) Calculate the mean blood lead level (BLL) of Flint children (who receive Flint water) under the age of five years in different time intervals before and after water switch beginning from January 1, 2013 to ~~current~~September 15, 2015.

2) Calculate the percentage of Flint children (who receive Flint water) under the age of five years with elevated blood lead (EBL) in different time intervals before and after water switch beginning from January 1, 2013 to ~~current~~September 15, 2015.

3) Examine any relationship between water age at child's home and child's BLL status.

~~2~~4) Continue to assess the mean BLL and percentage of children with EBL in Flint past September 15, 2015 and compare these percentages to the pre time period (January 1, 2013 to September 15, 2013) and/or initial post water switch time period (January 1, 2015 to September 15, 2015.)

5) Identify elevated BLL areas within Flint based on GIS mapping at least quarterly starting in 2016.

4. **Significance** or **Study Rationale**

(Describe long-range objectives.)

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With no reported changes in blood lead level data, it is unclear if the change in Flint water source has impacted pediatric lead exposure. Information about the change in the mean and the change in the percentage of elevated blood lead levels from a large sample of potentially exposed impacted children has tremendous public policy, public health and socioeconomic implications.

II. METHODS

The METHODS is a 'blueprint' of your study plan. It outlines the steps that you will undertake in order to successfully conduct the study.

1. Setting

(Where will the work be conducted? Identify and describe the setting or settings.)

City of Flint; City of Flint will be determined by residence of the following zip codes: 48501 to 48507. Additionally, recipients of Flint water will identified with GIS or other software assistance. This is the area that primarily was affected by the change in water source. The city of Flint has a population just below 100,000 (99,002 estimated in 2014) and 8% are below age 5. In Flint, 41.5% of residents are below the poverty level (compared to 16.8% in Michigan).

2. Subjects

(Describe population/sample; demographic profile/characteristics; subject inclusion and exclusion criteria; anticipated number and the likelihood of recruiting number.)

All children less than five years old, with an emphasis on children less than 15 months old, with blood lead levels who live in the city of Flint. Additionally, children less than 5 years who had lead levels through Hurley Laboratory who do not live in the city will be analyzed as a comparison group.

Additionally, the state of Michigan will provide blood lead data on all children less than 6 years old who live in Genesee County. (These children will be identified as living in Flint city or not based on GIS analysis.)

3. Project Design

(Describe how you will conduct the project. Describe study personnel; subject recruitment and informed consent processes; intervention descriptions; resources/materials; equipment. Provide a tentative time line for conducting project work.)

Phase 1- Previously approved by MDHHS and Hurley IRBs in Fall 2015

This is a retrospective study of blood lead levels. This project will be conducted through the request of various data sets (as described below). No informed consent will be needed. There will be no intervention as part of the study. The principal investigator will request data from the below sources. Jenny LaChance will be primarily responsible for getting data into a format that can be analyzed with statistical software. Both investigators with Dr. Sadler will review, analyze, and disseminate data. Dr. Schnepp will assist with review of analysis and dissemination of information. Our tentative timeline is that data would be received starting after IRB approval (~September 2015). Once we have data, we will start analysis. Because different data sets may

be received at different times, we may be received data for the next 6-12months while analyzing other data sets. Once we have results, findings may be presented or published for up to 5 years.

Data sets

Blood lead levels for all Hurley Children's Clinic patients aged less than five years will be obtained from Epic EMR. A report will be requested to include patient's medical record number, full address, date of birth, date of blood draw, zip code, full address, and blood lead level.

Blood lead levels for all patients aged less than five years will be obtained from the Hurley lab electronic system. A report will be requested to include patient's medical record number, date of birth, date of blood draw, zip code, full address, blood lead level, and primary medical doctor. The approximate water age received at each child's home will be determined for each child.

Blood lead levels for all patients in Flint (and Genesee County) aged less than five years will be obtained from MDHHS Childhood Lead Poisoning Prevention Program database (which sends data to the MDHHS Data Warehouse) from the state of Michigan. A report will be requested to include child ID number, date of birth, date of blood draw, address with zip code, blood lead level, and specimen type.

Blood lead levels for all patients aged less than five years will be obtained from the Greater Flint Health Coalition's Children's Healthcare Access Program (CHAP). CHAP sites include Hurley Children's Clinic, Mott Children's Health Center, Hamilton Health Center and Akpinar Pediatrics. A report will be requested to include patient's medical record number, date of birth, date of blood draw, zip code, blood lead level, and primary medical doctor.

Additionally, demographic data will be requested when available. Demographic variables may include gender, race, and insurance type, if available. Finally, ward or risk level of lead (based on water data) may be determined from GIS or address information.

Lastly, water service line information (lead/no lead, etc) will be incorporated into data sets as possible. This information will be received by the city of Flint.

Phase II: Amended study protocol {January 2016} to include data prospectively from MDHHS Childhood Lead Poisoning Prevention Program data base.

The State of Michigan will provide BLL results for all children tested in Genesee County since September 15, 2015 in January 2016 (estimated) and then will provide updated results every two weeks until December 2017 or earlier, as mutually agreed The data will be limited to the fields specified above for the retrospective analysis.

4. Data Collection

(Describe the data collection/storage plan. Include all data collection tools and process with the proposal. State how you will assure confidentiality.)

Data will be collected and stored on secure/encrypted memory sticks (or desktop of Hurley computers) received from Hurley's Informational Technology department. State of Michigan will provide

data in a secure electronic format that will then be stored on encrypted memory sticks or desktop of Hurley computers. Patient medical record numbers/Child ID numbers are only obtained to identify the same patient with multiple lead levels. After identification of duplicates, medical record numbers/Child ID numbers will be removed. Date of birth and date of lead level will be used to calculate age at time of lead lab result and timing in relation to the change in water source. Addresses will be used to determine who lives within the area served by Flint water. GIS or other software may assist with this.

Date of birth will removed from data files once age has been calculated at time of lead level blood draw. Date of lead level blood draw will be kept in raw data file (but not analysis file) until 1-year post dissemination in case there is a need to redefine pre/post based on other information learned or requests from others. Addresses must be kept with data file and GIS analysis file as these are the basis for the GIS analysis. Addresses will be destroyed 1 year ~~post dissemination~~following the completion of the ~~study~~following the completion of the study as this allows time for other researchers to question work and for us to produce other information if necessary based on commentary/questions. At that time, only GIS maps that were created will be kept. Published GIS maps will not identify specific street locations of specific study subjects' homes or any other information that could lead to a breach of confidentiality.

5. Sample Size

(For comparative research, this should be a formal sample size calculation, which the Research Center can help calculate. For descriptive or pilot studies, justify based on precision of the estimate, pragmatic issues based on resources, number of patients available, etc. or other factors.)*

Phase I:

Sample size of pre-switch first-time lead levels for children five years and less: estimated 800 from Hurley lab data and estimated at 2500 from state data.

Sample size of post-switch (one year post to September 15, 2015) first-time lead levels for children five years and less: estimated 800 from Hurley lab data and estimated at 2500 from state data.

~~Additionally data from September 15, 2015 will be received from the state of Michigan. These data will be used to monitor changes and is not part of the original sample size analysis. Data will be received on all lead tests every 2 weeks for children less than 6 years for approximately the next 2 years.~~

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If there is a 5% increase in elevated lead levels from 3% to 8%, then this sample will have adequate power. With an alpha of 0.05 and a power 0.80, 882 pre subjects and 221 post subjects would be needed.

Phase II:

Data will be provided by the state of Michigan going back to September 15, 2015 and then prospectively on all children in Genesee County with blood lead tests until the end of the study period (approximately December 2017). This is population data not a sample of cases. Thus the study will have a complete dataset of all children tested for lead from the beginning of the study until its closure.

*If you are conducting descriptive or exploratory work as opposed to an experimental study, you may provide a subject number justification as opposed to a power analysis.

***4.* Data Analysis**

(Describe statistical techniques to be applied in order to answer your research question or test your hypothesis; plan for interpretation and dissemination; person responsible. For descriptive studies, precision of the primary specific aim should be included.)[xv]

Phase I:

Descriptive statistics will be used to calculate blood lead level means (or geometric means) and percentage of children with elevated blood lead levels. Comparisons will be made with independent t-test/1 way ANOVAs and chi-squared analysis for groups and subgroups (age, risk level, etc). Additionally, regression modeling may be used to look at the impact of specific area and.or demographics on lead levels, if appropriate. Finally, GIS analysis may assist with identification and analysis of those who receive water and incidence of EBL and levels of lead.

Phase II

In phase II, data will be examined at least quarterly using GIS mapping and analysis to examine if there are any areas within Flint with high(er) predicted BLL. This analysis will allow for the identification of any new problem areas and may allow for prioritization of response.

Additionally, data from the pre time period (January 1, 2013 to September 15, 2013) and/or initial post water switch time period (January 1, 2015 to September 15, 2015) will be compared to later time periods (including but not limited to): follow up time period 2 (January 1, 2016 to September 15, 2016). Statistical techniques may include chi-square analysis, regression modeling, independent t-tests, and 1 way ANOVAs for groups and subgroups (based on age, risk levels, etc). This would be similar to the analysis conducted in Phase I.

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Jenny LaChance and Rick Sadler will be primarily responsible for data analysis.

~~[xv] You are encouraged to seek statistical consultation through a university or hospital research department.~~

III. REFERENCES or BIBLIOGRAPHY

See below

IV. APPENDICES

There is no data tool for this study as all data will received electronically (from different sources.) Please see included an excel spreadsheet that shows the variables that may be requested.

---

[i] Low Level Lead Exposure Harms Children: A Renewed Call for Primary Prevention. Report of the Advisory Committee on Childhood Lead Poisoning Prevention of the Centers for Disease Control and Prevention. January 4, 2012.

[ii] Centers for Disease Control and Prevention. Preventing Lead Poisoning in Young Children. CDC, Atlanta: 2005.

[iii] Healey, N., H. Jones-Otazo, M. Walker & A. Knafla. 2010. Toxicological Review and Recommended Toxicological Reference Values for Environmental Lead Exposure in Canada. FINAL REPORT. Prepared under contract to Health Canada. Prepared for the Contaminated Sites Division, Safe Environments Directorate, Healthy Environment and Consumer Safety Branch, Health Canada, Ottawa.

[iv] Shannon, M.W., Etiology of Childhood Lead Poisoning. In Lead poisoning in childhood, 1996, P. Brookes Pub. Co. (Baltimore). Edited by Siegfried M. Pueschel, James G. Linakis, Angela C. Anderson, 1996.

[v] US EPA. Safe Drinking Water Act Lead and Copper Rule (LCR). In Federal Register, Vol. 56, pp 26460-26564, 1991.

[vi] https://en.wikipedia.org/wiki/Lead_contamination_in_Washington,_D.C._drinking_water accessed on September 13, 2015.

[vii] http://www.deadlinedetroit.com/articles/12697/scary_leaded_water_and_one_flint_family_s_toxic_nightmare#.VfYm6eeZZjN accessed on September 13, 2015.

[viii] http://flintwaterstudy.org/ accessed on September 13, 2015.

This Document is a Non-Responsive Attachment.

From: Robinson, Mikelle (DHHS)
Sent: Thursday, November 19, 2015 5:03 PM
To: Moran, Susan (DHHS)
Subject: Updated Flint Action Plan & first weekly report from GCHD
Attachments: Flint Action Plan 11-20-15 v2.docx; 11182015 FLINT BLOOD LEAD CM - weekly status tracking form.docx

I updated the action plan from our Tuesday calls. Feel free to make changes. I wasn't sure if you want to share with Geralyn before sending to Nick.

Flint Water Public Health Response: MDHHS Action Plan

Weekly Update 11-20-15

TASK	STATUS	ACTION	DATE COMPLETED
Filter Distribution	Residents may continue to obtain filters from GCCARD (both sites 9-4PM) and MDHHS clients can continue to obtain filters at the two MDHHS office locations or the GCCARD sites.	No action indicated.	NA
Filter Replacement Distribution	The procedure is in place for replacement cartridge distribution including an abbreviated application for residents to apply for and obtain cartridge replacement. Cartridge replacement will occur at same locations as filter sites. DHHS is also placing an order for 750 replacement filters for the 8-cup Zerowater filters. 9000 Brita replacement filters on hand with an additional 10,000 readily available when needed. Total available= 19,000 **United Way requested that DHHS purchase Pur filter replacements. GCARD requests that no more bottled water be donated. They have plenty in stock. Cash is preferred.** **City of Flint set up distribution point in City Administration office building. GCHD will be providing City of Flint with Pur Filters. The Brita filter requires a form for MDHHS be filled out; there are some concerns that undocumented members of population will avoid Brita filters for this reason.**	DHHS and GCCARD will begin issuing the replacement filters the week of November 2nd.	**Ongoing**
	MDHHS is currently coordinating with GCARD on publicity for distribution of the replacement filters. United Way will provide Pur Filter Replacements. United Way will also be purchasing filter units for school water fountains. Press release planned Monday 11/2 re: pick up of replacement filters, videos to be posted on websites and you tube.	Jen Eisner will work with Hilda McShane	Completed 11/2
Public Education Proper Filter Use	When used improperly, the filters will exceed their capacity limit in a much shorter time frame thereby increasing need for filter replacement much sooner than expected. Develop NEW public education material about proper use of cartridge AND how to obtain filter replacement cartridges, targeted for release week of October 26 during lead awareness week.		Completed
	Request made for written instructions on filter cartridge replacements for nurse case managers to take on home visits. Wes is working to complete a packet for nurse case		**Pending**

TASK	STATUS	ACTION	DATE COMPLETED
	managers which will include information on filters.		
	Video created with Home Depot demonstrating replacement of the Brita replacement filter. DEQ receiving questions about meters on the water filter pitchers delivered to the schools which are likely Zerowater Filters.	The video added to the gov/flintwater website.	Completed 11/2
	Video will be added to nurse training- CLPPP.		Completed 11-10
Lead Testing Protocol:	Draft protocol has been completed, undergoing final review. Protocol calls for testing: Priority groups- • Confirmatory venous testing for children who had venous testing (115 children) • Children in day care, Head Start • children attending 3 schools (Freeman, Eisenhower, Brownell) • Children residing in high risk zip codes (03, 04) • All other students Protocol will be announced in a joint MDHHS/GCHD Press release.	Press release has been cleared with Governor's Office.	Completed 10-28
Blood Lead Testing: 9/28/15-10/23/15	CLPPP processed 580 tests from Flint zip codes since 9-28-15; 5 children were reported with elevated lead blood levels. There approximately 200 children that have been identified for follow-up.	MDHHS has arranged a contract with the GCHD to provide nurses for the follow-up.	Contract completed in E-grams as of 10-23
	Cross reference list of children with elevated lead levels with filter distribution data to ensure household has a filter. (Peeler/Scott) So far only about 20% of approximately 200 children with EBL are known to have received a filter. GCHD will deliver filters to these homes as they are doing the case follow-up. GCHD will provide weekly updates.	Send list to Kris S (done)	In process
	A group will develop reporting metrics and system to track same: Linda Dykema, Wes Priem, Michele Bruneau, Bob Scott and group met to discuss metrics. Plan to produce first detailed report for internal review the week of Nov. 9th. A simplified version for external dissemination will be released after internal review. Linda is working on an analysis of blood lead tests done since 9-28-25. Epi will assist with this analysis. Still fine-tuning the report. Report has been completed along with talking points.		Completed

TASK	STATUS	ACTION	DATE COMPLETED
Parent education	Parent education material completed. Discuss dissemination of parent material through Flint schools.	Call with Flint school superintendent, GCHD, and MDHHS scheduled 10-26-15 to discuss dissemination process.	Completed
	Schools require 6000+ information packets for distribution to all students. Print order sent to DTMB. Hardcopy will be distributed to GCHD for issuing to the schools, and to Headstart, daycare, and other agencies in Flint with children ages 0-5. Mark will drop off hard copies at GCHD. Toni LaRocco will take the lead in distribution of the materials to the schools and other agencies.	Geralyn Lasher arranged for printing.	10/30 printing completed and Mark dropped off 6,000 copies at the Flint School Admin. Building, and 2,500 to health dept. Remainder dropped off on 11/2.
	Ensure legislators receive material in advance	Elizabeth Hertel coordinate legislator notification	Completed
Provider Education	Provider Education material completed. Communication to providers will occur through GCHD and MDHHS networks (GCMS, GCARD, hospitals, etc).MDHHS will distribute through the Medicaid Health Plans. Hurley providers received the packet and the remainder of providers will receive the information next week.	Mark Valacek Wells/Peeler Electronic distribution through various listservs next week.	completed 10/30 Completed 11/2
Community public education and testing	McLaren Health Plan in conjunction with GCHD hosted a public testing and awareness event on November 5 at the Burton GCHD site. 40 children were tested. McLaren will have	Dr. Forschee has been contacted.	

TASK	STATUS	ACTION	DATE COMPLETED
event	providers on site to perform testing for their members; GCHD onsite to perform testing for all others. Event will also include Medicaid application assistance. Tony Larocco (GCHD) has contacted Molina and Meridian Health Plan regarding sponsorship of community testing and awareness event. Molina and Meridian Health Plan testing dates to be determined. GCHD will be at a community event on Nov. 12, from 2 PM to 7 PM, to focus on testing for children 0-5. (Brownell and Holmes Schools)> Another testing event was held at Brownell School on 11/12. Many organizations were present to provide information and services. 27 children were tested, 60 filters distributed. **There was only one EBL result from the Brownell clinic (5.5 ppb that will be reported out as a 6.0; McLaren results are not available yet.) Flint schools superintendent is interested in having another event.**	Tony contacted Molina and there is interest in a future testing event.	**pending**
	There will be a combination school testing/townhall/education event, sponsored by Rep. Neeley, on Nov. 2nd. A telephonic townhall is slated for Oct. 28 by Rep. Neely. Gongwer reported that 4,000 people participated in this call.	FYI	Completed
Public Education Materials	Mark Johnson, is the regional representative for ASTDR and CDC. He has been designated as contact. A call was held with ASRDR on 11/13 to discuss how to improve outreach efforts to the Flint community about lead hazards. It was suggested that state/county consider lowering the readability level of the lead materials for the public to 3rd or 4th grade reading level. **A workgroup is currently reviewing the documents for needed changes. Jim Henry contacted Dr. Suzanne Selig (UMichigan-Flint School of Public Health) who will seek community feedback on the materials that have been developed**. **After readability changes, some of the materials will be translated into Spanish and Arabic.**	CLPPP and GCHD staff will review documents and work with the communication office on any changes.	**Pending**
Environmental Investigation	$275 k contract with ETC requested on Oct. 21st, 2015. About 275 EBL investigations are budgeted for Flint. Wes will work with GCHD to coordinate with Flint Housing/other authorities to deal with recalcitrant landlords. DEH meeting on 11/5 with MDEQ staff to harmonize EBL investigation protocol with water testing protocol. 11/12 The EBL contractor met with GCHD staff to coordinate activities	Wes Priem to finalize contract with MDHHS Contracts.	Contract completed 10/29

TASK	STATUS	ACTION	DATE COMPLETED
	with case management. **There is a substantial disparity in the amount of time required for the EBL investigation activities and the amount of time to do the case management activities; however, they are still working on a solution to be able to continue joint visits.**		
Nurse Follow Up	Project sent to Contracts for inclusion in E-grams 10-23-15. 10-21-15 Funding for case management nurses will be disseminated to GCHD through new project: *Flint Water*, for $425,000 through the Comprehensive Contract E-grams system, to fund the: Follow-up of Children Reported with Elevated Lead Levels: Case Management Services. GCHD advised to secure approvals for use of these funds and begin procedures to place staff in appropriate positions to conduct the work. GCHD has shifted one nurse over for follow-up. That nurse if fully trained on elevated lead patient management. 1.5 nurse FTE's will be assigned and trained on 11-10-15. Lead Safe Home Program worked with GCHD on protocol to harmonize the flow of outreach to families with children with elevated blood levels. 11/10 Training has been completed for 2.5 FTE nurses. Some follow-up training will be scheduled as well. **Follow-up training with nurses was completed on 11-17. Weekly calls have been set up with CLPPP staff and nurses.** **Weekly status report from GCHD attached in separate file.**	Eden will contact Bob to send the list to Toni at GCHD so they can facilitate case management of children with elevated lead levels (done). Contract approved 10/26	Completed 10/27 Completed 11-10
Water Testing	DEQ will be testing at Freeman Elementary the week of 10-26-15, with plans to expand to 14 schools. Residential testing will have a different protocol. GCHD has been in contact with DEQ to possibly assist in sampling. Linda Dykema has a draft Executive Summary for Health-Based Drinking Water Lead Levels developed. Once testing is completed, this document will serve as a decision guide on reopening of school and/or daycare water fountains/faucets for student use. Linda will revise the model to include paint chip values/risk levels. GCHD sanitarians are assisting DEQ with water sampling. We should anticipate some differences in opinion on actionable pb levels. Suggested that the following language that DC used be adapted for our use: "The removal of lead in drinking water is most effective if the full lead service line is removed from both the public and private property. If you choose not to replace your private side pipe, lead can continue to dissolve in your drinking water. You should also replace galvanized	No action indicated, informational only – DEQ.	

TASK	STATUS	ACTION	DATE COMPLETED
	plumbing, older lead soldered pipes, and brass fixtures and use a different plumbing material in your home. Until all potential sources of lead in drinking water are removed from your private property, be sure to follow the flushing and filter instructions provided." "Water is lead-free when it leaves the treatment plant, but lead can be released when the water comes in contact with pipes and plumbing fixtures that contain lead. Lead sources and lead levels vary between buildings, so it is important to identify and remove any lead sources in each household." "Pregnant or nursing women and children under age six should use filtered tap water for drinking water and cooking until all lead sources are removed. Filters certified for lead removal are required to meet National Sanitary Foundation (NSF) Standard 53." **This language will be incorporated into EBL investigation reports and in the educational packets the nurses will distribute.**		**Pending**
Misc.	City of Flint is asking when the county will lift the emergency order. Jim Henry from GCHD mentioned he was hearing some concerns raised again about Legionella. Eden said that Jim Collins can help address this. Mark V. said that an extensive data analysis was done on this previously and it isn't an issue. DEQ gave permission to increase phosphate levels in the water temporarily. Some health concerns might be raised about this particularly for infants. Dr.Eden Wells said that it is unlikely to cause health problems but we can add information on the FAQ to help reassure citizens. DEQ released its Freeman School water testing results this week. EPA released its report from its expedited review of the response as well. **The water testing protocol has been changed to no longer do pre-flushing of the pipes. Other schools that are interested in having their water tested should make a request to DEQ. LARA will do a plumbing assessment before the water samples are taken.** The City of Flint is considering taking over the cost of providing the replacement pipes for at least some of the high risk homes.	FYI only	
	A call was held on the 10th with MDHHS staff and the regional USDA staff and congressional staff, on the ready to feed formula issue. Both USDA and Sen. Stabenow's office satisfied with client communication and monitoring process in place. Talking points have been	FYI	Completed

TASK	STATUS	ACTION	DATE COMPLETED
	developed by WIC staff and sent to the communication office for review. **The talking points have been approved by the Communications Office. There has only been one client request for Ready to Feed formula in the Flint WIC clinic.** **A webinar for health care providers will be held in early December to discuss the Lead issue, blood lead testing, Ready to Feed Formula, and answer any questions. It will be co-sponsored by the GCHD medical director.** **There will be a farmers market, in conjunction with a flu clinic, that the GCHD is holding on 21 November and lead-related information will be provided by GCHD.**		**Pending**
	Internal calls will be held once a week on Thursdays at 12:30.	FYI	

FLINT BLOOD LEAD LEVEL TESTING REPORT for week ending 11/13/2015

		A	B	C	D	E	F
PRIORITY LEVEL 1	**Target Population**	**# contacted and offered case management**	**% of total (A/X)**	**# of children receiving CM**	**% of total (C/X1) and (C/A)**	**# of Medicaid claims filed**	**% for whom Medicaid claims filed (E/C)**
	All children with elevated Capillary > 5 since April 2014 (total = **84**)	3	4%	NA	NA	NA	NA
	All children with newly elevated Venous > 5 since April 2014 (total = **79**)	0	0%	1	1.3%	1	100%
	All children with new elevated Venous ≥ 5 since October 2015 (total =**3**)	2	67%	0	0%	0	0%
	All children with elevated Capillary > 5 since Oct 2015 (total = **5**)	0	0%	NA	NA	NA	NA
	TOTALS						

** this number will change weekly*

NOTES: GCHD CM staff were in training all day 11/10, closed for holiday 11/11, and were at an outreach clinic on 11/12 for the afternoon away from the office. Note that children with capillary are not offered case management until result confirmed by venous sample, the 4% in column B represents number reached via phone. FYI-families may be contacted in one week, first home visit to open to CM may not occur in same week due to scheduling, etc. This information reflects activities for this week only.

Metrics included in contract

1. Number and percentage of target children with elevated blood lead levels of ≥ **5 ug/dL** that are successfully contacted and offered case management services. A and B
2. Number and percentage of target children receiving case management services. C and D
3. Number of Medicaid claims filed for children enrolled in Medicaid who receive testing or nursing assessment visits. E and F

11182015 FLINT BLOOD LEAD CM - weekly status tracking form

From: Moran, Susan (DHHS)
Sent: Wednesday, October 07, 2015 12:17 PM
To: Miller, Corinne (DHHS)
Cc: Robinson, Mikelle (DHHS)
Subject: Re: next week

Thank you for your leadership on this evolving situation.

Sent from my iPhone

On Oct 7, 2015, at 11:44 AM, Miller, Corinne (DHHS) <MillerC39@michigan.gov> wrote:

> I thought I would be off next week but have decided to be here at least for the first part of the week. Epidemiology needs to meet with CLPPP regarding further data provision on the Flint situation and we can get that done on Monday or Tuesday of this coming week. In addition, I need to talk with Wes further about the EBL investigations and hopefully he will have completed the one-page prospectus by the end of this week for Linda's review regarding funding EBL investigations for lead poisoned children in Flint.
>
> Corinne

From: Moran, Susan (DHHS)
Sent: Friday, October 09, 2015 9:53 AM
To: Peeler, Nancy (DHHS);Robinson, Mikelle (DHHS)
Subject: Fwd: EBL investigation budget request
Attachments: Environmental Blood Lead Investigations Flint Budget 10 2015 LDD (3) (2).docx; ATT00001.htm

Sent from my iPhone

Begin forwarded message:

> **From:** "Miller, Corinne (DHHS)" <MillerC39@michigan.gov>
> **Date:** October 8, 2015 at 3:32:24 PM EDT
> **To:** "Stephen, Kimberly (DHHS)" <STEPHENK@michigan.gov>
> **Cc:** "Moran, Susan (DHHS)" <MoranS@michigan.gov>, "Dykema, Linda D. (DHHS)" <DykemaL@michigan.gov>, "Priem, Wesley F. (DHHS)" <priemw@michigan.gov>
> **Subject: EBL investigation budget request**
>
> Kim,
>
> Per your request, attached are estimated budgets for EBL investigations, toxicology staff support, and printing of materials. Options 1 and 2 are different proposals for hiring EBL investigators. Option 2 requires using private sector firms for the investigations. We have a quote from one by e-mail and another called in a bid. The call was from a new firm and their bid was low enough to cause concern. It was clear they didn't know what they were doing. Option 2 also includes moving one of our enforcement staff to 50% funding with any new supplemental funds to facilitate community work and provide oversight to the work of the private contractors.
>
> We have also budgeted time for toxicology staff (Jennifer Gray) and an environmental health educator (Michelle Bruneau). Both are on federal funds and we found out the funder will not allow us to dedicate their time to Flint because Flint-specific activities are outside the scope of the federal funding objectives. Their work will be critical to this effort.
>
> Option 1 + toxicology + health education + outreach materials = $ 626,936
>
> Option 2 + toxicology + health education + outreach materials = $ 441,976
>
> If you have questions please contact me and if I am not available please reach out to Linda Dykema or Wes Priem.
>
> Corinne Miller, PhD
> State Epidemiologist and Director
> Bureau of Disease Control, Prevention and Epidemiology
> Michigan Department of Health and Human Services
> 201 Townsend Street
> Lansing, Michigan 48913
> Telephone: 517-335-8900

Fax: 517-335-8263

MDHHS Division of Environmental Health

City of Flint Budget Proposal
10/8/2015

Elevated Blood Lead (EBL) Environmental Investigations

Approximately 250 homes will need EBL investigation over the next year based on current SOM data and the projected increased of testing in the high risk and surrounding zip codes in the city of Flint. If fewer homes require investigation, excess funds could be moved to abatement. Average cost to abate a home is $10,500.

Qualifications for EBL endorsed home inspector:

1. Inspector/Risk Assessor Certification:
    a. Complete core lead basics course
    b. Lead Inspector Course
    c. Lead Risk Assessor Course
    d. Bachelor's Degree and at least 1 year of experience in construction or environmental field
    e. Associates Degree and at least 2 years of related experience in construction or environmental field
    f. Professional certification of Industrial hygienist , professional engineer, registered architect or other safety or environmental field based upon 4 year college degree
2. Pass EBL State Examination

Common practice is the best suited individual for this work has both knowledge of housing construction principles and environmental investigation experience.

Option1. MDHHS can utilize the existing master agreement with SEMHA to hire EBL investigators.

Budget Line Items	Cost per FTE	Comments	Total (4) Positions
Salary	$50,000	50-60 homes each per year	$200,000
Fringe	$20,000	40%	$80,000
Travel	$5,000	Millage, food	$40,000
Laboratory Analysis	$19,800	$27.50 =State Rate, $10.00 =Private lab	$79,200
XRF lead analyzer	$25,000		$100,000
Supplies and materials	$4,000	Computer, paper, labels, cell phone, CDs	$16,000
Indirect	$4,940	5% of total contract (excluding XRF purchase)	$19,760
Total	**$128,740**	**Total**	**$534,960**

Option 2: Alternatively, MDHHS could contract directly with various private firms with existing expertise to conduct EBL investigations under SOM oversight.

Budget Item	Cost
250 homes at $1,100 per home	$275,000
SOM Program Oversight, 50 % Courtney Wisinski (Industrial Hygienist)	$75,000
Total	**$350,000**

Technical Support Staff:

Toxicological expertise will be needed to address the complexity of exposures to lead in drinking water, soil, lead paint and other media. All current staff in the Toxicologist classification are supported by federal grants that will not allow them to work on the city of Flint drinking water problem, thus other support is needed. The Toxicologist will work in cooperation with the MDEQ Office of Water.

In addition, support is requested for a health educator to develop public health educational materials and coordinate outreach efforts with other SOM and local agencies.

Note: Because the technical issues are complex, hiring new staff to conduct these activities is not prudent or recommended.

Budget Item	Cost
SOM Toxicologist, 25% Jennifer Gray, Phd	$34,976
Contractual (MPHI) Health Educator, 25% Michelle Bruneau, MA	$32,000
Total	**$66,976**

Material Costs for Community Outreach Efforts:

$25,000 in funds will be needed to produce and print pamphlets, brochures and other outreach materials. Cost estimates can be provided at a later date.

From: Robinson, Mikelle (DCH)
Sent: Wednesday, February 25, 2015 2:29 PM
To: Moran, Susan (DCH)
Subject: RE: Lead question from budget hearing

I'm getting ready to send the questions out. I'll ask staff to send their responses to Cheryl to compile.

-----Original Message-----
From: Moran, Susan (DCH)
Sent: Wednesday, February 25, 2015 2:05 PM
To: Robinson, Mikelle (DCH)
Subject: FW: Lead question from budget hearing

Will you coordinate our responses (or Cheryl)

-----Original Message-----
From: LyonCallo, Sarah (DCH)
Sent: Wednesday, February 25, 2015 1:55 PM
To: Moran, Susan (DCH); Anderson, Paula (DCH)
Cc: McKane, Patricia (DCH); Miller, Corinne (DCH); Travis, Rashmi (DCH)
Subject: Lead question from budget hearing

4.5 percent of children under age 6 who were tested had blood lead levels of 5 micrograms per deciliter or higher.
0.5 percent had levels of 10 or higher.

Sent from my iPhone

From: Robinson, Mikelle (DHHS)
Sent: Tuesday, October 13, 2015 7:02 AM
To: Moran, Susan (DHHS)
Subject: Re: EBL PRoposal Table

Will do.

Sent from my iPad

On Oct 12, 2015, at 9:34 PM, Moran, Susan (DHHS) <MoranS@michigan.gov> wrote:

> Please handle
>
> ---
>
> **From:** Miller, Corinne (DHHS)
> **Sent:** Monday, October 12, 2015 5:08 PM
> **To:** Moran, Susan (DHHS)
> **Cc:** Wells, Eden (DHHS); Robinson, Mikelle (DHHS); Priem, Wesley F. (DHHS); Dykema, Linda D. (DHHS)
> **Subject:** FW: EBL PRoposal Table
>
> Did you want to send the attached table to Kim or wait until she reaches out to the program areas regarding the supplemental funding for Flint?
>
> When I spoke to Kim Stephen last week about a budget for the supplemental funding, I indicated that Wes had solicited some bids from private firms to do the EBL investigations in Flint.
>
> At that time, he had received one written proposal that was forwarded to Kim and had also received a phone call from another company.
>
> Kim indicated that as long as Wes had reached out to several firms, even if there had been no response, that was sufficient. She was going to contact DTMB to see if we could contract with a firm/s directly rather than going through an RFP process given the situation.
>
> ---
>
> **From:** Priem, Wesley F. (DHHS)
> **Sent:** Monday, October 12, 2015 4:39 PM
> **To:** Dykema, Linda D. (DHHS); Miller, Corinne (DHHS)
> **Cc:** Wisinski, Courtney (DHHS)
> **Subject:** EBL PRoposal Table
>
> See attached chart on bids for EBL investigations.
>
> <EBL PRoposal Table.docx>

From: Robinson, Mikelle (DHHS)
Sent: Wednesday, October 14, 2015 1:57 PM
To: Moran, Susan (DHHS)
Subject: RE: PLan for notes from calls
Attachments: 10-13-15_Daily Activity Summary, Internal Call.docx

Yes, Jon sent me his notes a few minutes ago. I tweaked them a bit. Let me know if you need more detail or have corrections.

From: Moran, Susan (DHHS)
Sent: Wednesday, October 14, 2015 1:49 PM
To: Robinson, Mikelle (DHHS)
Subject: FW: PLan for notes from calls

And these need to pass through you for review before they get tome.

From: Miller, Mark (DHHS)
Sent: Wednesday, October 14, 2015 1:34 PM
To: Moran, Susan (DHHS)
Cc: Robinson, Mikelle (DHHS); Gonzalez, Jonathan (DHHS)
Subject: PLan for notes from calls

Sue, as discussed I take responsibility for not having those notes from the 1230 meeting on Tuesday.

That being said, here is the plan:

For the 12:30 meetings: Jon will take notes, assemble, and have available for approval by Sue by 3 PM. Assuming approval, we'll have Cheryl email to the folks on the call by 5 PM the same day.

For the 3:00 meetings: Jon will take notes, assemble, and have available for approval by Sue by 9 AM the next morning. Assuming approval, we'll have Cheryl email to the folks on that call by 10 AM.

Population Health and Community Services Administration
Flint Water Daily Briefing Summary

Daily Briefing
PPI
Access Code: PPI

Date: *10-13-15*
Attendees: Sue Moran, Mikelle Robinson, Linda Dykema, Mark Miller, Corinne Miller, Rashmi Travis, Nancy Peeler, Linda Scott, Kris Schoenow, Eden Wells, Jennifer Lixey, Richard Thelen, Elizabeth Hertel, Sheryl Thompson, and Geralyn Lasher

Daily Activity Summary

Filter/Water Distribution

- Sheryl Thompson will be the DHHS lead instead of Richard Thelen.
- There are two methods being utilized to collect filter distribution data. Kris Schoenow and GCHD are discussing how to collect the same data fields on GCHD's cloud-based database.
- Filter distribution at four sites started on October 6th
- United Way purchased filters for schools and some filters have been distributed to daycares in the city. Using the Genesee County Community Action Resource Department.
- GCHD has helped distribute ~4,000 filters, supplied by the United Way, to individuals with chronic diseases and other vulnerable populations.
- All LHD filters have been provided by the United Way.
- 9000 filters have been ordered and the next step for them is to start to plan the replacement phase for those that picked up filters.
- Some sites have distributed water pitcher filters. These will have different replacement filters.

Blood Testing

- Nancy Peeler has protocol in place to address prioritizing populations for testing
- A protocol for blood testing is to be developed by Eden Wells, Rashmi Travis, Nancy Peeler, Toni LaRocco (GCHD) and Dr. Gary Johnson (GCHD)
- Protocol to be ready by Oct 14
- 151 children from all Flint zip codes have been identified with previous blood lead levels of 5 or over since April, 2014.
    - 85% of the children are Hurley patients. 92% of the children receive Medicaid.
    - 75 of the children need venous draws; 76 need venous retesting.

EBL Investigations

- There are two options: hire investigators through SEMHA or contract with a vendor.

- Contracting with a vendor appears to be the most cost-effective solution. Hiring and training investigators would be time prohibitive.
- Several bids were collected and shared with the budget office.

Communications

- The Frequently Asked Questions (FAQ) that was derived from information collected by GCHD is waiting on approval from MDHHS Communications.
- An infographic is currently being developed and will be submitted to MDHHS Communications for approval.
- All external communications need to go through MDHHS Communications; however, internal communications, such as epidemiological reports, are to be sent to Eden.

From: Robinson, Mikelle (DHHS)
Sent: Tuesday, October 20, 2015 2:11 PM
To: Moran, Susan (DHHS)
Subject: Fwd: Draft Action Plan
Attachments: MDHHS Action Plan Flint EBL_Oct20.docx; ATT00001.htm

Let me know if you have changes.

Sent from my iPad

Begin forwarded message:

> **From:** "Gonzalez, Jonathan (DHHS)" <GonzalezJ6@michigan.gov>
> **Date:** October 20, 2015 at 1:54:35 PM EDT
> **To:** "Miller, Mark (DHHS)" <millerm1@michigan.gov>
> **Cc:** "Robinson, Mikelle (DHHS)" <RobinsonM18@michigan.gov>
> **Subject: RE: Draft Action Plan**
>
> Attached for your review
>
> ---
>
> **From:** Miller, Mark (DHHS)
> **Sent:** Tuesday, October 20, 2015 1:20 PM
> **To:** Gonzalez, Jonathan (DHHS)
> **Cc:** Robinson, Mikelle (DHHS)
> **Subject:** FW: Draft Action Plan
>
> Can you fit the below into some modified version of the attached. ASAP????
>
> Thax
>
> mark
>
> ---
>
> **From:** Robinson, Mikelle (DHHS)
> **Sent:** Tuesday, October 20, 2015 12:23 PM
> **To:** Miller, Mark (DHHS) <millerm1@michigan.gov>
> **Subject:** FW: Draft Action Plan
>
> This is the short version that she wants input into the attached chart.
>
> Over the last week, DHHS (PHCSA) actions focused on supporting Genesee County Health Department and other state departments in coordinating:
>
> **Filter/Water Distribution:**
> -changes to the cloud-based database to compile all records of filters distributed and type of filter (in preparation for replacement filter distribution)
>
> **Blood testing and Case Management Follow-up:**

-protocol finalized for blood testing and follow-up
-protocol development for case management of confirmed children with EBL 5 and over (will be finalized by Friday)
-contract (project)via e-grams to GCHD for nurse case management

Elevated Blood Level Investigations:
-bids taken and contract development underway for contractor to conduct investigations in homes with elevated blood lead (EBL)

Communications:
-completion of FAQ and Infographic for posting on the Governor's website
-assisted MDARD on development of communication to food service establishment re: City of Flint water
-development of a letter and resources for schools to send to parents (education and encouraging testing) and a letter to providers, daycares, and Head Start Programs
-outreach to area laboratories regarding reminder of lead reporting requirements
-daily internal calls and daily calls with GCHD
-response to public phone calls about the Flint water issue

Miscellaneous:
-support to DEQ for water testing in the schools developing protocol for water testing and screening levels for evaluation of water data of schools
-participate (Linda and Eden) in the Mayor's Technical Advisory Committee and in weekly subcommittee meetings to address water sampling efforts in Flint schools
-began discussions on evaluation metrics and reporting for investigations and case management

Michigan Department of Community Health (MDHHS) Flint Water Action Plan

Action	Local Lead	MDHHS Lead	Tasks
Filter/Water Distribution	Tamara Brickley (Genesee County Health Department-GCHD)	Sheryl Thompson, MDHHS	- Coordination of distribution (GCHD) - Identify at-risk sub-groups (GCHD) - Amend cloud-based filter database to compile all records of filters distributed (including filter type) in preparation for replacement filter distribution - Ordering filter replacements (MDHHS)
Blood Testing	Tony LaRocco (GCHD) Possible partners: - Hurley - Great Flint Health Coalition - MIHP - LHD - Schools	Dr. Eden Wells/ Nancy Peeler (CLPPP)	- Test all ○ Students 0-16 ○ Priorities: ▪ 3 schools ▪ 2 zip codes ▪ ages 0-15 - Convene meeting with GCHD and all potential partners (MDHHS) ○ Partner with schools- information about testing sites options distributed through school districts to parents ○ Partner with Great Flint Health Coalition-network to develop testing sites and information about testing to healthcare providers ○ Partner with Hurley/McClaren/Genesys ○ Partner with MIHP/Home Visiting Program - Confirm that the state lab has capacity to handle increase in tests- - Blood testing and follow-up protocol has been finalized - Develop protocol for case management of confirmed children with EBL >5 - Contract (project) via EGRAMS to GCHD for nurse case management
Case Management Follow Up	Tony LaRocco (GCHD)	Eden Wells/ Nancy Peeler (CLPPP)	- Identification of all current positives- confirmatory testing for > 5 mcg/dl (as of April 2014) - Maintain registry of all tests performed (-/+)

			- Follow-up all cases >5 mcg/dl with the CLPP Case Management protocol
Elevated Blood Level Investigations(all > 5 mcg/dl)	Dawn Hallwood (GCHD)	Linda Dykema	- Secure financial resources necessary to support environmental health response - Follow-up CLPPP to see if immediate funds available - Recommendation to contract with Lead Investigation company thru SEMHA-licensed investigators - Bids taken and contract development underway for contractor to conduct investigations in homes with elevated blood level (EBL)
Communications	Hilda McShane (GCHD)	Geralyn Lasher	- Daily MDHHS and GCHD phone calls (3PM) - Provide provider education- links sent for Governor's site to GCHD 10/12 - Provide public education - Provide risk education - Provide links with lead prevention information to Flint - Completion of FAQ and infographic for dissemination on Governor's website - Assisted MDARD on development of communication to food service establishments - Development of a letter and resources for schools to send to parents (educational materials to encourage testing) and a letter to providers, daycares, and Head Start programs - Outreach to area laboratories regarding reminder of lead reporting requirements - Daily internal calls and daily external calls with GCHD - Response to public phone calls about the Flint water situation
Miscellaneous	TBD	TBD	- Provide support to DEQ for water testing in the schools, development of water testing protocol, and screening levels for evaluation of water data of schools - Participate in the Flint Mayor's Technical Advisory Committee and in weekly

			subcommittee meetings to address water sampling efforts in Flint schools - Began discussions on evaluation metrics and reporting for investigations and case management

From: Robinson, Mikelle (DHHS)
Sent: Tuesday, October 20, 2015 2:22 PM
To: Moran, Susan (DHHS)
Subject: RE: Draft Action Plan

Will do.

From: Moran, Susan (DHHS)
Sent: Tuesday, October 20, 2015 2:17 PM
To: Robinson, Mikelle (DHHS)
Subject: Re: Draft Action Plan

Can you send this directly to Geralyn- cc me. And send her the bulleted short version too

Sent from my iPhone

On Oct 20, 2015, at 2:10 PM, Robinson, Mikelle (DHHS) <RobinsonM18@michigan.gov> wrote:

> Let me know if you have changes.
>
> Sent from my iPad
>
> Begin forwarded message:
>
> **From:** "Gonzalez, Jonathan (DHHS)" <GonzalezJ6@michigan.gov>
> **Date:** October 20, 2015 at 1:54:35 PM EDT
> **To:** "Miller, Mark (DHHS)" <millerm1@michigan.gov>
> **Cc:** "Robinson, Mikelle (DHHS)" <RobinsonM18@michigan.gov>
> **Subject: RE: Draft Action Plan**
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> **Cc:** Robinson, Mikelle (DHHS)
> **Subject:** FW: Draft Action Plan
>
> Can you fit the below into some modified version of the attached. ASAP????
>
> Thax
>
> mark
>
> ---
>
> **From:** Robinson, Mikelle (DHHS)
> **Sent:** Tuesday, October 20, 2015 12:23 PM

To: Miller, Mark (DHHS) <millerm1@michigan.gov>
Subject: FW: Draft Action Plan

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Filter/Water Distribution:
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-began discussions on evaluation metrics and reporting for investigations and case management

<MDHHS Action Plan Flint EBL_Oct20.docx>

From: Robinson, Mikelle (DHHS)
Sent: Wednesday, October 21, 2015 9:00 AM
To: Peeler, Nancy (DHHS)
Subject: FW: update from Eden

FYI.

From: Robinson, Mikelle (DHHS)
Sent: Wednesday, October 21, 2015 9:00 AM
To: Lyon, Nick (DHHS)
Cc: Moran, Susan (DHHS); Grijalva, Nancy (DHHS)
Subject: update from Eden

Eden has spoken with Tony LaRocco and Dr. Mona Hanna-Attisha, and neither of them are aware of any children from Flint being hospitalized for lead toxicity. Both felt that they would have heard if that is the case. Just to be sure, Eden is planning to call the two other Flint area hospitals this morning to determine if they have admitted any children for this. We will keep you updated.

From: Robinson, Mikelle (DHHS)
Sent: Wednesday, October 28, 2015 2:37 PM
To: Moran, Susan (DHHS)
Subject: FW: Week 10-28-15_Action Plan
Attachments: Week 10-28-15_Action Plan LDD.docx

I'll clean this up before sending to Nick. Any changes? Eden said she'd take a look but I haven't heard back from her on it yet.

From: Robinson, Mikelle (DHHS)
Sent: Wednesday, October 28, 2015 2:21 PM
To: Dykema, Linda D. (DHHS)
Subject: RE: Week 10-28-15_Action Plan

I've highlighted additional comments. Please review and let me know if I should change any of it. Thanks!

From: Dykema, Linda D. (DHHS)
Sent: Wednesday, October 28, 2015 1:17 PM
To: Robinson, Mikelle (DHHS)
Subject: RE: Week 10-28-15_Action Plan

From: Miller, Mark (DHHS)
Sent: Wednesday, October 28, 2015 12:41 PM
To: Wells, Eden (DHHS); Robinson, Mikelle (DHHS); Dykema, Linda D. (DHHS)
Cc: Robinson, Mikelle (DHHS)
Subject: Week 10-28-15_Action Plan

I've updated this "grid" based on the meetings we had on Tuesday.

I'm sure all three of you have more to add.

Send any edits to **MIKELLE by 2 PM,** as this has to be to **Nancy G. by 3 PM.**

Thax

Mark

Flint Water Public Health Response: MDHHS Action Plan

Updated 10-28-15

TASK	STATUS	ACTION	DATE COMPLETED
Filter Distribution	Residents may continue to obtain filters from GCCARD (both sites 9-4PM) and MDHHS clients can continue to obtain filters at the two MDHHS office locations or the GCCARD sites. As of October 22, DHHS/GCCARD has issued 9728 filters, 95 pitchers.	No action indicated, informational only.	NA
Filter Replacement Distribution	The procedure is in place for replacement cartridge distribution including an abbreviated application for residents to apply for and obtain cartridge replacement. Cartridge replacement will occur at same locations as filter sites. DHHS is also placing an order for 750 replacement filters for the 8-cup Zerowater filters. 9000 Brita replacement filters on hand with an additional 10,000 readily available when needed. Total available= 19,000 **MDHHS is currently coordinating with GCARD on publicity for distribution of the replacement filters.**	DHHS and GCCARD will begin issuing the replacement filters the week of November 2nd.	**Pending**
Public Education Proper Filter Use	When used improperly, the filters will exceed their capacity limit in a much shorter time frame thereby increasing need for filter replacement much sooner than expected. Develop NEW public education material about proper use of cartridge AND how to obtain filter replacement cartridges, targeted for release week of October 26 during lead awareness week.	Jen Eisner will work with Hilda McShane	**Estimated completion date: 10-26-15**
	Video created with Home Depot demonstrating replacement of the Brita replacement filter.	The video will be posted on the gov/flintwater website.	**Pending**
Lead Testing Protocol:	Draft protocol has been completed, undergoing final review. Protocol calls for testing: Priority groups- • Confirmatory venous testing for children who had venous testing (115 children)	Protocol being cleared with Governor's Office.	**Pending**

TASK	STATUS	ACTION	DATE COMPLETED
	• Children in day care, Head Start • children attending 3 schools (Freeman, Eisenhower, Brownell) • Children residing in high risk zip codes (03, 04) • All other students **Protocol will be announced in a joint MDHHS/GCHD Press release.**		
Lead Testing: 9/28/15-10/23/15	CLPPP processed 580 tests from Flint zipcodes since 9-28-15; 5 children were reported with elevated lead blood levels. ***There are currently 147 children that have been identified for follow-up.***	**MDHHS has arranged a contract with the GCHD to provide nurses for the follow-up.**	**Contract in Egrams as of 10-23-15**
	Cross reference list of children with elevated lead levels with filter distribution data to ensure household has a filter. (Peeler/Scott) ~~So far only about 20% of the 147 children with EBL are known to have received a filter. GCHD will deliver filters to these homes as they are doing the case follow up. GCHD will provide weekly updates.~~	Send list to Kris S	**Pending**
	Would like to obtain the student list from the three schools and cross reference with our lead testing data to determine children tested/not tested **A group will develop reporting metrics and system to track same: Linda Dykema, Wes Priem, Michele Bruneauo, ~~Linda Scott~~, Bob Scott** ~~Linda is working on an analysis of blood lead tests done since 9-28-25. Epi will assist with this analysis. It was suggested that it would be helpful to have a non-government epidemiologist review the data before it is released.~~	Hertel to contact MDE	**Estimated completion date: 10-26-15**
Parent education	**Parent education material completed.** Discuss dissemination of parent material through Flint schools.	Call with Flint school superintendent, GCHD, and MDHHS scheduled 10-26-15 to discuss dissemination process.	~~**Pending**~~
	Schools require 6000+ information packets for distribution to all students. Print order sent to DTMB. **Hardcopy will be distributed to GCHD for issuing to the schools, and to Headstart, daycare, and other agencies in Flint with children ages 0-5.**	Geralyn Lasher arranged for printing.	**Done** **Expect hardcopy delivery by 11-2-15.**

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TASK	STATUS	ACTION	DATE COMPLETED
	Mark will drop off hard copies at GCHD. Toni LaRocco will take the lead in distribution of the materials to the schools and other agencies.		
	Ensure legislators receive material in advance	Elizabeth Hertel coordinate legislator notification	
Provider Education	**Provider Education material completed.** Communication to providers will occur through GCHD and MDHHS networks (GCMS, GCARD, hospitals, etc).MDHHS will distribute through the Medicaid Health Plans. **Documents are complete.**	**Mark Valacek Wells/Peeler** **Electronic distribution through various listservs is pending. (all parties).**	**Week of 10-26-15**
Community public education and testing event	McLaren Health Plan in conjunction with GCHD hosting a public testing and awareness event on November 5 at the Burton GCHD site. McLaren will have providers on site to perform testing for their members; GCHD onsite to perform testing for all others. Event will also include Medicaid application assistance. Tony Larocco (GCHD) has contacted Molina and Meridian Health Plan regarding sponsorship of community testing and awareness event. Molina and Meridian Health Plan testing dates to be determined. **GCHD will be at a community event on Nov. 12, from 2 PM to 7 PM, to focus on testing for children 0-5. (Brownell and Holmes Schools)>**	**Elizabeth will follow up with Molina**	
	There will be a combination school testing/townhall/eduation event, sponsored by Rep. Nealy, on Nov. 2nd. **A telephonic townhall is slated for Oct. 28 by Rep. Neely.**		
Environmental	$275 k contract with ETC requested on Oct. 21st, 2015.	Wes Priem to finalize	

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TASK	STATUS	ACTION	DATE COMPLETED
Investigation	**Wes will work with GCHD to coordinate with Flint Housing/other authorities to deal with recalcitrant landlords.** ~~DEH meeting on 11/5 with MDEQ staff to harmonize EBL investigation protocol with water testing protocol.~~	contract with MDHHS Contracts.	
Nurse Follow Up	Project sent to Contracts for inclusion in Egrams 10-23-15. 10-21-15 Funding for case management nurses will be disseminated to GCHD through new project: *Flint Water*, for $425,000 through the Comprehensive Contract Egrams system, to fund the: Follow-up of Children Reported with Elevated Lead Levels: Case Management Services. GCHD advised to secure approvals for use of these funds and begin procedures to place staff in appropriate positions to conduct the work. **GCHD has shifted one nurse over for follow-up. That nurse if fully trained on elevated lead patient management. 1.5 nurse FTE's will be assigned and trained on 11-10-15. We expect 2~~an~~other in place by the end of November**.	Eden will contact Bob to send the list to Toni at GCHD so they can facilitate case management of children with elevated lead levels (**done).** ~~Contract approved by GCHD Board on 10/26~~	**10/27**
Water Testing	DEQ will be testing at Freeman Elementary the week of 10-26-15, with plans to expand to 14 schools. Residential testing will have a different protocol. GCHD has been in contact with DEQ to possibly assist in sampling. Linda Dykema has a draft Executive Summary for Health-Based Drinking Water Lead Levels developed. Once testing is completed, this document will serve as a decision guide on reopening of school and/or daycare water fountains/faucets for student use. ~~Linda will revise the model to include paint chip values/risk levels.~~ **GCHD sanitarians are assisting DEQ with water sampling.**	No action indicated, informational only – DEQ.	
Misc.	**Letter from 2 Sn. and one congressman sent to USDA to inquire regarding use of Ready to Feed formula**. **United Way ~~looking to get~~applying for Americorp Volunteers to help with the**		

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TASK	STATUS	ACTION	DATE COMPLETED
	efforts.		

From: Robinson, Mikelle (DHHS)
Sent: Friday, November 06, 2015 4:03 PM
To: Moran, Susan (DHHS)
Cc: Anderson, Paula (DHHS)
Subject: RE: 3 pm Genesee County Water Call Notes 11.5.15
Attachments: Flint Action Plan 11-6-15.docx

I've updated the chart. Geralyn and Linda have reviewed for accuracy. Do you have any changes before I send to Nick?

From: Moran, Susan (DHHS)
Sent: Friday, November 06, 2015 3:26 PM
To: Robinson, Mikelle (DHHS)
Subject: Fwd: 3 pm Genesee County Water Call Notes 11.5.15

Please update the action plan to reflects this week updates/activities

Sent from my iPhone

Begin forwarded message:

> **From:** "Rockefeller, Cheryl (DHHS)" <RockefellerC@michigan.gov>
> **Date:** November 6, 2015 at 3:10:36 PM EST
> **To:** "Anderson, Paula (DHHS)" <AndersonP3@michigan.gov>, "Gonzalez, Jonathan (DHHS)" <GonzalezJ6@michigan.gov>, "Hertel, Elizabeth (DHHS)" <HertelE@michigan.gov>, "Lasher, Geralyn (DHHS)" <lasherg@michigan.gov>, "Mark Valacak (mvalacak@gchd.us)" <mvalacak@gchd.us>, "Miller, Mark (DHHS)" <millerm1@michigan.gov>, "Moran, Susan (DHHS)" <MoranS@michigan.gov>, "Ridley, Nancy (DHHS)" <RidleyN@michigan.gov>, "Robinson, Mikelle (DHHS)" <RobinsonM18@michigan.gov>, "Schoenow, Kris (DHHS)" <SchoenowK@michigan.gov>, "Sims, Teri (DHHS)" <SimsT2@michigan.gov>, "Tamara Brickey (tbrickey@gchd.us)" <tbrickey@gchd.us>, "Thompson, Sheryl D. (DHHS)" <ThompsonS2@michigan.gov>, "Toni Larocco tlarocco@gchd.us" <tlarocco@gchd.us>, "Travis, Rashmi (DHHS)" <TravisR@michigan.gov>, "Wells, Eden (DHHS)" <WellsE3@michigan.gov>
> **Subject: RE: 3 pm Genesee County Water Call Notes 11.5.15**
>
> Good Afternoon,
>
> The correct 3 pm notes are attached. I apologize for the inconvenience.
>
> Thank you,
> Cheryl

Flint Water Public Health Response: MDHHS Action Plan

Updated 110-286-15

TASK	STATUS	ACTION	DATE COMPLETED
Filter Distribution	Residents may continue to obtain filters from GCCARD (both sites 9-4PM) and MDHHS clients can continue to obtain filters at the two MDHHS office locations or the GCCARD sites. **As of ~~October 29,~~ November 5, DHHS/GCCARD distributed over 13,469 filters.** ~~has issued 9880 filters and pitchers.~~	No action indicated, informational only.	NA
Filter Replacement Distribution	The procedure is in place for replacement cartridge distribution including an abbreviated application for residents to apply for and obtain cartridge replacement. Cartridge replacement will occur at same locations as filter sites. DHHS is also placing an order for 750 replacement filters for the 8-cup Zerowater filters. 9000 Brita replacement filters on hand with an additional 10,000 readily available when needed. Total available= 19,000 MDHHS is currently coordinating with GCARD on publicity for distribution of the replacement filters. United Way will provide Pur Filter Replacements. **United Way will also be purchasing filter units for school water fountains.**	DHHS and GCCARD will begin issuing the replacement filters the week of November 2nd. Press release planned Monday 11/2 re:pick up of replacement filters, videos to be posted on websites and you tube	~~Pending~~Ongoing Completed 11/2
Public Education Proper Filter Use	When used improperly, the filters will exceed their capacity limit in a much shorter time frame thereby increasing need for filter replacement much sooner than expected. Develop NEW public education material about proper use of cartridge AND how to obtain filter replacement cartridges, targeted for release week of October 26 during lead awareness week. **Request made for written instructions on filter cartridge replacements**	Jen Eisner will work with Hilda McShane **Linda D. will draft and share with media**	Completed

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TASK	STATUS	ACTION	DATE COMPLETED
	for nurse case managers to take on home visits.	office for finalizing.	Pending
	Video created with Home Depot demonstrating replacement of the Brita replacement filter. -DEQ receiving questions about meters on the water filter pitchers delivered to the schools which are likely Zerowater Filters.	The video ~~will be posted~~added ~~on~~ to the gov/flintwater website. Angela will work on instructions. Video will be added to nurse training-CLPPP.	Completed 11/2 Pending Training scheduled for 11/10
Lead Testing Protocol:	Draft protocol has been completed, undergoing final review. Protocol calls for testing: Priority groups- • Confirmatory venous testing for children who had venous testing (115 children) • Children in day care, Head Start • children attending 3 schools (Freeman, Eisenhower, Brownell) • Children residing in high risk zip codes (03, 04) • All other students Protocol will be announced in a joint MDHHS/GCHD Press release.	Press release -has been cleared with Governor's Office.	Completed 10-28
Blood Lead Testing: 9/28/15-10/23/15	CLPPP processed 580 tests from Flint zip codes since 9-28-15; 5 children were reported with elevated lead blood levels. There are currently 147 children that have been identified for follow-up.	MDHHS has arranged a contract with the GCHD to provide nurses for the follow-up.	Contract completed in E-grams as of 10-23-~~15~~
	Cross reference list of children with elevated lead levels with filter distribution data to ensure household has a filter. (Peeler/Scott) So far only about 20% of the 147 children with EBL are known to have received a filter. GCHD will deliver filters to these homes as they are doing the case follow-up. GCHD will provide weekly updates.	Send list to Kris S (done)	~~i~~ In process
	Would like to obtain the student list from the three schools and cross	Hertel to contact MDE	~~Estimated completion date:~~

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TASK	STATUS	ACTION	DATE COMPLETED
	reference with our lead testing data to determine children tested/not tested A group will develop reporting metrics and system to track same: Linda Dykema, Wes Priem, Michele Bruneau,, Bob Scott Group met to discuss metrics. plan to produce first detailed report for internal review the week of Nov. 9th A simplified version for external dissemination will be released after internal review. Linda is working on an analysis of blood lead tests done since 9-28-25. Epi will assist with this analysis **Still fine-tuning the report.**		~~**11-2-15**~~ **Pending** **November 9**
Parent education	Parent education material completed. Discuss dissemination of parent material through Flint schools.	Call with Flint school superintendent, GCHD, and MDHHS scheduled 10-26-15 to discuss dissemination process.	**Completed**
	Schools require 6000+ information packets for distribution to all students. Print order sent to DTMB. Hardcopy will be distributed to GCHD for issuing to the schools, and to Headstart, daycare, and other agencies in Flint with children ages 0-5. Mark will drop off hard copies at GCHD. Toni LaRocco will take the lead in distribution of the materials to the schools and other agencies.	Geralyn Lasher arranged for printing.	~~10-30-15~~ 10/30 printing completed and Mark dropped off 6,000 copies at the Flint School Admin. Building., and 2,500 to health dept. Remainder ~~will be~~ dropped off on ~~Monday~~11/2.
	Ensure legislators receive material in advance	Elizabeth Hertel coordinate legislator notification	Completed

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TASK	STATUS	ACTION	DATE COMPLETED
Provider Education	Provider Education material completed. Communication to providers will occur through GCHD and MDHHS networks (GCMS, GCARD, hospitals, etc).MDHHS will distribute through the Medicaid Health Plans. Hurley providers received the packet and the remainder of providers will receive the information next week.	Mark Valacek Wells/Peeler Electronic distribution through various listservs next week.	completed 10/30~~/15~~ Completed 11/2
Community public education and testing event	McLaren Health Plan in conjunction with GCHD host~~inged~~ a public testing and awareness event on November 5 at the Burton GCHD site. **39 children were tested.** McLaren will have providers on site to perform testing for their members; GCHD onsite to perform testing for all others. Event will also include Medicaid application assistance. Tony Larocco (GCHD) has contacted Molina and Meridian Health Plan regarding sponsorship of community testing and awareness event. Molina and Meridian Health Plan testing dates to be determined. GCHD will be at a community event on Nov. 12, from 2 PM to 7 PM, to focus on testing for children 0-5. (Brownell and Holmes Schools)> **Molina doesn't have the staff to offer lead testing events.**	**Request that Molina send out a letter to members with kids between 0-2 to encourage testing. Mark requested sample letter from GCHD and will follow-up with Medicaid.~~Elizabeth will follow up with Molina~~**	**Pending**
	There will be a combination school testing/townhall/education event, sponsored by Rep. Neeley, on Nov. 2nd. A telephonic townhall is slated for Oct. 28 by Rep. Neely. Gongwer reported that 4,000 people participated in this call.		
Environmental Investigation	$275 k contract with ETC requested on Oct. 21st, 2015. Wes will work with GCHD to coordinate with Flint Housing/other	Wes Priem to finalize contract with MDHHS Contracts.	Contract

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TASK	STATUS	ACTION	DATE COMPLETED
	authorities to deal with recalcitrant landlords. DEH meeting on 11/5 with MDEQ staff to harmonize EBL investigation protocol with water testing protocol.		completed 10/29/~~15~~
Nurse Follow Up	Project sent to Contracts for inclusion in E-grams 10-23-15. 10-21-15 Funding for case management nurses will be disseminated to GCHD through new project: *Flint Water*, for $425,000 through the Comprehensive Contract E-grams system, to fund the: Follow-up of Children Reported with Elevated Lead Levels: Case Management Services. GCHD advised to secure approvals for use of these funds and begin procedures to place staff in appropriate positions to conduct the work. GCHD has shifted one nurse over for follow-up. That nurse if fully trained on elevated lead patient management. 1.5 nurse FTE's will be assigned and trained on 11-10-15. ~~Mark V. said that the nurses will start a week earlier than expected. Rashmi will look into whether training can occur earlier than the 10th.~~ **Lead Safe Home Program worked with GCHD on protocol to harmonize the flow of outreach to families with children with elevated blood levels.**	Eden will contact Bob to send the list to Toni at GCHD so they can facilitate case management of children with elevated lead levels (done). Contract approved by GCHD Board on 10/26	Completed 10/27
Water Testing	DEQ will be testing at Freeman Elementary the week of 10-26-15, with plans to expand to 14 schools. Residential testing will have a different protocol. GCHD has been in contact with DEQ to possibly assist in sampling. Linda Dykema has a draft Executive Summary for Health-Based Drinking Water Lead Levels developed. Once testing is completed, this document will serve as a decision guide on reopening of school and/or daycare water fountains/faucets for student use. Linda -will revise the model to include paint chip values/risk levels. GCHD sanitarians are assisting DEQ with water sampling.	No action indicated, informational only – DEQ. **Need to decide the health threshold for school water testing.**	Pending

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TASK	STATUS	ACTION	DATE COMPLETED
Misc.	City of Flint is asking when the county will lift the emergency order. Jim Henry from GCHD mentioned he was hearing some concerns raised again about Legionella. Eden said that Jim Collins can help address this. Mark V. said that an extensive data analysis was done on this previously and it isn't an issue. DEQ gave permission to increase phosphate levels in the water temporarily. Some health concerns might be raised about this particularly for infants. Dr. Eden Wells said that it is unlikely to cause health problems but we can add information on the FAQ to help reassure citizens. **DEQ is planning to release its school water testing results on 11/9. EPA will be releasing a report 11/10 from its expedited review of the response.**	Add a statement on the FAQ document on phosphates ~~FYI only~~~~Add a statement on the FAQ document on phosphates?~~	~~11/6~~~~Pending~~

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From: Robinson, Mikelle (DHHS)
Sent: Friday, November 13, 2015 2:26 PM
To: Moran, Susan (DHHS)
Subject: 11:00 call notes
Attachments: MDHHS Genesee County_Water_Daily Call Notes_Oct 13 2015.docx

Do you want to review?

MDHHS – Genesee County Health Department

3PM Conference Call Notes, October 13, 2015

Attendees: Sue Moran, Mikelle Robinson, Eden Wells, Mark Miller, Mark Valacak (Health Officer), Elizabeth Hertel, Geralyn Lasher, Sheryl Thompson, Kris Schoenow, and Jon Gonzalez

GCHD Update:

Central Point of Communication/Coordination

- The United Way held a meeting with community partners today and the GCHD announced it would be acting as the communication hub.
- GCHD is working with the United Way to create a dissemination list for updates.
- The School Board President has been joining the meetings at the United Way and discussions with contacts at private and charter schools are occurring to supply them with filters.
- GCHD advised that they will proceed with a daily briefing at 4:00PM.

Filter Tracking System

- GCHD and Kris Schoenow (MDHHS) are working to expand the cloud-based database to include all needed information so that one database can be used to track filter distribution.
- It is important that the database track the types of filters provided since replacement filters need to be distributed to these families in a couple of months.
- The database will be used to cross reference the list of kids with elevated blood levels to ensure these households receive filters.

MDHHS Update:

Protocol for Identifying and Prioritizing Children that Require Testing and Case Management

- 151 children from all Flint zip codes have been identified with previous blood lead levels of 5 or over since April, 2014.
- 85% of the children are Hurley patients. 92% of the children receive Medicaid.
- 75 of the children need venous draws; 76 need venous retesting.
- Eden Wells, Rashmi Travis, Nancy Peeler, Toni LaRocco (GCHD) and Dr. Gary Johnson (GCHD) will work together to develop the testing and case management protocols.

- Possible completion date of protocol by October 14th.
- U of M Flint, and McLaren Health are interested in assisting with capillary lead testing. Public health students can also assist as needed.
- Training may be needed on the protocols and data reporting.
- There was discussion about parental requests to test older children. The risk based protocol will be customized given the situation.
- The environmental assessment protocol is currently available on the MDHHS website.

Funding

- Still awaiting approval of the supplemental funding request.

Communication

- There was discussion about communication/engagement with providers.
- Geralyn is working on a list of providers and partners list.
- She will work with Hilda on the dissemination of information to the appropriate groups and the community.
- The new lead toolkit has been completed and was sent to Mark today via links.
- An FAQ document has been created and is awaiting approval. An infographic also is in development.
    - Once approved, both the infographic and FAQ will be sent to Mark and posted to the site.

NEXT STEPS/ACTION ITEMS

- Completion of the testing and case management protocol
- Continue daily state-local update calls
- Send FAQ to Mark Valacak once it has been approved by MDHHS Communications
- Completion of changes to the filter distribution database.

From: Robinson, Mikelle (DHHS)
Sent: Wednesday, October 21, 2015 8:19 AM
To: Lyon, Nick (DHHS)
Cc: Grijalva, Nancy (DHHS)
Subject: FW: Lead Issue in Flint - TEST RESULTS ARE IN

Importance: High

FYI.

From: Peeler, Nancy (DHHS)
Sent: Tuesday, October 20, 2015 5:28 PM
To: Miller, Mark (DHHS); Dykema, Linda D. (DHHS); Priem, Wesley F. (DHHS); Moran, Susan (DHHS); Wells, Eden (DHHS)
Cc: Robinson, Mikelle (DHHS); Travis, Rashmi (DHHS); Fink, Brenda (DHHS)
Subject: RE: Lead Issue in Flint - TEST RESULTS ARE IN
Importance: High

Good afternoon – we have received test results from the lab for the family whose situation we discussed at 8:30am. Both parents and all 4 children have levels < 3 based on venous testing (basically, < 3 means below the detectible limit). Good news for all!

Nancy

-----Original Appointment-----
From: Miller, Mark (DHHS)
Sent: Monday, October 19, 2015 5:29 PM
To: Miller, Mark (DHHS); Dykema, Linda D. (DHHS); Priem, Wesley F. (DHHS); Peeler, Nancy (DHHS); Moran, Susan (DHHS); Wells, Eden (DHHS)
Subject: Lead Issue in Flint
When: Tuesday, October 20, 2015 8:30 AM-9:00 AM (UTC-05:00) Eastern Time (US & Canada).
Where: Conference Call

Can we have a conference call on Tuesday, Oct. 20th, from 8:30 to 9:00 AM, to discuss the below situation in Flint?

For folks in CV, you can come up to my office on the 6th floor if you'd like……..

PPI

xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

From Linda Dykema:

I just spoke with the dog's owner and have his contact information.

They live in 48503 and they are on Flint water.

They have a 2-year old male dog who lost a lot of weight in a short period of time and they sought vet care. The dog's blood tested at a level of 409...not sure of the units, but the owner read from a vet report that said anything over 350 was considered lead toxicosis. They also have a 4-year old female dog who previously had 2 successful liters, but who delivered a single still born pup this morning (they would like the pup tested/autopsied but cannot afford the cost).

The adult female in the house is pregnant (1st trimester) and there are children <6 years living there as well. Father says he called GCHD a week and a half ago and was told to 1) see their family Dr., and 2) GCHD would call them back. To date no call back. All family members had venous draw today for lead testing. Dr. has told them to not use the water for bathing.

They received a filter from city of Flint. They sent a filtered water sample to a lab somewhere (man wasn't sure where) and the results indicate the filter doesn't work (man did not recall the lead level found).

Linda

From: Moran, Susan (DHHS)
Sent: Monday, October 19, 2015 4:53 PM
To: Signs, Kimberly (DHHS); Stobierski, Mary Grace (DHHS); Miller, Corinne (DHHS); Miller, Mark (DHHS)
Cc: Wells, Eden (DHHS); Dykema, Linda D. (DHHS)
Subject: RE: Call-Lead Toxicity in a Dog

Ok- so who does the follow up with family---is that us(MDHHS) or the health dept?

From: Signs, Kimberly (DHHS)
Sent: Monday, October 19, 2015 4:49 PM
To: Stobierski, Mary Grace (DHHS); Miller, Corinne (DHHS); Moran, Susan (DHHS); Miller, Mark (DHHS)
Cc: Wells, Eden (DHHS); Dykema, Linda D. (DHHS)
Subject: Call-Lead Toxicity in a Dog

MDHHS has been notified this afternoon of a family from the Flint area whose dog was diagnosed with lead toxicity. I received a voice message from Dr. Michele Schalow with MDARD about this case, and Eden Wells was contacted by Linda Dykema, who was also informed of this case. At this time, I don't have any information about the dog or why it was tested, but information is that the testing was performed at MSU's Diagnostic Center for Population and Animal Health. Eden is getting ready to board a plane, so asked me to notify everyone. The family of the dog includes children and a pregnant woman. Her thought is that the family needs to be tested asap. Kim

Kimberly Signs, DVM
Emerging and Zoonotic Infectious Disease Section
Bureau of Disease Control, Prevention, and Epidemiology
Michigan Department of Health and Human Services
201 Townsend St., Capitol View Building, 5th Floor, Lansing, MI, 48913
(517) 335-8165 (517) 335-8263 signsk@michigan.gov www.michigan.gov/mdch

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From: Moran, Susan (DHHS)
Sent: Tuesday, October 27, 2015 5:17 PM
To: Grijalva, Nancy (DHHS);Lyon, Nick (DHHS)
Subject: FW: Daily Activity Summary of 12:30 pm Call 10.27.15
Attachments: 12.30 pm 10-27-15_Daily Activity Summary.docx

Summary from our internal team call today.

From: Rockefeller, Cheryl (DHHS)
Sent: Tuesday, October 27, 2015 4:58 PM
To: Moran, Susan (DHHS); Robinson, Mikelle (DHHS); Wells, Eden (DHHS); Miller, Mark (DHHS); Miller, Corinne (DHHS); Dykema, Linda D. (DHHS); Peeler, Nancy (DHHS); Priem, Wesley F. (DHHS); Fink, Brenda (DHHS); Travis, Rashmi (DHHS); Gonzalez, Jonathan (DHHS); Lixey-Terrill, Jennifer (DHHS); Thelen, Richard (DHHS); Scott, Robert L. (DHHS); Schoenow, Kris (DHHS); Lasher, Geralyn (DHHS); Hertel, Elizabeth (DHHS); Scott, Linda (DHHS); Scott, Robert L. (DHHS)
Cc: Anderson, Paula (DHHS); Bouters, Janese (DHHS); Barr, Jacqui (DHHS); Mayes, Nanette (DHHS)
Subject: Daily Activity Summary of 12:30 pm Call 10.27.15

Good Afternoon,

Attached is the summary of the 12:30 pm call from 10/27/15.

Thank you,
Cheryl

Population Health and Community Services Administration
Flint Water 10-27-15 Briefing Summary

Daily Briefing

PPI
Access Code: PPI

Attendees: Sue Moran, Mikelle Robinson, Eden Wells, Geralyn Lasher, Mark Miller, Linda Dykema, Nancy Peeler, Wes Priem, Linda Scott, Bob Scott, Corinne Miller, and Jon Gonzalez

Daily Activity Summary

Filter/Water Distribution

- Currently coordinating with GCCARD to determine timing of public announcement when the replacement filters will be available. It is anticipated that a public announcement will occur next week.

Lead Testing Protocol: Provider/Parent Education

- Waiting on a quote from Dr. Gary Johnson (GCHD) to include in press release.
- Waiting on branding efforts (combining MDHHS and GCHD letterhead) on the materials, as well.
- Both provider/parent education materials will be announced in the same press release.
- All materials would be sent to the GCHD for dissemination into the community, with the schools distributing the bulk of the parent materials.
- The provider material will disseminated electronically.
- A second-tier notification list was discussed. It could include: 211, Home Visitors, MDE Office of Great Start, Early Childhood Investment Corporation, DLARA Childcare Licensing, and State-level partners.
- Elizabeth Hertel will notify three (3) Flint-area legislators once the materials are disseminated.
- Planning meeting Thursday 10/29 with Rep Neely, school superintendent, and GCHD for community event on November 12. Focus is on children 0-5.

Print/Copying Costs

- It will cost $10,000 to print 12,000 copies of the materials.

Lead Testing Results

- Need to develop common set of metrics for aggregate tracking and reporting information.
    - A sub-group will develop a model reporting format: Linda Dykema, Wes Priem, Michelle Bruno, Linda Scott, and Bob Scott.

EBL Investigations

- Results from water testing at Freeman Elementary School indicated that there are potentially easy fixes to bring the school into compliance with whatever threshold value is ultimately selected. This is the first of three (3) schools to have its water tested.

- Wes Priem advised that the contract with ETC is pending a discussion with MDHHS Budget. ETC is has been advised that there will be a maximum of 250 sites to visit.
- Since 60-70% of all properties in Flint are rentals, there is some concern about not getting compliance from landlords to complete onsite visits. Wes Priem may have to coordinate efforts with Flint housing and/or the Genesee County Prosecutor.

Nurse Capacity

- GCHD advised that they currently have a nurse acting as coordinator.
- 1.5 FTE has been identified and will be trained 11-10-15.

Funding

- The EBL Investigation contract with ETC is pending a discussion with MDHHS Budget.

Misc.

- Michigan members of the US Congress issued a letter to get the USDA to clarify the use of Ready to Feed formula.
- The Flint Lead Innovation Team, a group comprised of members from Hurley, Michigan State University, and others, mentioned in the press. Two prominent members quoted have been Dr. Dean Sienko (MSU) and Dr. Mona Hanna-Attisha (Hurley).
- We'll continue briefings twice per week after this week in short term.

From: Moran, Susan (DHHS)
Sent: Tuesday, October 27, 2015 5:29 PM
To: Grijalva, Nancy (DHHS);Lyon, Nick (DHHS)
Subject: FW: 3 pm 10-27-15_Daily Activity Summary
Attachments: 3 pm 10-27-15_Daily Activity Summary.docx

These are notes from our 3PM call with Genesee County Health Dept.
Would you like to receive two separate documents or a summary document that highlights activities from our internal call and call with GCHD? Both internal team summary and the GCHD call summary documents are sent to Geralyn and Elizabeth. What would best meet your needs?
My plan is to update the action plan on Friday, at the end of the week, but we can do that on a daily basis as well.

From: Miller, Mark (DHHS)
Sent: Tuesday, October 27, 2015 5:20 PM
To: Moran, Susan (DHHS); Robinson, Mikelle (DHHS)
Subject: 3 pm 10-27-15_Daily Activity Summary

Notes from 3 PM call.

Population Health and Community Services Administration
Genesee County Health Department - Flint Water Bi-Weekly Briefing Summary

Daily Briefing

PPI

Access Code: PPI

Attendees: Sue Moran, Mikelle Robinson, Mark Miller, Bob Scott, Sheryl Thompson, Mark Valacak, Geralyn Lasher, Toni LaRocco, and Jon Gonzalez

Daily Activity Summary

Filter/Water Distribution

- GCHD intends on starting filter replacement distribution efforts next week; however, they currently leave a replacement when the first filter is initially installed.
- GCHD wants clients to bring in the old filters when they get a replacement to make sure the correct replacement product is issued (Brita vs. Pur).

Lead Testing Protocol

- GCHD has received the list of 147 clients identified as having elevated blood lead levels for follow-up.
- Only ~20% of the 147 individuals for follow-up are known to have received a water filter through the GCHD.
- GCHD currently does not have the list to show which of the 147 individuals that are known to have received a filter; however, they will provide weekly updates on the progress of increasing that percentage once they receive the list.

Lead Testing Protocol (Parents)

- The schools have agreed to distribute the materials to parents.
- Once the materials are delivered to Toni LaRocco, the GCHD will take lead on distribution.

Community Events

- An event with Molina is still being organized.
- A telephonic town hall event will be held on 28 October and hosted by US Rep. Dan Kildee.
- Another town hall is scheduled for 2 November and will be hosted by State Rep. Sheldon Neeley. Details are limited at present; however, it is believed the event will occur at the Bethel United Methodist Church.
- On 12 November, there will be an event at Brownell and Holmes Schools in the northwest portion of town.

Contract

- The contract with GCHD was entered into EGRAMS on Friday and the Genesee Board of Commissioners approved it during a special meeting on 26 October.
- Mark Miller is working on payment options with MDHHS Contracts.

Misc.

- Valacak advised that the number of public inquiries about water in Flint has decreased recently.
- Students attending schools of choice (a school outside of their school district) are a concern. Grand Blanc contacted GCHD to discuss filters for students residing in Flint.
- The United Way is looking to get ~8 Americorps volunteers to assist with community outreach activities, enrolling clients into WIC, and adding capacity to Wes Priem's operations.

Nurse Capacity

- GCHD advised that 2.5 FTE nurses will be trained and available on 10 November. The hiring and training dates for the last 1.0 FTE are to be determined.

Funding

- The EBL Investigation contract with ETC is pending a discussion with MDHHS Budget.

Misc.

- The Flint Lead Innovation Team, a group comprised of members from Hurley, Michigan State University, and others, has started gaining attention in the press. Two prominent members quoted have been Dr. Dean Sienko (MSU) and Dr. Mona Hanna-Attisha (Hurley).
- We'll plan on call briefings to occur twice per week after this week.
- Per the GCHD, education and testing at Brownell/Holmes Schools, from 3-7PM on November 12 for children ages 0-5. This event is in addition to the event at Burton (GCHD) on November 5.

From: Moran, Susan (DHHS)
Sent: Friday, December 11, 2015 10:33 AM
To: Lyon, Nick (DHHS)
Cc: Grijalva, Nancy (DHHS)
Subject: Talking Points for Monday

- Dr Mona H-A concerned about/focused on ensuring there is a system to in place to support long range follow up of Flint area children. The system needs to include tracking, enhanced services (such as referral to Early On for young children) , coordination of enhanced services, provider awareness, etc.
- MSU Flint, College of Human Medicine, MSU College of Human Medicine and MSU Ext resources supporting Mona's work by providing scientific and technical resources, nutritional recommendations and cooking demonstrations, brainstorming how to address long- term planning, etc. Dr Wells hasbeen a part of a few of these meetings as well. MDHHS has reviewed and is reviewing the educational resources being developed by Mona's group and MSU Extension.
- MDHHS working with Hurley/Dr Mona H-A to execute data use agreement that would allow MDHHS to exchange lead screening data with Hurley. Data will be used for GIS mapping and identification of case clusters etc. This will enhance efforts to accelerate testing/case management of at risk families, it also provides data that can be used for long range follow up of children.
- MDHHS scheduled to meet MDE in early January to discuss coordination between health system and educational system in support of long range follow up.

From: Frost, Erik (DHHS)
Sent: Friday, December 18, 2015 12:40 PM
To: Lyon, Nick (DHHS)
Cc: Grijalva, Nancy (DHHS)
Subject: Readable FOIA response
Attachments: FW: State data confirms higher blood-lead levels in Flint kids

Attached is the only e-mail you need to review. The 2 unreadable documents had this same e-mail in it 3 times, which is why those documents were so long. Those duplicative, unreadable documents have now been removed and replaced by the attached. While the end does still get narrow, it's now readable.

We thought this it was common sense that the FOIA documents that go out should be readable, but to ensure this doesn't happen again, we have added our FOIA processing manual to now read:

"Review the documents received from the program area. If the documents are not readable or are not properly formatted, contact the program area and require the program area to send readable or properly formatted documents."

Thanks for alerting us and sorry about that.

Erik

From: Peeler, Nancy (DHHS)
Sent: Friday, December 18, 2015 9:16 AM
To: Frost, Erik (DHHS)
Subject: FW: State data confirms higher blood-lead levels in Flint kids

---

From: LyonCallo, Sarah (DCH)
Sent: Monday, September 28, 2015 10:05 AM
To: Peeler, Nancy (DCH) <PeelerN@michigan.gov>
Cc: McKane, Patricia (DCH) <McKaneP@michigan.gov>; Fink, Brenda (DCH) <FinkB@michigan.gov>
Subject: Re: State data confirms higher blood-lead levels in Flint kids

nancy - i will be in touch with you and bob via email shortly. please work with me until patti gets back, ccing patti.

Sent from my iPad

On Sep 28, 2015, at 9:59 AM, Peeler, Nancy (DCH) <PeelerN@michigan.gov> wrote:

Can you give us your cell number? Bob and I have a number of questions about the data you need pulled.

Sent from my iPhone

On Sep 28, 2015, at 9:45 AM, McKane, Patricia (DCH) <McKaneP@michigan.gov> wrote:

I believe Sarah's point was that we should have been brought in before count data was provided to Angela and others and released to the press, not after.
Cristin is well aware of the need to analyze data, now.
Also if you are having difficulty reaching Cristin, I would recommend contacting me, Sarah or Virginia. Email or cell phone works best for me as I'm rarely at my desk.

Sent from my iPhone

On Sep 28, 2015, at 7:35 AM, Peeler, Nancy (DCH) <PeelerN@michigan.gov> wrote:

We've also been trying to reach Cristin – it wasn't clear to us whether she knew about this assignment, which this email indicates she does. We appreciate that confirmation. I will pass this info on to Bob Scott. We appreciate if you can please keep Bob, as the CLPPP Surveillance Manager who has extended knowledge about this data, in the loop. He can then update me as needed.

Nancy

From: LyonCallo, Sarah (DCH)
Sent: Monday, September 28, 2015 9:19 AM
To: Fink, Brenda (DCH)

Cc: Peeler, Nancy (DCH); McKane, Patricia (DCH)
Subject: Re: State data confirms higher blood-lead levels in Flint kids

Dear Brenda,

After seeing Gongwer on Friday AM, I contacted Corinne to understand what was going on, Linda Dykema and Angela later pulled in Epidemiology. I come out of environmental health (cut my teeth on superfund site in a politically complex area) and can appreciate sensitivity on multiple fronts, as well as appreciating the analyses of data at the local level (well done).

It would benefit all of us for epidemiology staff to be pulled in as quickly as possible in the future, so that Patti and I can assist Cristin, that we can weigh in on design issues, and we can make sure that we are not at cross purposes when Angela requests a response. Cristin's response will take some time.

Cristin and I discussed an approach on Friday before we received the report from Angela with the updated counts. We will take a look this AM and revise our approach.

Sarah

Sent from my iPad

On Sep 28, 2015, at 8:45 AM, Fink, Brenda (DCH) <FinkB@michigan.gov> wrote:

Obviously this is uber high profile---so we just need to be sure we're about the data, which as you and Sarah likely know, is under a lot of scrutiny because some of the local folks have different data (done differently, lots of issues----just this involves people who care deeply about the community, Larry Reynolds who is now on our iM Exec Team, etc) I'm just saying sensitivity to the local people who are so concerned about the babies there based on what they have for data is a context that is important, beyond the high profile and other issues . My comment has nothing to do with the data itself. Just the context of very concerned people. Doesn't impact our data . . . obviously. It's just there's a people side to this issue that sometimes gets lost when something becomes so politicized. Just for us, I guess.

Brenda Fink, A.C.S.W.
Director, Division of Family and Community Health
Michigan Department of Health and Human Services
109 W. Michigan Ave.
Lansing, MI 48933
517-335-8863
Fax: 517-335-8697
finkb@michigan.gov

From: Peeler, Nancy (DCH)
Sent: Monday, September 28, 2015 7:54 AM
To: McKane, Patricia (DCH)
Cc: Fink, Brenda (DCH); LyonCallo, Sarah (DCH)
Subject: Fwd: State data confirms higher blood-lead levels in Flint kids

Good morning Patti, looping you in FYI. Wanted you to be aware of this as Cristins supervisor.

Sent from my iPhone

Begin forwarded message:

From: "Minicuci, Angela (DCH)" <MinicuciA@michigan.gov>
Date: September 27, 2015 at 9:29:49 PM EDT
To: "Wells, Eden (DCH)" <WellsE3@michigan.gov>
Cc: "Lasher, Geralyn (DCH)" <lasherg@michigan.gov>, "Moran, Susan (DCH)" <MoranS@michigan.gov>, "Peeler, Nancy (DCH)" <PeelerN@michigan.gov>, "Robinson, Mikelle (DCH)" <RobinsonM18@michigan.gov>, "Hertel, Elizabeth (DCH)" <HertelE@michigan.gov>, "Eisner, Jennifer (DCH)" <EisnerJ@michigan.gov>
Subject: Re: State data confirms higher blood-lead levels in Flint kids

I've asked our lead epidemiologist to look at the data closer than what was in the charts to get a handle on this. The epi is Cristin Larder.

Sent from my iPhone

On Sep 27, 2015, at 5:39 PM, Wells, Eden (DCH) <WellsE3@michigan.gov> wrote:

Given not sure what % children tested, etc.

Sent from my iPhone

On Sep 27, 2015, at 5:34 PM, Wells, Eden (DCH) <WellsE3@michigan.gov> wrote:

Thanks--DFP is looking at tests positive/number of tests done-- not sure that this is a reliable measure used by our program. Await input from Nancy or Linda.

Sent from my iPhone

On Sep 27, 2015, at 5:26 PM, Lasher, Geralyn (DCH) <lasherg@michigan.gov> wrote:

Yes. We provided the graphs with the narrative bullet points.

Sent from my iPad

On Sep 27, 2015, at 5:20 PM, Wells, Eden (DCH) <WellsE3@michigan.gov> wrote:

Geralyn- were the graphs shown outside of MDHHS?

Sent from my iPhone

On Sep 27, 2015, at 5:06 PM, Moran, Susan (DCH) <MoranS@michigan.gov> wrote:

Sorry - hit send too soon.
Copying Lynda and Corrine- not sure who in Epi or CLPPP has been point person on state's data.

Sent from my iPhone

On Sep 27, 2015, at 2:11 PM, Lasher, Geralyn (DCH) <lasherg@michigan.gov> wrote:

We will need help responding to what the Free Press is claiming in this article.

Sue--let us know who can get us this as early Monday as possible.

State data confirms higher blood-lead levels in Flint kids

http://www.freep.com/story/opinion/columnists/nancy-kaffer/2015/09/26/state-data-flint-lead/72820798/

Sent from my iPad

From: Danieli, Sharon (DHHS)
Sent: Tuesday, December 22, 2015 9:35 AM
To: Lyon, Nick (DHHS)
Cc: Grijalva, Nancy (DHHS)
Subject: News Articles - Morning of 12/22/15

GONGWER:

Virginia Tech Researcher Claims Stonewalling On Lead Data

The Department of Health and Human Services had data that showed there were elevated lead levels in Flint's water, but delayed in releasing that data to others for review, Virginia Tech professor Marc Edwards said in an article posted to his website documenting the city's water crisis.
Department officials agreed and said the experience led to changes in how they examine data.

Mr. Edwards said the department had data from shortly after Flint changed its water source that showed a spike in blood lead levels in children in two at-risk neighborhoods, but did not disclose that data until September 2015. "They discovered scientifically conclusive evidence of an anomalous increase in childhood lead poisoning in summer 2014 immediately after the switch in water sources, but stood by silently as Michigan Department of Environmental Quality (MDEQ) officials repeatedly and falsely stated that no spike in blood lead levels (BLL) of children had occurred," he said in the post.

DHHS spokesperson Jennifer Eisner agreed the department had data that showed the spike, but said its analysis at the time overlooked factors that, in retrospect, would have shown there was a water quality problem. "When initially looking at the citywide and county elevated blood lead level numbers, the increase appeared to be consistent with the seasonal fluctuation seen in the summer months," Ms. Eisner said. "It wasn't until the Hurley report came out that our epidemiologists took a more in-depth look at the data by ZIP code, controlling for seasonal variation, and confirmed an increase outside of normal trends. As a result of this process, we have determined that the way we analyze data collected needs to be thoroughly reviewed."

Mr. Edwards said DHHS officials also stonewalled him on getting access to that data. He said data he had gotten easily in 2006 documents for a similar review took several weeks to receive after his request sent September 2. When he did finally receive the data, he said it was a version that omitted the lead level spike from summer 2014 that the department had created in July. He said a series of emails he received under a recent Freedom of Information Act request showed and intention by DHHS officials to keep the reports from the public. "Our FOIA reveals a shocking DHHS graph created in October 2015. It shows the statistically significant spike in blood lead that occurred in summer 2014 - the scientific result that DHHS has never publicly acknowledged," Mr. Edwards said in his post.

Ms. Eisner said the department has worked to make the data available. "Summary reports outlining blood lead level testing are posted online on a bi-weekly basis, and we work closely with local partners to fulfill data requests as we receive them," she said.

- See more at: http://www.gongwer.com/programming/news.cfm?newsedition_id=5424901#sthash.iGEYv4UV.dpuf

Feds Praise State's Child Welfare Progress

The federal government complimented the changes made to the state's child welfare services, saying it is leading to more vulnerable children finding safe and permanent homes, according the Department of Health and Human

Services. U.S. Administration for Children and Families Commissioner Rafael Lopez recognized a variety of changes made to the child welfare system, a statement from DHHS said. The state's Children's Services Agency oversees protective services, foster care, adoption and juvenile justice systems. "The successful completion of this program improvement plan is a milestone for both Michigan and ACF," Mr. Lopez wrote. "It represents dedication and commitment from staff at every level."

The federal government told the state in 2009 it was not in compliance with federal guidelines, and the state has been working on improving its child welfare system since then. The statement said when Governor Rick Snyder took office in 2011, he made improving the state's child welfare system one of his top goals, and now the state has succeeded in meeting the federal goals, leading to potential federal penalties of at least $2.8 million being rescinded. "I am proud of the progress that Michigan has made in taking care of children who have been abused and neglected," Mr. Snyder said. "It is gratifying to know that the U.S. Administration for Children and Families has recognized the reforms we have implemented. We have more work to do, but there is no doubt that Michigan's vulnerable children receive better services today than they did five years ago."

The letter demonstrates that Michigan is succeeding in providing coordinated services to vulnerable children and families, said DHHS Director Nick Lyon. "We want kids in the state's child welfare system to safely return to their homes or find a loving, permanent home through adoption if it's determined it is not safe for them to be reunited with their parents," he said. "There are about 13,000 children in Michigan's foster care system at any given time who have been removed from their homes due to abuse or neglect."

- See more at: http://www.gongwer.com/programming/news.cfm?newsedition_id=5424901#sthash.iGEYv4UV.dpuf

Newly published study gives more evidence of elevated lead in Flint kids **(Flint Journal)**

Michigan Medicaid system hits the cloud **(Lansing State Journal)**

Michigan meets child welfare goals **(Lansing State Journal)**

MIRS:

Lyon: Achieving Vision For DHHS Merger Could Need Federal Changes

Nearly a year after the massive merger of the state's health and human services departments, its leader said some state and local silos have fallen as a result, but more need to follow -- including at the federal level.

The creation of the Michigan Department of Health and Human Services (DHHS) was the big administrative story earlier this year after Gov. Rick SNYDER announced he wanted to merge the two biggest state departments into one gigantic one (See "Snyder Pens Order Creating New Department of Health & Human Services," 2/6/15).

DHHS Director Nick **LYON**, in a year-end interview with *MIRS*, said the merger has bore fruit already, including the state better serving people whose needs overlap the two halves of DHHS.

For instance, when it comes to foster care children, the state is working to make sure kids who are removed from their homes -- a human services function -- get hooked up with a behavioral health provider and a primary care physician.

"There is no doubt that a child removed is going to suffer some sort of trauma from that event," Lyon said. "And we need to treat them as quickly as possible."

Another area Lyon is looking at is making eligibility seamless for Medicaid recipients who need food assistance.

And while Lyon said field offices across the state have gotten a better handle on the various programs offered through DHHS, he said the state still faces a "silo system" when it comes to local public health departments and community mental health agencies, although he said there's been some communication improvements there.

The goal of creating DHHS in the first place -- according to Snyder, Lyon and other state officials -- was to move to a system built around treating the "whole person" rather than just categorizing clients into various assistance programs.

One roadblock to this: The federal government hasn't necessarily adopted the same model, and the DHHS has to deal with a lot of federal programs in different places.

"We're still dealing with siloed federal programs, so the question is, do we build a program that deals with the siloed programs, or do we try to break down those silos at the federal level? And we're going to attack it in both places," Lyon said.

Asked if it was realistic to accomplish the DHHS vision by changing how the federal government works, Lyon replied quickly, "Completely realistic."

"We have an obligation - if we see something that can be improved, regardless of where that issue may be, I think . . . states have the obligation to stand up and try to do something," he said.

Lyon said the federal government has "embraced" the ideas presented by the DHHS.

"I am certainly encouraged by how my federal partners have reacted to much of what we're trying to do," he said.

Snyder and the administration have previously mentioned applying for various waivers to cut through federal programming. Lyon said DHHS has been able to get around this through conversations with the feds.

"We've been able to work with the federal government to ask for things without a waiver," he said.

This give-and-take between the state and the federal government was apparent recently when the feds granted approval to a waiver for the Healthy Michigan Plan, which allows Michigan's customized Medicaid expansion program to continue (See "Feds, State Reach Compromise To Keep Healthy Michigan In Place," 12/17/15).

The final approval appeared to mark a compromise between what is called for in state law regarding the Healthy Michigan Plan, and what the feds wanted preserved in their vision for Medicaid expansion.

State Testing In Flint To Continue: The DHHS role in the state's response to the Flint water crisis has involved testing of children and adults for lead, which became a problem after the city switched its water supply to the Flint River for more than a year.

Lyon touched on the Flint issue briefly, saying the state would continue testing (See "Bits And Tidbits," 12/11/15).

He said the next priority for the DHHS is "following up and ensuring that children who have elevated blood lead levels, that we are doing everything we can to reduce those blood lead levels."

Feds: State Meeting Marks On Child Welfare Improvements

A federal report released today found that Michigan has met goals set for improving the state's child welfare system.

However, the report won't have any bearing on the ongoing negotiations between the state and an advocacy organization to lift different court-ordered requirements on Michigan's child welfare system.

Today, the Michigan Department of Health and Human Services (DHHS) received a letter from the feds saying the state has achieved all the goals in a federally implemented "program improvement plan."

The state has been working with the U.S. Administration for Children and Families (ACF) since 2009, when federal officials said the state was not in compliance, according to a press release.

Now, the feds say vulnerable children are safer and are finding permanent homes more quickly.

"The successful completion of this program improvement plan is a milestone for both Michigan and ACF," said Rafeal **LOPEZ**, commissioner of the ACF. "It represents dedication and commitment from staff at every level."

In 2008, the state first reached a settlement with the advocacy group Children's Rights, which brought a class action suit against the state regarding its child welfare system.

As a result of the settlement, the DHHS has had to meet a number of objectives through periodic reports delivered to a federal court (See "Michigan Score On Child Welfare Report Tied to Computer Problems," 4/13/15).

Earlier this year, the state embarked on renegotiating the terms with Children's Rights (See "State, Advocates To Renegotiate Child Welfare Oversight," 2/20/15).

Those negotiations are still ongoing, and DHHS Director Nick **LYON** described the talks as going "quite well" in a recent interview (See related story).

With the release of this report noting the state's improvements in child welfare, Children's Rights spokesperson Wende Gozan **BROWN** said it wouldn't have any bearing on the negotiations. She said the program improvement plan required by the feds is different.

The state said much of the same, saying the benchmarks met in the ACF plan "do not directly affect" the court oversight.

Asked if this report could gain the state any leverage in its negotiations with Children's Rights, the state said no, because the two issues aren't tied together.

As a result of the ACF letter today, the state is off the hook for at least $2.8 million in potential federal penalties, which have been rescinded.

Michigan meets, exceeds federal goals for child welfare system

"LANSING, Mich. – Vulnerable Michigan children are safer and are finding permanent homes more quickly through improvements to the state's child welfare system, according to the U.S. Administration for Children and Families (ACF). "

Source: *Department of Health and Human Services* **Date:** *12-22-2015* **Link:** *http://mirsnews.com/pdfs/Press_Releases/1450721616_dhhs.pdf*

Families urged to provide a safe sleep space for baby during holiday travel

"LANSING, Mich. – With the holidays around the corner, it's a busy time of year often spent traveling away from home for visits. For families with babies, travel can be especially hectic and it can be hard to remember all of the necessities. One item to put at the top of your list is a safe space for baby to sleep when you're away from home."

Source: *Department of Health and Human Services* **Date:** *12-22-2015* **Link:** *http://mirsnews.com/pdfs/Press_Releases/1450714302_dhhs.pdf*

Rep Lawrence passes ESEA amendment to benefit foster youth

"WASHINGTON, D.C. – Rep. Brenda Lawrence has passed an amendment requiring the U.S. Secretary of Education to track the educational progress of foster youth in America, a key measure that will protect hundreds of thousands of foster care students across America."

Source: *Rep. Brenda Lawrence* **Date:** *12-22-2015* **Link:** *http://mirsnews.com/pdfs/Press_Releases/1450730611_lawrence.pdf*

Thanks,

Sharon

From: Peng, Qian (DCH)
Sent: Monday, February 24, 2014 9:36 AM
To: Embry, Sheila (DCH);Stiffler, Kathleen A. (DCH);Fink, Brenda (DCH);Peeler, Nancy (DCH);Scott, Robert (DHS);Christian, Stella (DCH);Edwards, Cynthia (DCH);McCandless, Karla K. (DCH);Zavala, Rita (DCH);Hadar, Sandy (DCH);Fitton, Stephen (DCH);Geiger, Terry (DCH);Bien, Stan (DCH);Kahn, Heather (DCH)
Subject: February 2014 Blood Lead Testing Report
Attachments: 201402.pdf; February 2013 - February 2014 - PPC.pdf

Attached you will find the February 2014 Medicaid Blood Lead Testing report.

This report is produced on a monthly basis. The purpose of the Blood Lead Testing Report is to provide information on blood lead testing in the Medicaid population.

Effective October, 2010, Medicaid Health Plans were contractually required to ensure that at least eighty (80) percent of continuously enrolled two (2) year old children have had at least one (1) blood lead test on/or before their second birthday.

Effective August 1, 2012, McLaren Health Plan assumed CareSource Michigan's Medicaid operations in Michigan.

For February 2014:

- 5 out of 13 met the continuous enrollment requirement.

An additional report, **February 2013 – February 2014 - PPC.pdf**, demonstrates the progress that each health plan has made on "two year olds" blood lead tested over the past 12 months.

Please feel free to contact Qian (Daisy) Peng at 517-241-1388 or PengQ@Michigan.gov if you have any questions or concerns regarding these reports.

Thank you.

Medical Services Administration
Office of Medicaid Health Information Technology

MEDICAID BLOOD LEAD TESTING

February 2014

Produced by Data Management & Security Section
Office of Medicaid Health Information Technology
Cynthia Green-Edwards, Director

Blood Lead Testing Methodology

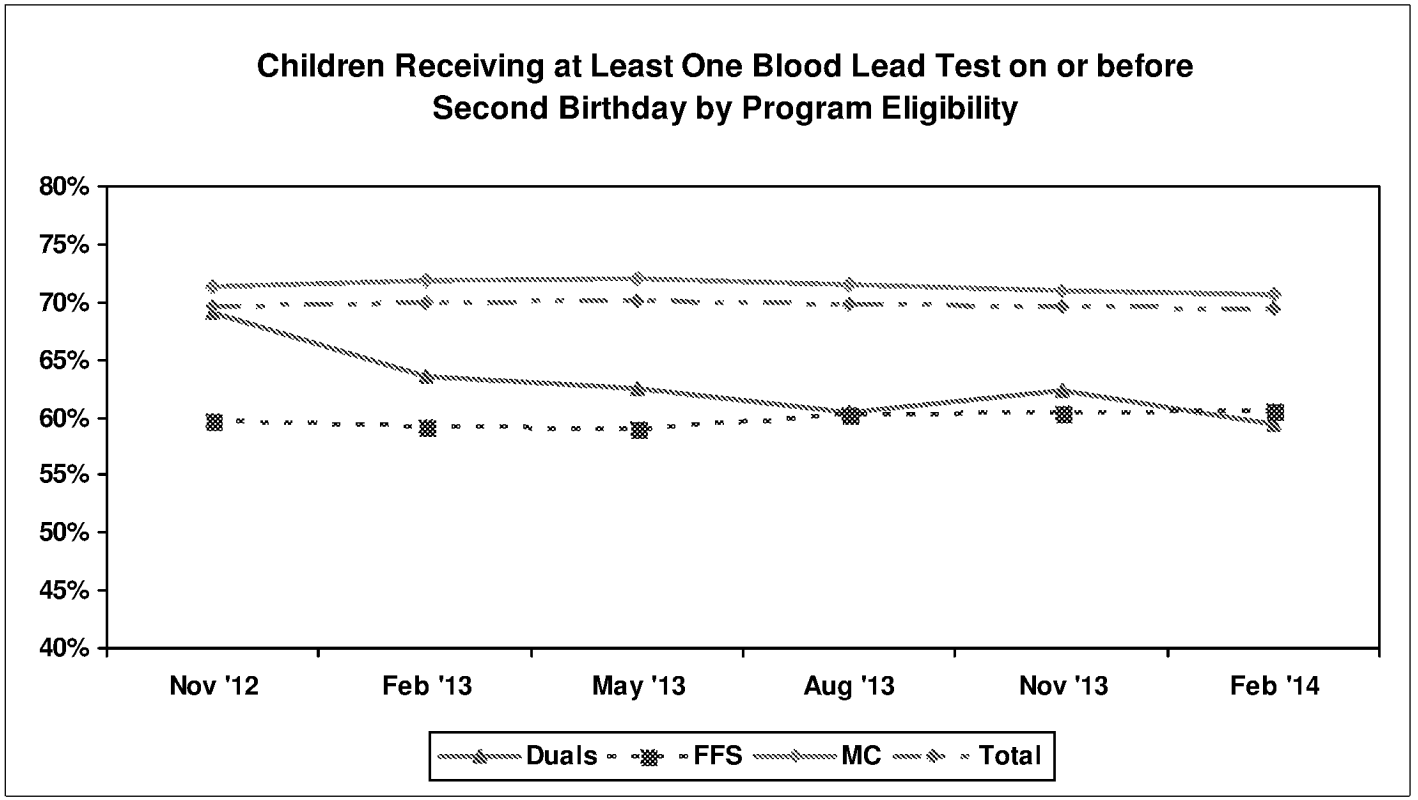
- **Children must have been eligible for one of the following programs in February 2014**
  - Medicaid Managed Care (MC)
    - enrolled in a Medicaid Health Plan (MHP)
  - Medicaid Fee-for-Service (FFS)
    - enrolled for Medicaid Only FFS coverage
  - Medicaid and CSHCS Dual Eligible (Duals)
    - dually eligible for both Medicaid and CSHCS
- **Blood Lead testing results include children tested:**
  - on or before indicated birthday for 2 and 3 year olds
  - at any time between ages 1 to 6
- **Unique Client Identifier (UCI) used to establish link between Medicaid and lead databases.**

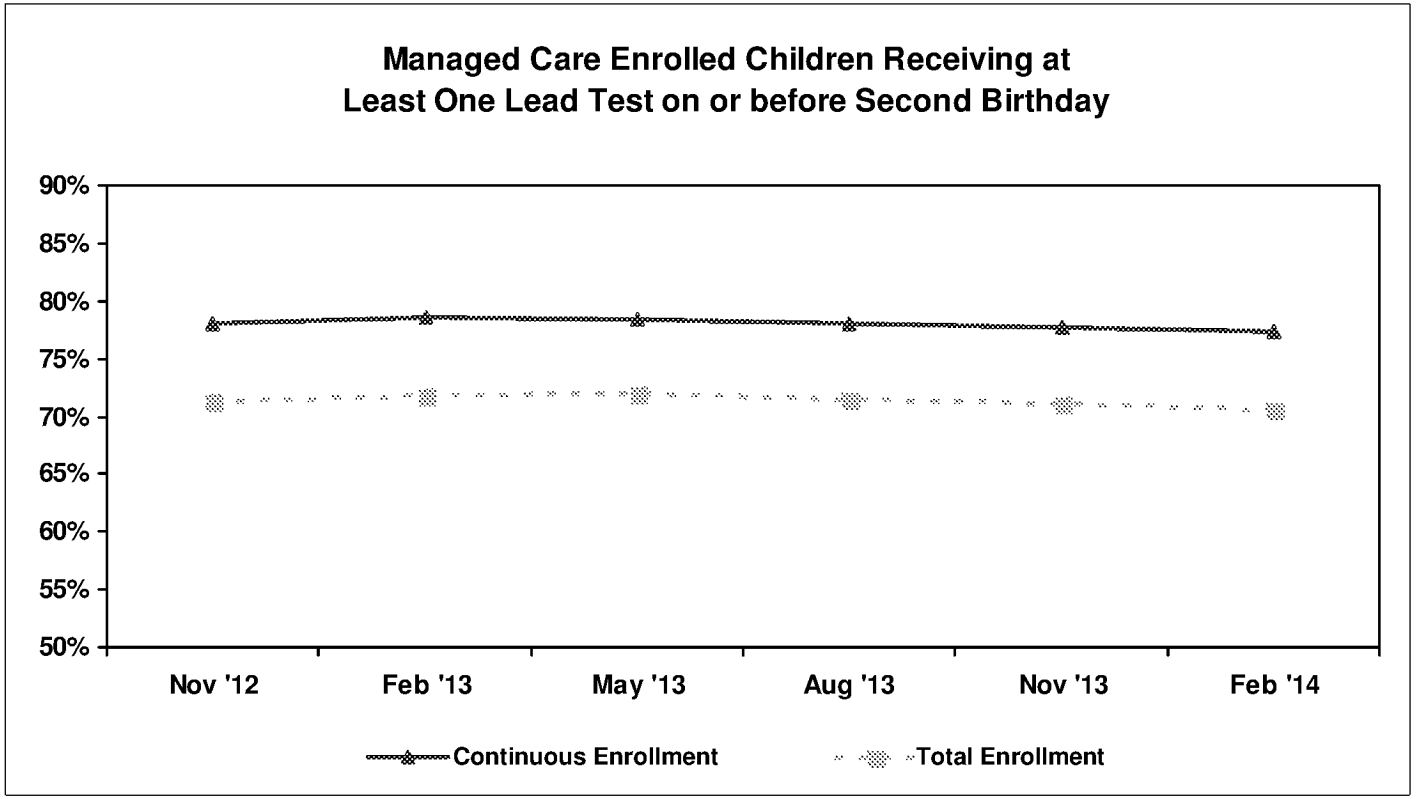
Questions should be directed to Qian Peng at (517) 241-1388, or pengq@michigan.gov

Blood Lead Testing Summary

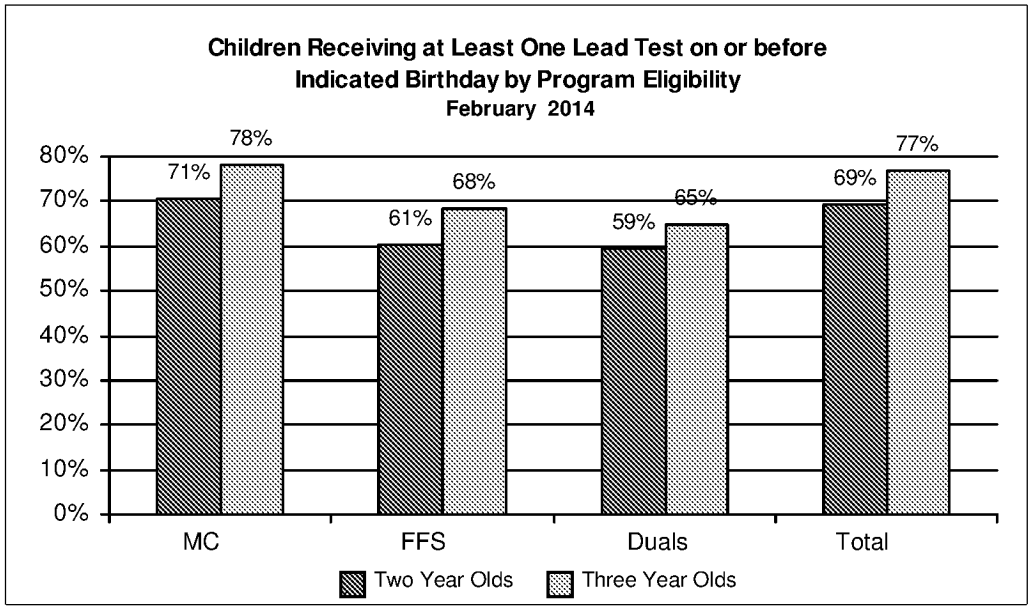
- **2 year old children tested on or before their 2nd birthday**
  - 69% Statewide
  - 69% City of Detroit
  - 71% Statewide for Medicaid MC
    - 77% Statewide for Medicaid MC with 12-Month Continuous Enrollment
  - 61% Statewide for Medicaid Only FFS Eligibles
  - 59% Statewide for CSHCS Duals

- **3 year old children tested on or before their 3rd birthday**
  - 77% Statewide
  - 81% City of Detroit
  - 78% Statewide for Medicaid MC
    - 84% Statewide for Medicaid MC with 12-Month Continuous Enrollment
  - 68% Statewide for Medicaid Only FFS Eligibles
  - 65% Statewide for CSHCS Duals


Children Receiving at Least One Blood Lead Test on or before Second Birthday by Program Eligibility
80%
75%
70%
65%
60%
55%
50%
45%
40%
Nov '12
Feb '13
May '13
Aug '13
Nov '13
Feb '14
Duals
FFS
MC
Total



Total Enrollment
-Enrolled in measurement month
Continuous Enrollment
-Based on MMIS eligibility system
-Enrolled in same health plan for the measurement month and 12 months preceding 2nd birthday, with a 1-month allowable gap.


Children Receiving at Least One Lead Test on or before Indicated Birthday by Program Eligibility
February 2014
80%
70%
60%
50%
40%
30%
20%
10%
0%
71%
78%
61%
68%
59%
65%
69%
77%
MC
FFS
Duals
Total
Two Year Olds
Three Year Olds

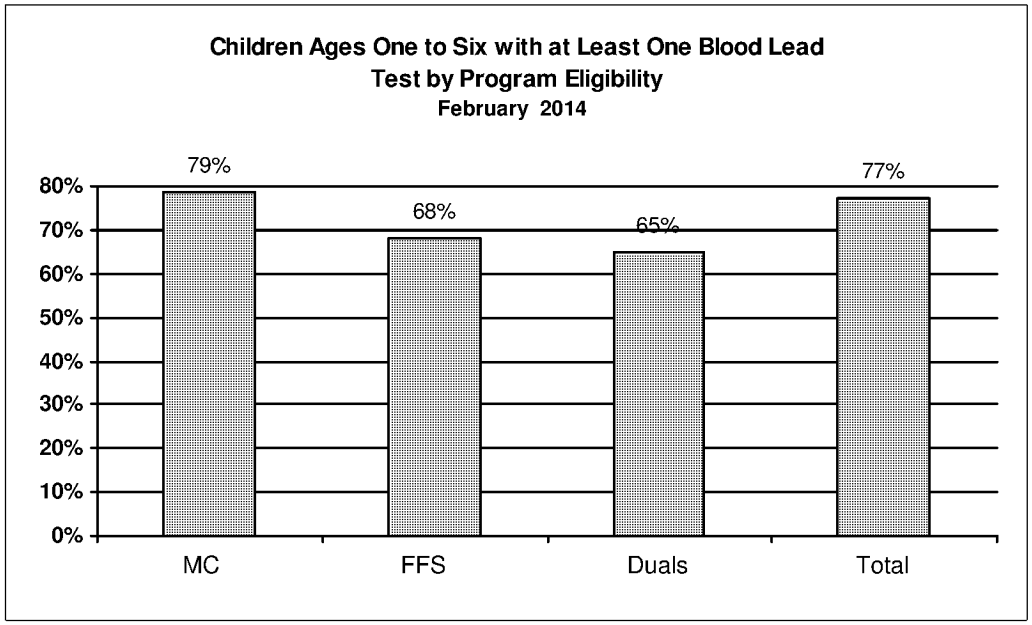

Children Ages One to Six with at Least One Blood Lead Test by Program Eligibility
February 2014
80%
70%
60%
50%
40%
30%
20%
10%
0%
79%
68%
65%
77%
MC
FFS
Duals
Total

Table 1. Percent of Children with at Least One Blood Lead Test on or before their Second Birthday

Program	Feb-13	Mar-13	Apr-13	May-13	Jun-13	Jul-13	Aug-13	Sep-13	Oct-13	Nov-13	Dec-13	Jan-14	Feb-14
MC	71.9%	71.9%	72.1%	72.1%	71.9%	71.6%	71.4%	71.5%	71.1%	71.0%	70.9%	70.9%	70.7%
FFS	59.2%	58.8%	59.2%	59.0%	61.0%	60.7%	60.3%	60.4%	60.5%	60.4%	60.0%	60.0%	60.5%
Duals	63.6%	57.1%	57.9%	62.5%	61.1%	57.9%	60.4%	62.0%	64.5%	62.3%	60.3%	62.0%	59.4%
Total	**69.9%**	**69.9%**	**70.2%**	**70.2%**	**70.3%**	**70.0%**	**69.9%**	**69.9%**	**69.6%**	**69.5%**	**69.4%**	**69.4%**	**69.4%**

Table 2. Percent of Children with at Least One Blood Lead Test on or before their Third Birthday

Program	Feb-13	Mar-13	Apr-13	May-13	Jun-13	Jul-13	Aug-13	Sep-13	Oct-13	Nov-13	Dec-13	Jan-14	Feb-14
MC	78.1%	78.2%	78.3%	78.5%	78.2%	78.4%	78.4%	78.4%	78.2%	78.2%	78.3%	78.2%	78.4%
FFS	67.0%	67.7%	68.1%	66.7%	67.6%	67.5%	67.1%	67.1%	67.5%	67.9%	68.0%	68.6%	68.4%
Duals	68.8%	65.9%	65.6%	67.3%	69.1%	69.8%	67.8%	67.2%	67.8%	67.4%	66.8%	67.1%	64.6%
Total	**76.4%**	**76.6%**	**76.7%**	**76.8%**	**76.6%**	**76.7%**	**76.7%**	**76.7%**	**76.6%**	**76.7%**	**76.8%**	**76.9%**	**77.0%**

Table 3. Percent of Children Ages One to Six with at Least One Blood Lead Test

Program	Feb-13	Mar-13	Apr-13	May-13	Jun-13	Jul-13	Aug-13	Sep-13	Oct-13	Nov-13	Dec-13	Jan-14	Feb-14
MC	80.0%	79.8%	79.2%	79.3%	79.0%	79.1%	79.0%	79.3%	79.3%	79.5%	79.2%	79.0%	78.7%
FFS	68.2%	68.1%	67.8%	67.4%	68.5%	68.2%	67.9%	68.3%	68.5%	68.5%	68.2%	68.4%	68.3%
Duals	71.1%	67.4%	65.6%	65.3%	65.0%	65.0%	63.5%	64.7%	64.6%	65.1%	65.1%	65.3%	65.0%
Total	**78.1%**	**78.0%**	**77.4%**	**77.5%**	**77.4%**	**77.5%**	**77.4%**	**77.6%**	**77.7%**	**77.8%**	**77.6%**	**77.5%**	**77.3%**

Table 4. Statewide Blood Lead Testing of Two and Three Year Old Children for All Programs

February 2014

County	2 Years of Age			3 Years of Age		
	Eligibles	Eligibles with at least 1 test on or before their 2nd birthday	Percent of Eligibles with at least 1 test on or before their 2nd birthday	Eligibles	Eligibles with at least 1 test on or before their 3rd birthday	Percent of Eligibles with at least 1 test on or before their 3rd birthday
ALCONA	38	25	**66%**	34	28	**82%**
ALGER	32	26	**81%**	38	26	**68%**
ALLEGAN	621	350	**56%**	571	374	**65%**
ALPENA	149	113	**76%**	140	120	**86%**
ANTRIM	113	81	**72%**	117	98	**84%**
ARENAC	74	55	**74%**	76	58	**76%**
BARAGA	49	34	**69%**	60	50	**83%**
BARRY	246	174	**71%**	275	220	**80%**
BAY	501	411	**82%**	531	474	**89%**
BENZIE	76	57	**75%**	76	62	**82%**
BERRIEN	1,038	570	**55%**	1,027	706	**69%**
BRANCH	301	203	**67%**	300	216	**72%**
CALHOUN	926	563	**61%**	952	673	**71%**
CASS	268	155	**58%**	298	201	**67%**
CHARLEVOIX	133	104	**78%**	123	105	**85%**
CHEBOYGAN	137	103	**75%**	125	99	**79%**
CHIPPEWA	181	134	**74%**	187	163	**87%**
CLARE	185	146	**79%**	195	157	**81%**
CLINTON	247	153	**62%**	272	216	**79%**
CRAWFORD	67	45	**67%**	68	48	**71%**
DELTA	197	147	**75%**	165	142	**86%**
DICKINSON	128	102	**80%**	123	103	**84%**
EATON	463	332	**72%**	471	361	**77%**
EMMET	156	120	**77%**	142	110	**77%**
GENESEE	2,941	2,051	**70%**	2,979	2,351	**79%**
GLADWIN	126	98	**78%**	134	106	**79%**
GOGEBIC	86	60	**70%**	84	64	**76%**
GRAND TRAVERSE	396	235	**59%**	390	285	**73%**
GRATIOT	245	176	**72%**	198	165	**83%**
HILLSDALE	279	208	**75%**	261	198	**76%**
HOUGHTON	167	107	**64%**	191	149	**78%**
HURON	138	111	**80%**	166	140	**84%**
INGHAM	1,509	1,139	**75%**	1,474	1,209	**82%**
IONIA	348	247	**71%**	364	286	**79%**
IOSCO	160	85	**53%**	148	93	**63%**
IRON	64	52	**81%**	46	39	**85%**
ISABELLA	264	190	**72%**	273	205	**75%**
JACKSON	904	742	**82%**	914	799	**87%**
KALAMAZOO	1,330	1,032	**78%**	1,345	1,094	**81%**
KALKASKA	102	82	**80%**	104	83	**80%**
KENT	3,771	3,075	**82%**	3,628	3,093	**85%**
KEWEENAW	6	3	**50%**	11	10	**91%**
LAKE	67	50	**75%**	58	44	**76%**
LAPEER	406	261	**64%**	392	301	**77%**
LEELANAU	60	42	**70%**	71	58	**82%**
LENAWEE	577	449	**78%**	495	395	**80%**
LIVINGSTON	471	345	**73%**	464	345	**74%**
LUCE	35	26	**74%**	44	38	**86%**
MACKINAC	38	27	**71%**	59	47	**80%**
MACOMB	3,884	2,501	**64%**	3,840	2,748	**72%**
MANISTEE	90	80	**89%**	102	90	**88%**
MARQUETTE	266	193	**73%**	253	206	**81%**
MASON	156	140	**90%**	157	144	**92%**
MECOSTA	228	170	**75%**	227	174	**77%**
MENOMINEE	100	72	**72%**	91	66	**73%**
MIDLAND	349	160	**46%**	352	228	**65%**
MISSAUKEE	111	89	**80%**	103	81	**79%**
MONROE	646	478	**74%**	652	527	**81%**
MONTCALM	357	228	**64%**	429	328	**76%**
MONTMORENCY	40	31	**78%**	36	29	**81%**
MUSKEGON	1,284	766	**60%**	1,233	843	**68%**
NEWAYGO	305	225	**74%**	341	248	**73%**
OAKLAND	3,949	2,605	**66%**	3,845	2,844	**74%**
OCEANA	200	161	**81%**	224	177	**79%**
OGEMAW	139	66	**47%**	117	65	**56%**
ONTONAGON	22	16	**73%**	20	18	**90%**
OSCEOLA	155	118	**76%**	149	119	**80%**
OSCODA	38	10	**26%**	46	26	**57%**
OTSEGO	158	106	**67%**	155	125	**81%**
OTTAWA	1,045	638	**61%**	1,000	648	**65%**
PRESQUE ISLE	46	37	**80%**	53	42	**79%**
ROSCOMMON	118	86	**73%**	110	90	**82%**
SAGINAW	1,272	1,037	**82%**	1,281	1,106	**86%**
SAINT CLAIR	876	711	**81%**	925	767	**83%**
SAINT JOSEPH	457	276	**60%**	426	306	**72%**
SANILAC	209	159	**76%**	222	171	**77%**
SCHOOLCRAFT	39	32	**82%**	34	28	**82%**
SHIAWASSEE	380	313	**82%**	369	294	**80%**
TUSCOLA	323	261	**81%**	294	240	**82%**
VAN BUREN	501	293	**58%**	517	352	**68%**
WASHTENAW	1,159	715	**62%**	1,156	753	**65%**
DETROIT, CITY OF	9,424	6,517	**69%**	9,673	7,799	**81%**
WAYNE, ex Detroit	5,016	3,159	**63%**	4,752	3,391	**71%**
WEXFORD	266	211	**79%**	265	198	**75%**
MICHIGAN	**54.424**	**37.756**	**69%**	**54.108**	**41.678**	**77%**

Table 5. Statewide Blood Lead Testing of Two and Three Year Old Children Enrolled in Managed Care

February 2014

County	2 Years of Age			3 Years of Age		
	Eligibles	Eligibles with at least 1 test on or before their 2nd birthday	Percent of Eligibles with at least 1 test on or before their 2nd birthday	Eligibles	Eligibles with at least 1 test on or before their 3rd birthday	Percent of Eligibles with at least 1 test on or before their 3rd birthday
ALCONA	33	23	**70%**	29	24	**83%**
ALGER	30	26	**87%**	31	22	**71%**
ALLEGAN	507	296	**58%**	466	312	**67%**
ALPENA	122	94	**77%**	118	103	**87%**
ANTRIM	89	64	**72%**	103	88	**85%**
ARENAC	67	51	**76%**	65	53	**82%**
BARAGA	24	19	**79%**	34	30	**88%**
BARRY	207	148	**71%**	218	175	**80%**
BAY	438	360	**82%**	460	416	**90%**
BENZIE	57	44	**77%**	65	55	**85%**
BERRIEN	904	502	**56%**	892	639	**72%**
BRANCH	257	181	**70%**	251	187	**75%**
CALHOUN	822	509	**62%**	805	583	**72%**
CASS	231	139	**60%**	261	184	**70%**
CHARLEVOIX	117	94	**80%**	95	82	**86%**
CHEBOYGAN	119	92	**77%**	106	86	**81%**
CHIPPEWA	113	88	**78%**	122	106	**87%**
CLARE	156	125	**80%**	176	144	**82%**
CLINTON	212	137	**65%**	222	179	**81%**
CRAWFORD	55	37	**67%**	62	45	**73%**
DELTA	171	130	**76%**	138	122	**88%**
DICKINSON	104	87	**84%**	105	87	**83%**
EATON	395	291	**74%**	398	308	**77%**
EMMET	126	99	**79%**	117	92	**79%**
GENESEE	2,661	1,896	**71%**	2,681	2,146	**80%**
GLADWIN	109	87	**80%**	109	86	**79%**
GOGEBIC	73	54	**74%**	67	55	**82%**
GRAND TRAVERSE	337	205	**61%**	334	252	**75%**
GRATIOT	204	154	**75%**	161	136	**84%**
HILLSDALE	239	181	**76%**	225	172	**76%**
HOUGHTON	142	90	**63%**	171	133	**78%**
HURON	119	96	**81%**	128	111	**87%**
INGHAM	1,331	1,021	**77%**	1,303	1,091	**84%**
IONIA	296	212	**72%**	296	236	**80%**
IOSCO	141	79	**56%**	133	83	**62%**
IRON	55	46	**84%**	36	29	**81%**
ISABELLA	223	164	**74%**	224	173	**77%**
JACKSON	785	651	**83%**	788	698	**89%**
KALAMAZOO	1,167	928	**80%**	1,146	947	**83%**
KALKASKA	85	70	**82%**	87	70	**80%**
KENT	3,184	2,630	**83%**	3,028	2,634	**87%**
KEWEENAW	4	2	**50%**	7	7	**100%**
LAKE	58	42	**72%**	49	39	**80%**
LAPEER	334	213	**64%**	337	266	**79%**
LEELANAU	47	31	**66%**	50	41	**82%**
LENAWEE	497	388	**78%**	421	347	**82%**
LIVINGSTON	379	293	**77%**	396	301	**76%**
LUCE	30	25	**83%**	37	34	**92%**
MACKINAC	32	21	**66%**	38	30	**79%**
MACOMB	3,401	2,228	**66%**	3,385	2,471	**73%**
MANISTEE	77	70	**91%**	81	71	**88%**
MARQUETTE	239	178	**74%**	225	184	**82%**
MASON	133	119	**89%**	139	129	**93%**
MECOSTA	190	146	**77%**	193	151	**78%**
MENOMINEE	85	63	**74%**	65	46	**71%**
MIDLAND	305	141	**46%**	301	199	**66%**
MISSAUKEE	91	74	**81%**	84	68	**81%**
MONROE	545	409	**75%**	552	454	**82%**
MONTCALM	292	195	**67%**	353	270	**76%**
MONTMORENCY	33	26	**79%**	30	24	**80%**
MUSKEGON	1,098	669	**61%**	1,049	733	**70%**
NEWAYGO	262	196	**75%**	281	210	**75%**
OAKLAND	3,443	2,345	**68%**	3,361	2,545	**76%**
OCEANA	164	135	**82%**	180	148	**82%**
OGEMAW	123	60	**49%**	98	53	**54%**
ONTONAGON	21	15	**71%**	20	18	**90%**
OSCEOLA	132	103	**78%**	122	97	**80%**
OSCODA	33	9	**27%**	42	24	**57%**
OTSEGO	143	96	**67%**	132	108	**82%**
OTTAWA	809	507	**63%**	778	532	**68%**
PRESQUE ISLE	41	33	**80%**	46	36	**78%**
ROSCOMMON	107	79	**74%**	98	81	**83%**
SAGINAW	1,134	934	**82%**	1,141	1,001	**88%**
SAINT CLAIR	767	639	**83%**	798	675	**85%**
SAINT JOSEPH	386	241	**62%**	331	243	**73%**
SANILAC	184	144	**78%**	185	154	**83%**
SCHOOLCRAFT	32	25	**78%**	31	26	**84%**
SHIAWASSEE	336	284	**85%**	313	263	**84%**
TUSCOLA	273	224	**82%**	245	206	**84%**
VAN BUREN	443	262	**59%**	438	309	**71%**
WASHTENAW	994	638	**64%**	988	657	**66%**
DETROIT, CITY OF	8,640	6,018	**70%**	8,876	7,173	**81%**
WAYNE, ex Detroit	4,398	2,845	**65%**	4,192	3,041	**73%**
WEXFORD	222	180	**81%**	220	163	**74%**
MICHIGAN	**47.464**	**33.545**	**71%**	**46.964**	**36.802**	**78%**

Table 6. Statewide Blood Lead Testing of Two and Three Year Old Children Eligible for Medicaid Only Fee-for-Service Coverage
February 2014

County	2 Years of Age			3 Years of Age		
	Eligibles	Eligibles with at least 1 test on or before their 2nd birthday	Percent of Eligibles with at least 1 test on or before their 2nd birthday	Eligibles	Eligibles with at least 1 test on or before their 3rd birthday	Percent of Eligibles with at least 1 test on or before their 3rd birthday
ALCONA	5	2	40%	4	4	100%
ALGER	2	0	0%	7	4	57%
ALLEGAN	109	53	49%	102	59	58%
ALPENA	27	19	70%	20	15	75%
ANTRIM	24	17	71%	14	10	71%
ARENAC	7	4	57%	11	5	45%
BARAGA	25	15	60%	26	20	77%
BARRY	38	26	68%	54	42	78%
BAY	62	50	81%	69	56	81%
BENZIE	19	13	68%	11	7	64%
BERRIEN	129	63	49%	131	65	50%
BRANCH	43	22	51%	46	26	57%
CALHOUN	101	53	52%	143	87	61%
CASS	37	16	43%	37	17	46%
CHARLEVOIX	16	10	63%	26	21	81%
CHEBOYGAN	18	11	61%	18	12	67%
CHIPPEWA	68	46	68%	63	56	89%
CLARE	29	21	72%	18	12	67%
CLINTON	31	14	45%	50	37	74%
CRAWFORD	12	8	67%	6	3	50%
DELTA	26	17	65%	27	20	74%
DICKINSON	24	15	63%	18	16	89%
EATON	65	38	58%	73	53	73%
EMMET	30	21	70%	23	16	70%
GENESEE	274	152	55%	291	201	69%
GLADWIN	17	11	65%	25	20	80%
GOGEBIC	13	6	46%	17	9	53%
GRAND TRAVERSE	58	30	52%	53	32	60%
GRATIOT	40	21	53%	35	27	77%
HILLSDALE	40	27	68%	35	25	71%
HOUGHTON	24	16	67%	18	15	83%
HURON	19	15	79%	38	29	76%
INGHAM	172	114	66%	163	112	69%
IONIA	50	33	66%	67	49	73%
IOSCO	19	6	32%	15	10	67%
IRON	9	6	67%	10	10	100%
ISABELLA	40	25	63%	48	31	65%
JACKSON	112	86	77%	119	95	80%
KALAMAZOO	158	101	64%	193	143	74%
KALKASKA	16	12	75%	16	12	75%
KENT	558	422	76%	569	438	77%
KEWEENAW	2	1	50%	4	3	75%
LAKE	9	8	89%	9	5	56%
LAPEER	69	45	65%	54	35	65%
LEELANAU	12	10	83%	21	17	81%
LENAWEE	76	59	78%	71	45	63%
LIVINGSTON	87	50	57%	67	43	64%
LUCE	5	1	20%	5	2	40%
MACKINAC	6	6	100%	20	16	80%
MACOMB	464	262	56%	447	275	62%
MANISTEE	12	9	75%	21	19	90%
MARQUETTE	27	15	56%	26	22	85%
MASON	19	17	89%	17	14	82%
MECOSTA	37	23	62%	32	23	72%
MENOMINEE	14	9	64%	26	20	77%
MIDLAND	37	16	43%	51	29	57%
MISSAUKEE	20	15	75%	19	13	68%
MONROE	98	67	68%	96	71	74%
MONTCALM	64	32	50%	74	58	78%
MONTMORENCY	7	5	71%	5	4	80%
MUSKEGON	179	93	52%	181	109	60%
NEWAYGO	43	29	67%	58	36	62%
OAKLAND	486	252	52%	468	290	62%
OCEANA	35	25	71%	44	29	66%
OGEMAW	15	6	40%	19	12	63%
ONTONAGON	1	1	100%	0	0	NA
OSCEOLA	22	14	64%	26	21	81%
OSCODA	5	1	20%	4	2	50%
OTSEGO	15	10	67%	23	17	74%
OTTAWA	228	125	55%	216	112	52%
PRESQUE ISLE	5	4	80%	7	6	86%
ROSCOMMON	10	6	60%	12	9	75%
SAGINAW	134	100	75%	135	102	76%
SAINT CLAIR	105	72	69%	125	92	74%
SAINT JOSEPH	68	34	50%	95	63	66%
SANILAC	24	15	63%	35	16	46%
SCHOOLCRAFT	5	5	100%	3	2	67%
SHIAWASSEE	44	29	66%	54	30	56%
TUSCOLA	49	36	73%	46	32	70%
VAN BUREN	58	31	53%	77	42	55%
WASHTENAW	160	75	47%	157	89	57%
DETROIT, CITY OF	770	493	64%	780	614	79%
WAYNE, ex Detroit	596	301	51%	536	337	63%
WEXFORD	43	31	72%	43	33	77%
MICHIGAN	**6.731**	**4.075**	**61%**	**6.918**	**4.730**	**68%**

Table 7: Blood Lead Testing of Two Year Old Children by Length of Enrollment

February 2014

Health Plan Name	Total Enrollment			Continuous Enrollment			
	Eligibles	Eligibles with at least 1 test on or before their 2nd birthday	Percent of Eligibles with at least 1 test on or before their 2nd birthday	Eligibles	Eligibles with at least 1 test on or before their 2nd birthday	Percent of Eligibles with at least 1 test on or before their 2nd birthday	Percentage Point Difference with Continuous Enrollment
Blue Cross Complete	1,537	923	60%	439	323	74%	14
CoventryCares of Michigan	1,229	866	70%	787	585	74%	4
HealthPlus Partners	2,191	1,683	77%	1,381	1,136	82%	5
McLaren Health Plan	4,639	3,303	71%	2,184	1,771	81%	10
Meridian Health Plan of Michigan	12,633	9,197	73%	7,705	6,119	79%	7
Midwest Health Plan	2,724	1,810	66%	1,570	1,137	72%	6
Molina Healthcare of Michigan	7,186	4,975	69%	4,544	3,405	75%	6
PHP-Mid-Michigan Family Care	716	537	75%	451	370	82%	7
Priority Health Govt Pgms	2,851	2,083	73%	1,562	1,258	81%	7
ProCare Health Plan	212	119	56%	69	40	58%	2
Total Health Care	1,759	1,108	63%	920	618	67%	4
United Healthcare-Great Lakes	8,668	6,092	70%	5,392	4,081	76%	5
Upper Peninsula Health Plan	1,160	871	75%	753	635	84%	9
Managed Care Totals/Percent	**47,505**	**33,567**	**71%**	**27,757**	**21,478**	**77%**	**6**
Current Performance Monitoring Standard			**N/A**			**80%**	
FFS (Title XIX only)	**6,746**	**4,084**	**61%**	**1,304**	**856**	**66%**	**5**
FFS (Title V/XIX)	**229**	**136**	**59%**	**126**	**75**	**60%**	**1**
FFS Totals (Title XIX & V/XIX)	**6,975**	**4,220**	**61%**	**1,430**	**931**	**65%**	**4**

Total Enrollment

- Based on MMIS eligibility system
- Enrolled in plan (health plan or FFS) for the measurement month

Continuous Enrollment

- Based on MMIS eligibility system
- Enrolled in same plan (health plan or FFS) for the measurement month and 12 months preceding 2nd birthday, with 1-month allowable gap

Table 8. Blood Lead Testing of Three Year Old Children by Length of Enrollment

February 2014

Health Plan Name	Total Enrollment			Continuous Enrollment			
	Eligibles	Eligibles with at least 1 test on or before their 3rd birthday	Percent of Eligibles with at least 1 test on or before their 3rd birthday	Eligibles	Eligibles with at least 1 test on or before their 3rd birthday	Percent of Eligibles with at least 1 test on or before their 3rd birthday	Percentage Point Difference with Continuous Enrollment
Blue Cross Complete	1,570	1,061	68%	500	385	77%	9
CoventryCares of Michigan	1,278	1,036	81%	860	735	85%	4
HealthPlus Partners	2,297	1,933	84%	1,539	1,364	89%	5
McLaren Health Plan	4,530	3,551	78%	2,376	2,046	86%	8
Meridian Health Plan of Michigan	11,999	9,555	80%	7,831	6,658	85%	5
Midwest Health Plan	2,618	1,952	75%	1,599	1,272	80%	5
Molina Healthcare of Michigan	7,280	5,687	78%	4,932	4,027	82%	4
PHP-Mid-Michigan Family Care	690	560	81%	431	370	86%	5
Priority Health Govt Pgms	2,773	2,156	78%	1,647	1,394	85%	7
ProCare Health Plan	207	145	70%	101	76	75%	5
Total Health Care	1,804	1,309	73%	1,026	802	78%	5
United Healthcare-Great Lakes	8,838	6,953	79%	5,987	4,957	83%	4
Upper Peninsula Health Plan	1,127	929	82%	759	675	89%	7
Managed Care Totals/Percent	**47,011**	**36,827**	**78%**	**29,588**	**24,761**	**84%**	**6**
FFS (Title XIX only)	**6,937**	**4,740**	**68%**	**1,780**	**1,288**	**72%**	**4**
FFS (Title V/XIX)	**226**	**146**	**65%**	**120**	**77**	**64%**	**-1**
FFS Totals (Title XIX & V/XIX)	**7,163**	**4,886**	**68%**	**1,900**	**1,365**	**72%**	**4**

Total Enrollment

- Based on MMIS eligibility system
- Enrolled in plan (health plan or FFS) for the measurement month

Continuous Enrollment

- Based on MMIS eligibility system
- Enrolled in same plan (health plan or FFS) for the measurement month and 12 months preceding 3rd birthday, with 1-month allowable gap

Data Management and Security Section
Office of Medicaid Health Information Technology
Medical Services Administration
Department of Community Health
State of Michigan

Date Created: 2/20/2014

Medicaid Lead Testing Rates for Two Year Old Children

Percentage Point Changes from February 2013 to February 2014 for 2 Year Olds Blood Lead Tested

Health Plan Name	Percent of Eligibles with at least One Lead Test on or before 2nd Birthday					
	Total Enrollment			Continuous Enrollment		
	Feb-13	Feb-14	Percentage Point Difference Between 13 -- 14	Feb-13	Feb-14	Percentage Point Difference Between 13 -- 14
Blue Cross Complete	63%	60%	-3	70%	74%	4
CareSource Michigan						
CoventryCares of Michigan	71%	70%	-1	75%	74%	-1
HealthPlus Partners, Inc.	77%	77%	0	83%	82%	-1
McLaren Health Plan	73%	71%	-2	86%	81%	-5
Meridian Health Plan of MI	74%	73%	-1	81%	79%	-2
Midwest Health Plan	65%	66%	1	72%	72%	0
Molina Healthcare of Michigan	71%	69%	-2	76%	75%	-1
PHP-MM Family Care	75%	75%	0	79%	82%	3
Priority Health Government Programs, Inc.	74%	73%	-1	81%	81%	0
ProCare Health Plan	59%	56%	-3	62%	58%	-4
Total Health Care	63%	63%	0	68%	67%	-1
United Healthcare Great Lakes	72%	70%	-2	77%	76%	-1
Upper Peninsula Health Plan	78%	75%	-3	88%	84%	-4
Managed Care Average/Percent	**72%**	**71%**	**-1**	**79%**	**77%**	**-2**
Current Performance Monitoring Standard	**N/A**	**N/A**		**N/A**	**80%**	

FFS (Title XIX only)	**59%**	**61%**	**2**	**68%**	**66%**	**-2**
FFS (Title V/XIX)	**64%**	**59%**	**-5**	**65%**	**60%**	**-5**
FFS Totals (Title XIX and V/XIX)	**59%**	**61%**	**2**	**67%**	**65%**	**-2**

From: Scott, Robert L. (DCH)
Sent: Wednesday, March 05, 2014 4:32 PM
To: Peeler, Nancy (DCH)
Subject: RE: Fitton's presentation pages 27 amd 28
Attachments: 2013 CLPPP Data Report PRELIM.pdf

Not exactly---the report included the usual tables by counties, # and % tested, # and % with elevated BLL (see attached).

From: Peeler, Nancy (DCH)
Sent: Wednesday, March 05, 2014 4:29 PM
To: Scott, Robert L. (DCH)
Subject: RE: Fitton's presentation pages 27 amd 28

And we listed the counties with 'highest' proportions of children with lead levels >5?

One of my first concerns is with Medicaid using our product without talking with us first. I'm sure we can make a list of 'concerns'. In fact, that's probably the best thing to do now – what concerns/issue do we see with all of this? Will help us to know what steps to take to address it all, and how to prioritize. Thanks for setting up the appointment for tomorrow, we'll be able to make good use of that time!

From: Scott, Robert L. (DCH)
Sent: Wednesday, March 05, 2014 4:08 PM
To: Peeler, Nancy (DCH)
Subject: RE: Fitton's presentation pages 27 amd 28

Not sure how they got it, but possibly Matt Davis. I originally sent this preliminary report to the MIALSH mailing list (because I'm slow this year getting the final annual report out). Dr. Davis is on that list, but it's a pretty long list of folks inside and outside of state govt.

From: Peeler, Nancy (DCH)
Sent: Wednesday, March 05, 2014 3:57 PM
To: Scott, Robert L. (DCH)
Subject: RE: Fitton's presentation pages 27 amd 28

Yes, seems like we will definitely need to talk through all of this. For now, please stop sending anything out, not to Mary Sue, not to Jean, not to anyone. Just put it on hold until we can sort through this and get a better sense of what is going on. No need to respond to a LSB request until we have one.

So you produced the chart on page 28? And how did Medicaid get it?

From: Scott, Robert L. (DCH)
Sent: Wednesday, March 05, 2014 3:42 PM
To: Peeler, Nancy (DCH)
Subject: FW: Fitton's presentation pages 27 amd 28

Last one! I talked with Jean Doss on the phone, trying to explain the difference between Mr. Fitton's 82.4% tested and the much lower %s in my annual reports. She sent me this to show where her questions, and Mr. Lindstrom's quotes,

were coming from. Page 27 must have come from Medicaid staff. Page 28 came straight out of a "preliminary" data report I sent to MIALSH members and Prevention grantees. I suppose that's something else we need to talk about.

From: Jean Doss [mailto:jmdoss@comcast.net]
Sent: Wednesday, March 05, 2014 2:21 PM
To: Scott, Robert L. (DCH)
Subject: Fitton's presentation pages 27 amd 28

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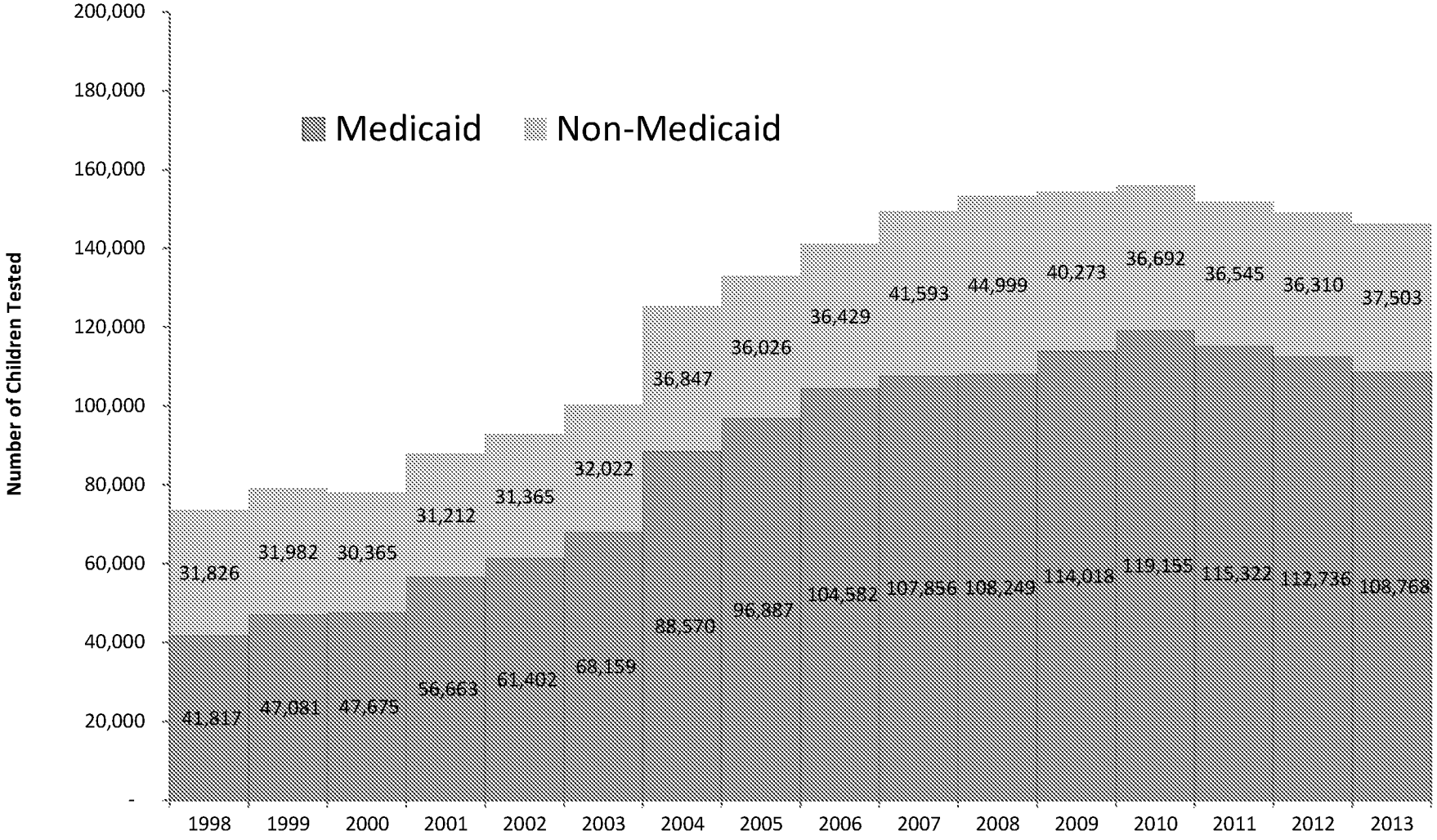
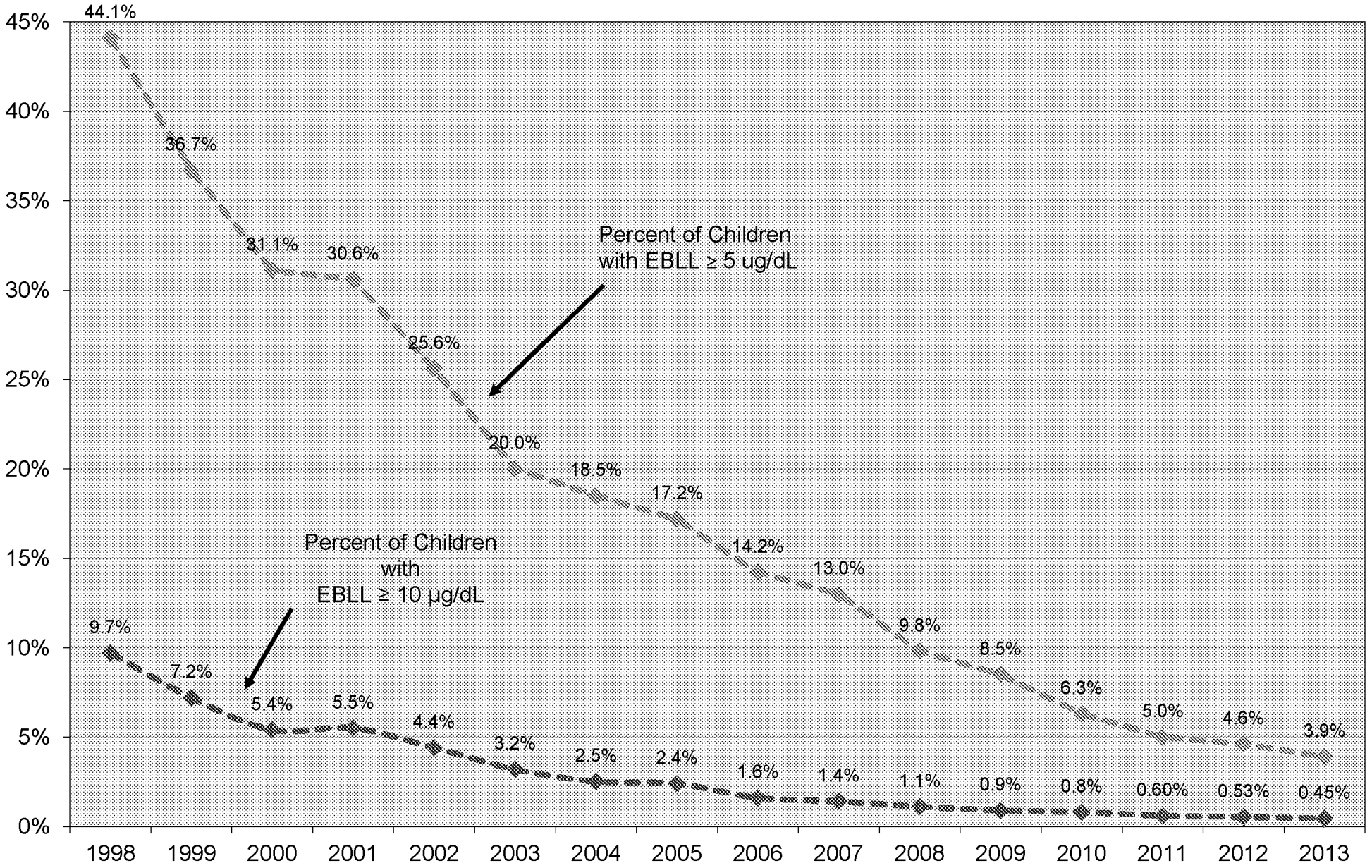
Number of Children Tested for Lead, 1998 - 2013
Michigan Children less than Six Years of Age



February 14, 2014 Source: MDCH Data Warehouse

Elevated Blood Lead Levels (EBLL) in Michigan 1998 - 2013
Children less than Six Years of Age



February 14, 2014
Source: MDCH Data Warehouse

Childhood Lead Poisoning Data Facts (PRELIMINARY)
All Counties in Michigan - Children less than Six Years of Age
Calendar Year 2013

				Children < Age 6, Tested for Lead		Children Tested, by Highest Blood Lead Level									
County	%Pre-1950 Housing	%Pre-1978 Housing	Children Under Age 6	Number of Children Tested	% Tested	<5 ug/dL (capillary or venous)	5 to 9 ug/dL (capillary or venous)	Capillary >= 10 ug/dL, not confirmed by venous	Confirmed 10-19 ug/dL (venous only)	Confirmed 20-44 ug/dL (venous only)	Confirmed ≥45 ug/dL (venous only)	Total ≥ 5 µg/dL	Total Confirmed >=10 ug/dL	% with BLL >= 5 ug/dL	% Confirmed >= 10 ug/dL
Alcona	12.4	61.5	397	51	**12.8**	50	1	0	0	0	0	**1**	**0**	**2.0**	**0.0**
Alger	29.5	64.1	464	76	**16.4**	75	1	0	0	0	0	**1**	**0**	**1.3**	**0.0**
Allegan	23.2	51.1	9,073	1,159	**12.8**	1,124	31	2	2	0	0	**35**	**2**	**3.0**	**0.2**
Alpena	25.3	71.6	1,816	299	**16.5**	292	6	1	0	0	0	**7**	**0**	**2.3**	**0.0**
Antrim	18.8	52.6	1,447	257	**17.8**	251	5	1	0	0	0	**6**	**0**	**2.3**	**0.0**
Arenac	19.8	58.2	919	163	**17.7**	161	2	0	0	0	0	**2**	**0**	**1.2**	**0.0**
Baraga	34.0	71.7	533	128	**24.0**	127	1	0	0	0	0	**1**	**0**	**0.8**	**0.0**
Barry	27.1	57.3	4,282	465	**10.9**	453	10	2	0	0	0	**12**	**0**	**2.6**	**0.0**
Bay	33.9	75.6	7,516	1,422	**18.9**	1,351	63	0	7	1	0	**71**	**8**	**5.0**	**0.6**
Benzie	18.6	46.3	1,104	231	**20.9**	225	6	0	0	0	0	**6**	**0**	**2.6**	**0.0**
Berrien	28.6	72.2	11,542	1,726	**15.0**	1,662	52	0	10	2	0	**64**	**12**	**3.7**	**0.7**
Branch	30.9	65.3	3,540	765	**21.6**	726	35	3	0	1	0	**39**	**1**	**5.1**	**0.1**
Calhoun	36.1	75.3	10,545	1,971	**18.7**	1,903	54	3	7	4	0	**68**	**11**	**3.5**	**0.6**
Cass	22.4	59.9	3,616	458	**12.7**	438	16	3	1	0	0	**20**	**1**	**4.4**	**0.2**
Charlevoix	25.3	54.4	1,632	296	**18.1**	294	2	0	0	0	0	**2**	**0**	**0.7**	**0.0**
Cheboygan	20.9	53.5	1,517	264	**17.4**	262	0	2	0	0	0	**2**	**0**	**0.8**	**0.0**
Chippewa	25.1	58.6	2,384	434	**18.2**	429	5	0	0	0	0	**5**	**0**	**1.2**	**0.0**
Clare	14.5	58.8	2,099	411	**19.6**	408	3	0	0	0	0	**3**	**0**	**0.7**	**0.0**
Clinton	22.5	52.8	5,467	564	**10.3**	552	12	0	0	0	0	**12**	**0**	**2.1**	**0.0**
Crawford	13.7	55.6	814	87	**10.7**	81	6	0	0	0	0	**6**	**0**	**6.9**	**0.0**
Delta	33.3	68.0	2,411	453	**18.8**	435	15	2	1	0	0	**18**	**1**	**4.0**	**0.2**
Dickinson	38.9	71.7	1,595	303	**19.0**	296	4	2	1	0	0	**7**	**1**	**2.3**	**0.3**
Eaton	20.4	56.4	7,352	1,131	**15.4**	1,116	13	2	0	0	0	**15**	**0**	**1.3**	**0.0**
Emmet	23.0	48.3	2,026	322	**15.9**	320	2	0	0	0	0	**2**	**0**	**0.6**	**0.0**
Genesee	19.9	68.0	33,014	7,060	**21.4**	6,902	134	13	5	6	0	**158**	**11**	**2.2**	**0.2**
Gladwin	12.4	49.5	1,488	245	**16.5**	240	5	0	0	0	0	**5**	**0**	**2.0**	**0.0**
Gogebic	50.0	76.7	899	192	**21.4**	187	5	0	0	0	0	**5**	**0**	**2.6**	**0.0**
Grand Traverse	14.7	43.5	5,912	1,032	**17.5**	995	30	7	0	0	0	**37**	**0**	**3.6**	**0.0**
Gratiot	34.7	69.8	2,817	474	**16.8**	467	7	0	0	0	0	**7**	**0**	**1.5**	**0.0**
Hillsdale	36.5	63.2	3,412	785	**23.0**	759	24	1	1	0	0	**26**	**1**	**3.3**	**0.1**
Houghton	53.4	75.5	2,559	538	**21.0**	514	23	0	0	1	0	**24**	**1**	**4.5**	**0.2**
Huron	31.8	68.9	1,955	394	**20.2**	371	22	0	1	0	0	**23**	**1**	**5.8**	**0.3**
Ingham	24.9	68.2	19,374	4,700	**24.3**	4,485	208	2	4	1	0	**215**	**5**	**4.6**	**0.1**
Ionia	35.8	63.0	4,971	824	**16.6**	810	12	1	1	0	0	**14**	**1**	**1.7**	**0.1**
Iosco	12.7	65.6	1,238	146	**11.8**	142	3	1	0	0	0	**4**	**0**	**2.7**	**0.0**
Iron	44.1	72.1	616	149	**24.2**	146	3	0	0	0	0	**3**	**0**	**2.0**	**0.0**
Isabella	16.3	48.2	4,335	730	**16.8**	722	6	1	0	1	0	**8**	**1**	**1.1**	**0.1**
Jackson	33.0	67.9	11,436	2,962	**25.9**	2,772	162	12	13	2	1	**190**	**16**	**6.4**	**0.5**
Kalamazoo	22.5	62.6	18,813	3,537	**18.8**	3,410	104	12	10	1	0	**127**	**11**	**3.6**	**0.3**
Kalkaska	13.2	49.3	1,243	222	**17.9**	218	4	0	0	0	0	**4**	**0**	**1.8**	**0.0**
Kent	24.8	59.2	52,782	10,367	**19.6**	9,817	482	15	43	9	1	**550**	**53**	**5.3**	**0.5**
Keweenaw	46.9	77.6	119	28	**23.5**	26	2	0	0	0	0	**2**	**0**	**7.1**	**0.0**
Lake	12.5	52.6	632	120	**19.0**	119	1	0	0	0	0	**1**	**0**	**0.8**	**0.0**
Lapeer	20.4	52.9	5,661	1,011	**17.9**	974	36	1	0	0	0	**37**	**0**	**3.7**	**0.0**

Childhood Lead Poisoning Data Facts (PRELIMINARY)
All Counties in Michigan - Children less than Six Years of Age
Calendar Year 2013

				Children < Age 6, Tested for Lead		Children Tested, by Highest Blood Lead Level									
County	%Pre-1950 Housing	%Pre-1978 Housing	Children Under Age 6	Number of Children Tested	% Tested	<5 ug/dL (capillary or venous)	5 to 9 ug/dL (capillary or venous)	Capillary >= 10 ug/dL, not confirmed by venous	Confirmed 10-19 ug/dL (venous only)	Confirmed 20-44 ug/dL (venous only)	Confirmed ≥45 ug/dL (venous only)	Total ≥ 5 µg/dL	Total Confirmed >=10 ug/dL	% with BLL >= 5 ug/dL	% Confirmed >= 10 ug/dL
Leelanau	17.9	46.5	1,129	213	**18.9**	206	6	1	0	0	0	**7**	**0**	**3.3**	**0.0**
Lenawee	33.6	67.2	6,878	1,512	**22.0**	1,425	72	10	3	1	0	**86**	**4**	**5.7**	**0.3**
Livingston	11.4	39.0	12,273	1,095	**8.9**	1,083	11	0	0	1	0	**12**	**1**	**1.1**	**0.1**
Luce	23.8	64.3	365	73	**20.0**	71	2	0	0	0	0	**2**	**0**	**2.7**	**0.0**
Mackinac	23.4	58.6	588	116	**19.7**	110	6	0	0	0	0	**6**	**0**	**5.2**	**0.0**
Macomb	9.3	59.1	59,055	9,834	**16.7**	9,677	129	8	12	6	2	**157**	**20**	**1.6**	**0.2**
Manistee	28.8	63.9	1,319	246	**18.7**	231	12	1	2	0	0	**15**	**2**	**6.1**	**0.8**
Marquette	27.9	69.4	4,118	514	**12.5**	494	17	1	2	0	0	**20**	**2**	**3.9**	**0.4**
Mason	32.1	64.6	1,939	364	**18.8**	324	33	5	2	0	0	**40**	**2**	**11.0**	**0.6**
Mecosta	18.2	53.4	2,676	365	**13.6**	359	6	0	0	0	0	**6**	**0**	**1.6**	**0.0**
Menominee	35.4	73.2	1,402	261	**18.6**	251	9	0	1	0	0	**10**	**1**	**3.8**	**0.4**
Midland	15.2	58.7	5,704	501	**8.8**	493	7	1	0	0	0	**8**	**0**	**1.6**	**0.0**
Missaukee	21.2	56.2	1,069	133	**12.4**	133	0	0	0	0	0	**0**	**0**	**0.0**	**0.0**
Monroe	23.0	59.0	10,600	1,684	**15.9**	1,642	39	3	0	0	0	**42**	**0**	**2.5**	**0.0**
Montcalm	27.3	57.7	4,690	610	**13.0**	602	8	0	0	0	0	**8**	**0**	**1.3**	**0.0**
Montmorency	18.1	58.6	445	80	**18.0**	80	0	0	0	0	0	**0**	**0**	**0.0**	**0.0**
Muskegon	25.8	66.2	13,574	3,021	**22.3**	2,876	124	7	12	2	0	**145**	**14**	**4.8**	**0.5**
Newaygo	19.3	53.6	3,651	426	**11.7**	422	4	0	0	0	0	**4**	**0**	**0.9**	**0.0**
Oakland	14.7	60.5	83,246	14,037	**16.9**	13,820	185	6	20	4	1	**216**	**25**	**1.5**	**0.2**
Oceana	25.8	57.8	2,148	515	**24.0**	498	14	1	2	0	0	**17**	**2**	**3.3**	**0.4**
Ogemaw	12.8	61.6	1,265	95	**7.5**	93	2	0	0	0	0	**2**	**0**	**2.1**	**0.0**
Ontonagon	39.1	73.2	291	48	**16.5**	48	0	0	0	0	0	**0**	**0**	**0.0**	**0.0**
Osceola	22.6	56.6	1,762	361	**20.5**	349	8	0	1	2	1	**12**	**4**	**3.3**	**1.1**
Oscoda	17.8	62.1	532	48	**9.0**	47	1	0	0	0	0	**1**	**0**	**2.1**	**0.0**
Otsego	12.2	50.3	1,674	315	**18.8**	314	1	0	0	0	0	**1**	**0**	**0.3**	**0.0**
Ottawa	15.7	45.3	21,497	2,928	**13.6**	2,836	82	7	3	0	0	**92**	**3**	**3.1**	**0.1**
Presque Isle	21.1	66.3	649	121	**18.6**	121	0	0	0	0	0	**0**	**0**	**0.0**	**0.0**
Roscommon	13.1	58.7	1,143	215	**18.8**	211	4	0	0	0	0	**4**	**0**	**1.9**	**0.0**
Saginaw	28.1	73.1	14,304	3,769	**26.3**	3,637	110	9	12	1	0	**132**	**13**	**3.5**	**0.3**
St Clair	25.8	59.4	11,319	2,596	**22.9**	2,475	109	9	3	0	0	**121**	**3**	**4.7**	**0.1**
St Joseph	27.5	65.1	5,148	980	**19.0**	942	32	4	1	1	0	**38**	**2**	**3.9**	**0.2**
Sanilac	30.7	64.6	3,053	542	**17.8**	525	16	0	1	0	0	**17**	**1**	**3.1**	**0.2**
Schoolcraft	25.5	63.3	491	88	**17.9**	88	0	0	0	0	0	**0**	**0**	**0.0**	**0.0**
Shiawassee	33.9	68.2	4,844	1,230	**25.4**	1,184	40	1	3	2	0	**46**	**5**	**3.7**	**0.4**
Tuscola	30.2	67.4	3,768	903	**24.0**	882	21	0	0	0	0	**21**	**0**	**2.3**	**0.0**
Van Buren	23.3	58.1	5,901	879	**14.9**	859	15	1	4	0	0	**20**	**4**	**2.3**	**0.5**
Washtenaw	17.2	56.5	23,105	2,733	**11.8**	2,686	43	1	2	1	0	**47**	**3**	**1.7**	**0.1**
Wayne ex Det	22.6	74.5	78,340	19,044	**24.3**	18,560	403	28	42	11	0	**484**	**53**	**2.5**	**0.3**
Wexford	23.0	53.7	2,690	328	**12.2**	318	9	1	0	0	0	**10**	**0**	**3.0**	**0.0**
Detroit, City of	62.2	93.2	62,377	24,496	**39.3**	22,511	1,576	60	280	62	7	**1,985**	**349**	**8.1**	**1.4**
MICHIGAN	24.7	64.8	718,389	146,271	**20.4**	140,590	4,774	254	515	123	13	**5,679**	**651**	**3.9**	**0.4**

Sources: US Census Bureau, Census 2010 (Pre-1950 Housing, Pre-1978 Housing and County Populations) and American Community Survey 2010 5-year estimates (Detroit population); MDCH Data Warehouse (children tested)

Note: %EBLL is calculated as follows: Number of Children w/EBLL divided by (Number of Children Tested minus Children w/elevated capillary tests, not confirmed by venous)

February 14, 2013

Childhood Lead Poisoning Data Facts (PRELIMINARY)
All Counties in Michigan - Children One and Two Years of Age
Calendar Year 2013

				Children Ages 1 & 2, Tested for Lead		Children Tested, by Highest Blood Lead Level									
County	%Pre-1950 Housing	%Pre-1978 Housing	Children Ages One and Two	Number of Children Tested	% Tested	<5 ug/dL (capillary or venous)	5 to 9 ug/dL (capillary or venous)	Capillary >= 10 ug/dL, not confirmed by venous	Confirmed 10-19 ug/dL (venous only)	Confirmed 20-44 ug/dL (venous only)	Confirmed ≥45 ug/dL (venous only)	Total ≥ 5 µg/dL	Total Confirmed >=10 ug/dL	% with BLL >= 5 ug/dL	% Confirmed >= 10 ug/dL
Alcona	12.4	61.5	125	39	**31.2**	38	1	0	0	0	0	**1**	**0**	**2.6**	**0.0**
Alger	29.5	64.1	144	65	**45.1**	64	1	0	0	0	0	**1**	**0**	**1.5**	**0.0**
Allegan	23.2	51.1	2,962	758	**25.6**	732	23	1	2	0	0	**26**	**2**	**3.4**	**0.3**
Alpena	25.3	71.6	608	251	**41.3**	245	5	1	0	0	0	**6**	**0**	**2.4**	**0.0**
Antrim	18.8	52.6	431	174	**40.4**	170	3	1	0	0	0	**4**	**0**	**2.3**	**0.0**
Arenac	19.8	58.2	304	127	**41.8**	126	1	0	0	0	0	**1**	**0**	**0.8**	**0.0**
Baraga	34.0	71.7	163	96	**58.9**	96	0	0	0	0	0	**0**	**0**	**0.0**	**0.0**
Barry	27.1	57.3	1,386	368	**26.6**	360	7	1	0	0	0	**8**	**0**	**2.2**	**0.0**
Bay	33.9	75.6	2,478	1,239	**50.0**	1,175	57	0	6	1	0	**64**	**7**	**5.2**	**0.6**
Benzie	18.6	46.3	365	135	**37.0**	130	5	0	0	0	0	**5**	**0**	**3.7**	**0.0**
Berrien	28.6	72.2	3,848	1,321	**34.3**	1,269	42	0	8	2	0	**52**	**10**	**3.9**	**0.8**
Branch	30.9	65.3	1,205	298	**24.7**	277	18	2	0	1	0	**21**	**1**	**7.0**	**0.3**
Calhoun	36.1	75.3	3,511	1,184	**33.7**	1,144	33	0	6	1	0	**40**	**7**	**3.4**	**0.6**
Cass	22.4	59.9	1,183	373	**31.5**	358	12	2	1	0	0	**15**	**1**	**4.0**	**0.3**
Charlevoix	25.3	54.4	510	207	**40.6**	207	0	0	0	0	0	**0**	**0**	**0.0**	**0.0**
Cheboygan	20.9	53.5	460	203	**44.1**	201	0	2	0	0	0	**2**	**0**	**1.0**	**0.0**
Chippewa	25.1	58.6	745	243	**32.6**	240	3	0	0	0	0	**3**	**0**	**1.2**	**0.0**
Clare	14.5	58.8	692	329	**47.5**	328	1	0	0	0	0	**1**	**0**	**0.3**	**0.0**
Clinton	22.5	52.8	1,772	311	**17.6**	306	5	0	0	0	0	**5**	**0**	**1.6**	**0.0**
Crawford	13.7	55.6	269	72	**26.8**	67	5	0	0	0	0	**5**	**0**	**6.9**	**0.0**
Delta	33.3	68.0	768	368	**47.9**	353	12	2	1	0	0	**15**	**1**	**4.1**	**0.3**
Dickinson	38.9	71.7	525	272	**51.8**	266	3	2	1	0	0	**6**	**1**	**2.2**	**0.4**
Eaton	20.4	56.4	2,463	726	**29.5**	718	6	2	0	0	0	**8**	**0**	**1.1**	**0.0**
Emmet	23.0	48.3	675	232	**34.4**	230	2	0	0	0	0	**2**	**0**	**0.9**	**0.0**
Genesee	19.9	68.0	10,815	4,561	**42.2**	4,445	98	9	4	5	0	**116**	**9**	**2.5**	**0.2**
Gladwin	12.4	49.5	507	172	**33.9**	170	2	0	0	0	0	**2**	**0**	**1.2**	**0.0**
Gogebic	50.0	76.7	313	142	**45.4**	139	3	0	0	0	0	**3**	**0**	**2.1**	**0.0**
Grand Traverse	14.7	43.5	1,970	558	**28.3**	535	21	2	0	0	0	**23**	**0**	**4.1**	**0.0**
Gratiot	34.7	69.8	875	307	**35.1**	302	5	0	0	0	0	**5**	**0**	**1.6**	**0.0**
Hillsdale	36.5	63.2	1,126	352	**31.3**	337	14	0	1	0	0	**15**	**1**	**4.3**	**0.3**
Houghton	53.4	75.5	853	455	**53.3**	433	22	0	0	0	0	**22**	**0**	**4.8**	**0.0**
Huron	31.8	68.9	651	222	**34.1**	208	13	0	1	0	0	**14**	**1**	**6.3**	**0.5**
Ingham	24.9	68.2	6,439	2,770	**43.0**	2,638	128	1	3	0	0	**132**	**3**	**4.8**	**0.1**
Ionia	35.8	63.0	1,678	649	**38.7**	639	9	1	0	0	0	**10**	**0**	**1.5**	**0.0**
Iosco	12.7	65.6	403	103	**25.6**	102	0	1	0	0	0	**1**	**0**	**1.0**	**0.0**
Iron	44.1	72.1	218	109	**50.0**	106	3	0	0	0	0	**3**	**0**	**2.8**	**0.0**
Isabella	16.3	48.2	1,417	458	**32.3**	455	2	1	0	0	0	**3**	**0**	**0.7**	**0.0**
Jackson	33.0	67.9	3,717	2,101	**56.5**	1,953	125	10	11	1	1	**148**	**13**	**7.0**	**0.6**
Kalamazoo	22.5	62.6	6,292	2,108	**33.5**	2,019	76	8	5	0	0	**89**	**5**	**4.2**	**0.2**
Kalkaska	13.2	49.3	428	120	**28.0**	117	3	0	0	0	0	**3**	**0**	**2.5**	**0.0**
Kent	24.8	59.2	17,581	8,352	**47.5**	7,918	379	12	36	6	1	**434**	**43**	**5.2**	**0.5**
Keweenaw	46.9	77.6	43	23	**53.5**	21	2	0	0	0	0	**2**	**0**	**8.7**	**0.0**
Lake	12.5	52.6	233	89	**38.2**	89	0	0	0	0	0	**0**	**0**	**0.0**	**0.0**
Lapeer	20.4	52.9	1,814	697	**38.4**	667	29	1	0	0	0	**30**	**0**	**4.3**	**0.0**

Childhood Lead Poisoning Data Facts (PRELIMINARY)
All Counties in Michigan - Children One and Two Years of Age
Calendar Year 2013

				Children Ages 1 & 2, Tested for Lead		Children Tested, by Highest Blood Lead Level									
County	%Pre-1950 Housing	%Pre-1978 Housing	Children Ages One and Two	Number of Children Tested	% Tested	<5 ug/dL (capillary or venous)	5 to 9 ug/dL (capillary or venous)	Capillary >= 10 ug/dL, not confirmed by venous	Confirmed 10-19 ug/dL (venous only)	Confirmed 20-44 ug/dL (venous only)	Confirmed ≥45 ug/dL (venous only)	Total ≥ 5 µg/dL	Total Confirmed >=10 ug/dL	% with BLL >= 5 ug/dL	% Confirmed >= 10 ug/dL
Leelanau	17.9	46.5	349	114	**32.7**	109	5	0	0	0	0	**5**	**0**	**4.4**	**0.0**
Lenawee	33.6	67.2	2,216	959	**43.3**	908	41	7	2	1	0	**51**	**3**	**5.3**	**0.3**
Livingston	11.4	39.0	3,859	815	**21.1**	806	8	0	0	1	0	**9**	**1**	**1.1**	**0.1**
Luce	23.8	64.3	125	69	**55.2**	68	1	0	0	0	0	**1**	**0**	**1.4**	**0.0**
Mackinac	23.4	58.6	169	88	**52.1**	83	5	0	0	0	0	**5**	**0**	**5.7**	**0.0**
Macomb	9.3	59.1	19,109	6,202	**32.5**	6,108	82	3	5	2	2	**94**	**9**	**1.5**	**0.1**
Manistee	28.8	63.9	431	214	**49.7**	200	11	1	2	0	0	**14**	**2**	**6.5**	**0.9**
Marquette	27.9	69.4	1,395	432	**31.0**	413	16	1	2	0	0	**19**	**2**	**4.4**	**0.5**
Mason	32.1	64.6	619	118	**19.1**	112	6	0	0	0	0	**6**	**0**	**5.1**	**0.0**
Mecosta	18.2	53.4	880	267	**30.3**	263	4	0	0	0	0	**4**	**0**	**1.5**	**0.0**
Menominee	35.4	73.2	481	205	**42.6**	196	8	0	1	0	0	**9**	**1**	**4.4**	**0.5**
Midland	15.2	58.7	1,846	291	**15.8**	287	4	0	0	0	0	**4**	**0**	**1.4**	**0.0**
Missaukee	21.2	56.2	358	102	**28.5**	102	0	0	0	0	0	**0**	**0**	**0.0**	**0.0**
Monroe	23.0	59.0	3,400	1,235	**36.3**	1,208	26	1	0	0	0	**27**	**0**	**2.2**	**0.0**
Montcalm	27.3	57.7	1,567	417	**26.6**	410	7	0	0	0	0	**7**	**0**	**1.7**	**0.0**
Montmorency	18.1	58.6	144	64	**44.4**	64	0	0	0	0	0	**0**	**0**	**0.0**	**0.0**
Muskegon	25.8	66.2	4,515	1,707	**37.8**	1,612	79	5	9	2	0	**95**	**11**	**5.6**	**0.6**
Newaygo	19.3	53.6	1,229	358	**29.1**	355	3	0	0	0	0	**3**	**0**	**0.8**	**0.0**
Oakland	14.7	60.5	27,176	7,581	**27.9**	7,446	119	3	9	3	1	**135**	**13**	**1.8**	**0.2**
Oceana	25.8	57.8	706	252	**35.7**	245	6	0	1	0	0	**7**	**1**	**2.8**	**0.4**
Ogemaw	12.8	61.6	410	75	**18.3**	73	2	0	0	0	0	**2**	**0**	**2.7**	**0.0**
Ontonagon	39.1	73.2	86	37	**43.0**	37	0	0	0	0	0	**0**	**0**	**0.0**	**0.0**
Osceola	22.6	56.6	555	258	**46.5**	251	4	0	1	1	1	**7**	**3**	**2.7**	**1.2**
Oscoda	17.8	62.1	160	33	**20.6**	33	0	0	0	0	0	**0**	**0**	**0.0**	**0.0**
Otsego	12.2	50.3	556	186	**33.5**	186	0	0	0	0	0	**0**	**0**	**0.0**	**0.0**
Ottawa	15.7	45.3	7,028	2,509	**35.7**	2,434	68	4	3	0	0	**75**	**3**	**3.0**	**0.1**
Presque Isle	21.1	66.3	204	86	**42.2**	86	0	0	0	0	0	**0**	**0**	**0.0**	**0.0**
Roscommon	13.1	58.7	403	179	**44.4**	175	4	0	0	0	0	**4**	**0**	**2.2**	**0.0**
Saginaw	28.1	73.1	4,611	2,777	**60.2**	2,683	78	7	8	1	0	**94**	**9**	**3.4**	**0.3**
St Clair	25.8	59.4	3,618	1,221	**33.7**	1,146	69	4	2	0	0	**75**	**2**	**6.1**	**0.2**
St Joseph	27.5	65.1	1,719	645	**37.5**	617	24	4	0	0	0	**28**	**0**	**4.3**	**0.0**
Sanilac	30.7	64.6	984	266	**27.0**	255	10	0	1	0	0	**11**	**1**	**4.1**	**0.4**
Schoolcraft	25.5	63.3	165	76	**46.1**	76	0	0	0	0	0	**0**	**0**	**0.0**	**0.0**
Shiawassee	33.9	68.2	1,561	758	**48.6**	725	28	1	2	2	0	**33**	**4**	**4.4**	**0.5**
Tuscola	30.2	67.4	1,249	582	**46.6**	568	14	0	0	0	0	**14**	**0**	**2.4**	**0.0**
Van Buren	23.3	58.1	1,888	525	**27.8**	513	9	0	3	0	0	**12**	**3**	**2.3**	**0.6**
Washtenaw	17.2	56.5	7,445	1,808	**24.3**	1,776	29	1	1	1	0	**32**	**2**	**1.8**	**0.1**
Wayne ex Det	22.6	74.5	24,586	10,230	**41.6**	9,958	225	15	24	8	0	**272**	**32**	**2.7**	**0.3**
Wexford	23.0	53.7	894	254	**28.4**	246	7	1	0	0	0	**8**	**0**	**3.1**	**0.0**
Detroit, City of	62.2	93.2	20,749	10,246	**49.4**	9,175	826	31	164	44	6	**1,071**	**214**	**10.5**	**2.1**
MICHIGAN	24.7	64.8	234,410	87,980	**37.5**	84,401	3,007	151	326	83	12	**3,579**	**421**	**4.1**	**0.5**

Sources: US Census Bureau, Census 2010 (Pre-1950 Housing, Pre-1978 Housing and County Populations) and American Community Survey 2010 5-year estimates (Detroit population); MDCH Data Warehouse (children tested)

Note: %EBLL is calculated as follows: Number of Children w/EBLL divided by (Number of Children Tested minus Children w/elevated capillary tests, not confirmed by venous)

February 14, 2013

Childhood Lead Poisoning Data Facts (PRELIMINARY)
All Counties in Michigan
Calendar Year 2013
Blood Lead Testing Among Children who are Insured by Medicaid

	Children age 1 & 2 years, Insured by Medicaid							Children age 3 through 5 years, Insured by Medicaid				
County	Children, age 1-2 yrs	Children Tested	% Tested	Children with BLL 5 - 9 ug/dL	Children with Venous BLL >= 10 ug/dL	% >= 5	% >= 10	Children Tested for Lead Poisoning	Children with BLL 5 - 9 ug/dL	Children with Venous BLL >= 10 ug/dL	% >= 5	% >= 10
Alcona	80	37	46.3	1	0	2.7	0.0	9	0	0	0.0	0.0
Alger	77	54	70.1	0	0	0.0	0.0	3	0	0	0.0	0.0
Allegan	1,218	537	44.1	19	2	3.9	0.4	281	7	0	2.5	0.0
Alpena	305	232	76.1	5	0	2.2	0.0	33	1	0	3.0	0.0
Antrim	236	158	66.9	3	0	1.9	0.0	45	2	0	4.4	0.0
Arenac	155	104	67.1	1	0	1.0	0.0	31	1	0	3.2	0.0
Baraga	96	78	81.3	0	0	0.0	0.0	22	1	0	4.5	0.0
Barry	562	300	53.4	6	0	2.0	0.0	36	1	0	2.8	0.0
Bay	1,094	948	86.7	53	7	6.3	0.7	158	7	1	5.1	0.6
Benzie	156	121	77.6	5	0	4.1	0.0	46	1	0	2.2	0.0
Berrien	2,149	1,171	54.5	39	10	4.2	0.9	349	9	3	3.4	0.9
Branch	583	264	45.3	17	1	6.8	0.4	322	13	0	4.0	0.0
Calhoun	1,935	834	43.1	25	7	3.8	0.8	201	12	5	8.5	2.5
Cass	596	343	57.6	12	1	3.8	0.3	66	4	0	6.1	0.0
Charlevoix	284	194	68.3	0	0	0.0	0.0	42	2	0	4.8	0.0
Cheboygan	269	191	71.0	0	0	0.0	0.0	44	0	0	0.0	0.0
Chippewa	402	185	46.0	2	0	1.1	0.0	92	1	0	1.1	0.0
Clare	410	314	76.6	1	0	0.3	0.0	64	2	0	3.1	0.0
Clinton	526	244	46.4	5	0	2.0	0.0	166	4	0	2.4	0.0
Crawford	134	72	53.7	5	0	6.9	0.0	11	1	0	9.1	0.0
Delta	385	352	91.4	12	1	3.7	0.3	80	4	0	5.0	0.0
Dickinson	239	234	97.9	3	0	1.3	0.0	16	0	0	0.0	0.0
Eaton	926	625	67.5	7	0	1.1	0.0	334	4	0	1.2	0.0
Emmet	296	202	68.2	2	0	1.0	0.0	44	0	0	0.0	0.0
Genesee	6,054	3,667	60.6	77	10	2.4	0.3	1,714	31	1	1.9	0.1
Gladwin	261	170	65.1	2	0	1.2	0.0	68	3	0	4.4	0.0
Gogebic	155	122	78.7	2	0	1.6	0.0	34	1	0	2.9	0.0
Grand Traverse	789	424	53.7	19	0	4.5	0.0	151	2	0	1.3	0.0
Gratiot	483	293	60.7	4	0	1.4	0.0	96	1	0	1.0	0.0
Hillsdale	546	289	52.9	13	0	4.5	0.0	206	7	0	3.4	0.0
Houghton	355	268	75.5	18	0	6.7	0.0	51	1	1	3.9	2.0
Huron	331	189	57.1	12	1	6.9	0.5	135	7	0	5.2	0.0
Ingham	3,052	2,385	78.1	116	3	5.0	0.1	1638	73	2	4.6	0.1
Ionia	710	570	80.3	9	0	1.6	0.0	147	2	1	2.0	0.7
Iosco	302	97	32.1	0	0	0.0	0.0	38	3	0	7.9	0.0
Iron	117	97	82.9	3	0	3.1	0.0	28	0	0	0.0	0.0
Isabella	558	330	59.1	2	0	0.6	0.0	192	2	0	1.0	0.0
Jackson	1,958	1,520	77.6	107	11	7.8	0.7	555	27	2	5.2	0.4
Kalamazoo	2,711	1,535	56.6	67	4	4.6	0.3	503	15	6	4.2	1.2
Kalkaska	230	110	47.8	2	0	1.8	0.0	27	1	0	3.7	0.0
Kent	7,609	6,596	86.7	354	40	6.0	0.6	1,101	82	9	8.3	0.8
Keweenaw	19	12	63.2	1	0	8.3	0.0	4	0	0	0.0	0.0
Lake	128	89	69.5	0	0	0.0	0.0	26	0	0	0.0	0.0
Lapeer	806	548	68.0	24	0	4.4	0.0	243	4	0	1.6	0.0
Leelanau	143	88	61.5	4	0	4.5	0.0	33	0	0	0.0	0.0

Childhood Lead Poisoning Data Facts (PRELIMINARY)
All Counties in Michigan
Calendar Year 2013
Blood Lead Testing Among Children who are Insured by Medicaid

	Children age 1 & 2 years, Insured by Medicaid							Children age 3 through 5 years, Insured by Medicaid				
County	Children, age 1-2 yrs	Children Tested	% Tested	Children with BLL 5 - 9 ug/dL	Children with Venous BLL >= 10 ug/dL	% >= 5	% >= 10	Children Tested for Lead Poisoning	Children with BLL 5 - 9 ug/dL	Children with Venous BLL >= 10 ug/dL	% >= 5	% >= 10
Lenawee	1,057	733	69.3	36	2	5.2	0.3	297	24	1	8.4	0.3
Livingston	991	605	61.0	4	1	0.8	0.2	133	1	0	0.8	0.0
Luce	68	58	85.3	0	0	0.0	0.0	5	1	0	20.0	0.0
Mackinac	104	72	69.2	3	0	4.2	0.0	15	0	0	0.0	0.0
Macomb	7,879	3,894	49.4	55	6	1.6	0.2	1995	25	11	1.8	0.6
Manistee	229	185	80.8	9	1	5.4	0.5	20	1	0	5.0	0.0
Marquette	540	358	66.3	12	2	3.9	0.6	66	1	1	3.0	1.5
Mason	347	105	30.3	5	0	4.8	0.0	61	9	0	14.8	0.0
Mecosta	466	222	47.6	4	0	1.8	0.0	60	1	0	1.7	0.0
Menominee	204	161	78.9	8	0	5.0	0.0	43	1	0	2.3	0.0
Midland	727	222	30.5	3	0	1.4	0.0	155	3	0	1.9	0.0
Missaukee	198	101	51.0	0	0	0.0	0.0	17	0	0	0.0	0.0
Monroe	1,423	890	62.5	25	0	2.8	0.0	248	9	0	3.6	0.0
Montcalm	830	370	44.6	6	0	1.6	0.0	126	1	0	0.8	0.0
Montmorency	80	59	73.8	0	0	0.0	0.0	10	0	0	0.0	0.0
Muskegon	2,548	1,304	51.2	78	10	6.7	0.8	1029	41	3	4.3	0.3
Newaygo	672	292	43.5	3	0	1.0	0.0	40	0	0	0.0	0.0
Oakland	8,003	4,241	53.0	82	9	2.1	0.2	2633	34	7	1.6	0.3
Oceana	424	240	56.6	4	1	2.1	0.4	205	1	1	1.0	0.5
Ogemaw	236	70	29.7	2	0	2.9	0.0	19	0	0	0.0	0.0
Ontonagon	40	32	80.0	0	0	0.0	0.0	10	0	0	0.0	0.0
Osceola	313	243	77.6	4	3	2.9	1.2	91	4	1	5.5	1.1
Oscoda	87	29	33.3	0	0	0.0	0.0	10	0	0	0.0	0.0
Otsego	304	172	56.6	0	0	0.0	0.0	116	1	0	0.9	0.0
Ottawa	2,114	1,468	69.4	43	2	3.1	0.1	249	8	1	3.6	0.4
Presque Isle	117	73	62.4	0	0	0.0	0.0	17	0	0	0.0	0.0
Roscommon	259	176	68.0	4	0	2.3	0.0	35	0	0	0.0	0.0
Saginaw	2,625	2,147	81.8	73	10	3.9	0.5	728	27	4	4.3	0.5
St Clair	1,804	1,073	59.5	64	2	6.2	0.2	865	33	0	3.8	0.0
St Joseph	903	567	62.8	21	0	3.7	0.0	255	7	1	3.1	0.4
Sanilac	513	234	45.6	8	1	3.8	0.4	160	4	0	2.5	0.0
Schoolcraft	80	71	88.8	0	0	0.0	0.0	0	0	0	---	---
Shiawassee	751	610	81.2	27	4	5.1	0.7	302	9	1	3.3	0.3
Tuscola	592	464	78.4	13	0	2.8	0.0	242	7	0	2.9	0.0
Van Buren	1,090	438	40.2	6	3	2.1	0.7	185	3	0	1.6	0.0
Washtenaw	2,422	1,082	44.7	16	2	1.7	0.2	702	11	1	1.7	0.1
Wayne ex Det	11,515	7,375	64.0	183	24	2.8	0.3	5,878	132	22	2.6	0.4
Wexford	529	243	45.9	7	0	2.9	0.0	35	0	0	0.0	0.0
Detroit, City of	17,476	9,811	56.1	816	209	10.4	2.1	12,197	720	141	7.1	1.2
MICHIGAN	110,990	67,683	61.0	2,683	390	4.5	0.6	38,739	1,458	227	4.3	0.6

Source: MDCH Data Warehouse

February 14, 2013

Childhood Lead Poisoning Data Facts (PREMLIMINARY)
Fourteen Target Communities in Michigan
Calendar Year 2012
Children less than Six Years of Age

				Children < Age 6, Tested for Lead		Children Tested, by Highest Blood Lead Level									
Target Community	%Pre-1950 Housing	%Pre-1978 Housing	Children Under Age 6	Number of Children Tested	**% Tested**	<5 ug/dL (capillary, venous or unknown)	5 to 9 ug/dL (capillary, venous or unknown)	Capillary >= 10 ug/dL, not confirmed by venous	Confirmed 10-19 ug/dL (venous only)	Confirmed 20-44 ug/dL (venous only)	Confirmed ≥45 ug/dL (venous only)	**Total ≥ 5 µg/dL**	**Total Confirmed >=10 ug/dL**	**% with BLL >= 5 ug/dL**	**% Confirmed >= 10 ug/dL**
Battle Creek	43.0	79.6	4,824	868	**18.0**	837	26	0	2	3	0	31	5	3.6	0.6
Benton Harbor	57.7	84.0	1,330	299	**22.5**	273	24	0	2	0	0	26	2	8.7	0.7
Dearborn	48.1	85.3	10,184	2,381	**23.4**	2,328	40	2	7	4	0	53	11	2.2	0.5
Detroit	62.2	93.3	62,377	24,496	**39.3**	22,511	1,576	60	280	62	7	1985	349	8.1	1.4
Flint	38.0	89.7	10,071	2,304	**22.9**	2,226	70	0	4	4	0	78	8	3.4	0.3
Grand Rapids	48.1	81.5	17,604	4,624	**26.3**	4,196	369	12	38	8	1	428	47	9.3	1.0
Hamtramck	78.2	94.6	2,203	997	**45.3**	922	59	8	6	2	0	75	8	7.5	0.8
Highland Park	68.8	87.9	1,041	327	**31.4**	277	36	11	3	0	0	50	3	15.3	0.9
Jackson	67.6	91.6	3,502	1,126	**32.2**	1,006	101	7	10	1	1	120	12	10.7	1.1
Kalamazoo	40.8	78.8	5,331	1,407	**26.4**	1,320	69	10	7	1	0	87	8	6.2	0.6
Lansing	35.7	81.9	9,857	3,109	**31.5**	2,923	179	2	4	1	0	186	5	6.0	0.2
Muskegon/MuskHts	48.6	84.4	4,509	1,250	**27.7**	1,131	102	6	9	2	0	119	11	9.5	0.9
Pontiac	32.6	77.3	5,316	1,604	**30.2**	1,561	35	2	5	1	0	43	6	2.7	0.4
Saginaw	55.6	91.4	4,998	1,551	**31.0**	1,461	70	8	11	1	0	90	12	5.8	0.8
Subtotal	53.5	88.4	143,147	46,343	**32.4**	42,972	2,756	128	388	90	9	3,371	487	7.3	1.1
Michigan	24.7	64.8	718,389	146,271	**20.4**	140,590	4,774	254	515	123	13	5,679	651	3.9	0.4

Sources: US Census Bureau, Census 2010 (Pre-1950 Housing & Pre-1978 Housing) and American Community Survey 2010 5-year estimates, (Target Community populations); MDCH Data Warehouse (children tested)

February 14, 2013

Childhood Lead Poisoning Data Facts (PRELIMINARY)
Fourteen Target Communities in Michigan
Calendar Year 2012
Children One and Two Years of Age

				Children Age 1 & 2, Tested for Lead		Children Tested, by Highest Blood Lead Level									
Target Community	%Pre-1950 Housing	%Pre-1978 Housing	Children Age 1 & 2	Number of Children Tested	**% Tested**	<5 ug/dL (capillary, venous or unknown)	5 to 9 ug/dL (capillary, venous or unknown)	Capillary >= 10 ug/dL, not confirmed by venous	Confirmed 10-19 ug/dL (venous only)	Confirmed 20-44 ug/dL (venous only)	Confirmed ≥45 ug/dL (venous only)	**Total ≥ 5 µg/dL**	**Total Confirmed >=10 ug/dL**	**% with BLL >= 5 ug/dL**	**% Confirmed >= 10 ug/dL**
Battle Creek	43.0	79.6	1,652	522	**31.6**	520	18	0	2	0	0	20	2	3.8	0.4
Benton Harbor	57.7	84.0	458	195	**42.6**	193	18	0	2	0	0	20	2	10.3	1.0
Dearborn	48.1	85.3	3,448	1,224	**35.5**	1,217	24	2	5	2	0	33	7	2.7	0.6
Detroit	62.2	93.3	20,749	10,246	**49.4**	10,032	826	31	164	44	6	1071	214	10.5	2.1
Flint	38.0	89.7	3,409	1,483	**43.5**	1,475	52	6	4	4	0	66	8	4.5	0.5
Grand Rapids	48.1	81.5	5,949	3,655	**61.4**	3,618	290	10	31	5	1	337	37	9.2	1.0
Hamtramck	78.2	94.6	693	446	**64.4**	440	37	3	4	2	0	46	6	10.3	1.4
Highland Park	68.8	87.9	348	132	**37.9**	126	20	0	4	2	0	26	6	19.7	4.5
Jackson	67.6	91.6	1,193	770	**64.5**	761	76	7	9	0	0	92	9	11.9	1.2
Kalamazoo	40.8	78.8	1,783	814	**45.7**	810	51	8	4	0	0	63	4	7.7	0.5
Lansing	35.7	81.9	3,429	1,784	**52.0**	1,781	106	1	3	0	0	110	3	6.2	0.2
Muskegon/MuskHts	48.6	84.4	1,521	661	**43.5**	652	63	5	7	2	0	77	9	11.6	1.4
Pontiac	32.6	77.3	1,762	912	**51.8**	909	21	0	3	0	0	24	3	2.6	0.3
Saginaw	55.6	91.4	1,643	1,115	**67.9**	1,106	46	7	8	1	0	62	9	5.6	0.8
Subtotal	53.5	88.4	48,037	23,959	**49.9**	23,640	1,648	80	250	62	7	2,047	319	8.5	1.3
Michigan	24.7	64.8	234,410	87,980	**37.5**	84,401	3,007	151	326	83	12	3,579	421	4.1	0.5

Sources: US Census Bureau, Census 2010 (Pre-1950 Housing & Pre-1978 Housing) and American Community Survey 2010 5-year estimates, (Target Community populations); MDCH Data Warehouse (children tested)

February 14, 2013

From: Barron, Brad (DCH)
Sent: Wednesday, April 02, 2014 11:11 AM
To: Peeler, Nancy (DCH)
Subject: RE: Blood Lead Nursing Assessment

Hi Nancy –

I hope all is well. I would like to re-open this discussion of nursing assessment visits. In 2012 we spoke about the need to increase these in-home visits and I wanted to see if you or someone from your section could provide me with additional information or justification for why the limit of 2 visits is an unrealistic expectation and should be increased?

Thanks in advance,

-Brad

From: Peeler, Nancy (DCH)
Sent: Friday, October 05, 2012 11:33 AM
To: Barron, Brad (DCH)
Cc: Lishinski, Karen (DCH)
Subject: Re: Blood Lead Nursing Assessment

Thanks, Brad, good to know where to find this information. Yes. I think we can think about justification for changing what is currently offered, and how best to move forward in the future.

Sent from my iPhone

On Oct 5, 2012, at 11:29 AM, "Barron, Brad (DCH)" <BarronB@michigan.gov> wrote:

> I found this today within the Practitioner chapter of the Medicaid Provider manual:
>
> **Nursing Assessment/ Investigation Visits**
> MDCH covers up to two nursing assessment/investigation visits per episode of blood lead poisoning. If more than one child in the home has blood lead poisoning, the nursing assessment/investigation visits are covered for each child. Blood lead nursing visits must be provided in the child's home. For FFS beneficiaries, an enrolled home health agency, a LHD or other medical clinic, or a physician may conduct the visits. This procedure is not covered for Maternal Infant Health Program (MIHP) providers. Blood lead nursing visits provided through a MHP are covered by the individual MHP.
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> The first nursing assessment/investigation visit focuses on:
> - Assessment of the growth and developmental status of the child, including any symptomatology that may be present in the child.
> - Behavioral assessment of the child, including any aggressiveness and/or hyperactivity.
> - Nutritional assessment of the child.
> - Assessment of typical family practices that may produce lead risk (e.g., hobbies, occupation, cultural practices).
> - Limited physical identification of lead hazards within the dwelling.
> - Identification and planning for testing for any other family member at risk for sequelae of lead hazard exposure.
> - Education and information regarding lead hazards and ways to minimize those risks in the future.
> - Development of a family plan of care to increase the safety of the child from lead hazards.
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> The second blood lead nursing visit focuses on:
> - Reinforcement of the educational information presented to the family during the first visit.
> - Validation of the family's ability to carry out activities to minimize risks of continued lead exposure.
> - Modifications of the plan to minimize lead risks, as needed.

So, it is correct that a limit of 2 visits has been established. Would you be able to provide additional information or justification for why the limit of 2 visits is an unrealistic expectation? I know I have heard these complaints from Health Departments before. I have not looked in to the federal regulations related to this yet.

-Brad

Brad J. Barron, MPA
Medicaid Program Policy Division
Department of Community Health
(517)241-1286
barronb@michigan.gov

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From: Debbie <dbrinconsulting@gmail.com>
Sent: Friday, April 04, 2014 9:23 AM
To: Peeler, Nancy (DCH)
Subject: RE: Blood Lead Nursing Assessment

Absolutely. Just want to reach out to him. Lets meet next week. Good times for you?

From: Peeler, Nancy (DCH) [mailto:PeelerN@michigan.gov]
Sent: Friday, April 04, 2014 9:22 AM
To: Debbie
Subject: RE: Blood Lead Nursing Assessment

Yes, but I do want talk about and agree on the approach/strategy.

From: Debbie [mailto:dbrinconsulting@gmail.com]
Sent: Friday, April 04, 2014 5:35 AM
To: Peeler, Nancy (DCH)
Subject: RE: Blood Lead Nursing Assessment

Great. I know Brad are you ok if I reach out to him?

From: Peeler, Nancy (DCH) [mailto:PeelerN@michigan.gov]
Sent: Thursday, April 03, 2014 5:29 PM
To: Debbie Brinson (dbrinconsulting@gmail.com)
Subject: FW: Blood Lead Nursing Assessment
Importance: High

OK, help! Seems like maybe a door is open, but I'm not sure that's really the case.

1. Strategy – should we even try to argue for more nursing visits via this route (e.g. as 'nursing assessment visits'). I know we really want case management visits, which we have learned from you is NOT the same thing.
2. Documentation – if we respond, what would you suggest we provide?

Thanks for your help with thinking through this! I did let him know that we will put something together and asked him if there is a timeline for responding...will let you know what he says.

nancy

From: Barron, Brad (DCH)
Sent: Wednesday, April 02, 2014 11:11 AM
To: Peeler, Nancy (DCH)
Subject: RE: Blood Lead Nursing Assessment

Hi Nancy –

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Thanks in advance,

-Brad

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Sent: Friday, October 05, 2012 11:33 AM
To: Barron, Brad (DCH)
Cc: Lishinski, Karen (DCH)
Subject: Re: Blood Lead Nursing Assessment

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> -Brad
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> Brad J. Barron, MPA
> Medicaid Program Policy Division
> Department of Community Health
> (517)241-1286
> barronb@michigan.gov

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From: Scott, Robert L. (DCH)
Sent: Tuesday, April 08, 2014 9:46 AM
To: Peeler, Nancy (DCH)
Cc: Lishinski, Karen (DCH)
Subject: for your review while sitting in the airport
Attachments: CLPPP logic model draft 040214.pptx; Community Rx 040314.docx

Nancy,

Please see attached: drafts of logic model and community Rx. On the latter, I got the reading level down as far as I could while still providing the information.

Bob

Robert L. Scott
Childhood Lead Poisoning Prevention Program
Michigan Department of Community Health
(517) 335-8178

MDCH CLPPP LOGIC MODEL for FY 2014

INPUTS

- CLPPP Staff
- Medicaid
- MCIR
- IT staff from CDC, DTMB & MPHI
- LHD Grantees
- Other LHDs
- Other Partners
- Healthcare providers
- Laboratories and LeadCare users
- Federal $$
- State $$

ACTIVITIES

Nursing TA

Nurse Consultant
- TA for LHDs
- TA for Providers
- TA for parents

Intervention grants
- Detroit DHWP/IHP
- Kent Co HD
- Wayne Co HD

Surveillance & Reporting

Maintain & populate database
- Enforce mandate for reporting all BLLs to MDCH
- complete the transition from Approach to Access

Provide BLLs to LHDs
- complete the transition from STELLAR to HHLPSS

Send BLLs to Data Warehouse & MCIR

Education & Outreach Plan

Prevention grants (nine key communities)
- Community Rx
- Code Enforcement scorecard
- RPO Presentations

Education & Outreach grants (by Prosperity Region)
- Toolkit
- Presentations

Provider Education Workgroup
Non-Paint Collaborative

OUTPUTS

- Consultation as needed
- All grants monitored
- LHDs notified of all BLLs in their jurisdiction
- MDCH Data Warehouse is populated with BLL data for linking to Medicaid, MCIR and other
- Annual report to Legislature
  Annual report to stakeholders
  Other data reports as requested
- Community Rx template
- Code Enforcement scorecard
- RPO Presentations kit – PowerPoint outline and supporting documents
- Education & Outreach Toolkit

OBJECTIVES

- Complete case management for children with BLL >= 20, according to MDCH CLPPP protocol (including coordinating efforts among LHD/parents/provider)
- Some services for children with BLL 5 to 19
- Revise list of Target Communities based on recent data, revise Statewide Testing Plan accordingly
- Community Rx is completed for each funded community and available to providers
- Code Enforcement scorecard is completed for each funded community, with status identified, conversations begun
- Presentations for RPO groups in each funded community
- Education and training provided statewide to professionals who serve families

GOALS

- Health community responds to all children with Elevated BLLs
- Health & early childhood professionals area aware of the dangers of childhood lead poisoning, and know how to help families prevent it.
- RPOs and home-repair contractors are aware of the dangers of childhood lead poisoning, and know what they must do to eliminate lead hazards.
- Families are aware of the dangers of childhood lead poisoning, and know how to keep their children lead safe.
- Lead-related code enforcement policies are in place in key cities throughout Michigan.
- The prevalence of childhood lead poisoning continues to decrease in all areas of the state.

Community Rx for Children with Elevated Blood Lead Levels 5 to 14 µg/dL

Your child's name _____ Date _____

Your child's level is _____

Your child has been diagnosed with an elevated blood lead level. The most common source of lead poisoning is lead paint and lead dust in older homes. Lead is most harmful to children younger than 6 years old. The results can be lower IQ, learning problems, and behavior problems.

Follow-Up Instructions:

- ☐ Test your child again within three months. Call _____ for an appointment.
- ☐ Make sure all children in your home get a blood test for lead.
- ☐ Be sure to keep your child's next appointment for a checkup.
- ☐ Make sure your child is getting the healthy foods that your doctor suggests. [INSERT LOCAL WIC CONTACT INFO]
- ☐ Contact your county health department to learn about cleaning up lead. [INSERT HEALTH DEPT LEAD CONTACT]
- ☐ Have your home inspected for sources of lead by a certified inspector. [INSERT LOCAL INSPECTORS] [INSERT HEALTH DEPT INFO IF PPLICABLE]

Learn more about lead, how to keep your child safe, and who can help.

Call:

[INSERT HEALTH DEPT LEAD CONTACT]

Michigan's Childhood Lead Poisoning Prevention Program (888) 322-4453

On the Web:

www.leadfreekids.org
www.michigan.gov/lead
www.epa.gov/lead

Local Resources:

[INSERT LOCAL ORGANIZATIONS HERE, including name of organization, contact name, phone, and brief description of ways they can help. Include community-based and faith-based organizations, non-profits, safe housing resources, rental advocacy groups, free legal help, others as appropriate.]

From: Barron, Brad (DCH)
Sent: Tuesday, April 08, 2014 10:46 AM
To: Peeler, Nancy (DCH)
Subject: RE: Blood Lead Nursing Assessment

No specific timeline right now. I believe Deb Brinson has reached out to me to discuss this request further.

From: Peeler, Nancy (DCH)
Sent: Thursday, April 03, 2014 5:26 PM
To: Barron, Brad (DCH)
Subject: RE: Blood Lead Nursing Assessment

Hi Brad – thanks for getting back to us and asking for the information. We will put some info together for you and get back to you. Do you have a timeline in which you need a response from us?

Nancy

From: Barron, Brad (DCH)
Sent: Wednesday, April 02, 2014 11:11 AM
To: Peeler, Nancy (DCH)
Subject: RE: Blood Lead Nursing Assessment

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From: Peng, Qian (DCH)
Sent: Monday, April 21, 2014 11:14 AM
To: Embry, Sheila (DCH);Stiffler, Kathleen A. (DCH);Fink, Brenda (DCH);Peeler, Nancy (DCH);Christian, Stella (DCH);Edwards, Cynthia (DCH);McCandless, Karla K. (DCH);Zavala, Rita (DCH);Hadar, Sandy (DCH);Fitton, Stephen (DCH);Bien, Stan (DCH);Kahn, Heather (DCH);Scott, Robert L. (DCH)
Cc: Bowen, James (DCH)
Subject: April 2014 Blood Lead Testing Report
Attachments: 201404.pdf; APR 2013 - APR 2014 - PPC.pdf

Attached you will find the April 2014 Medicaid Blood Lead Testing report.

This report is produced on a monthly basis. The purpose of the Blood Lead Testing Report is to provide information on blood lead testing in the Medicaid population.

Effective October, 2010, Medicaid Health Plans were contractually required to ensure that at least eighty (80) percent of continuously enrolled two (2) year old children have had at least one (1) blood lead test on/or before their second birthday.

Effective August 1, 2012, McLaren Health Plan assumed CareSource Michigan's Medicaid operations in Michigan.

For April 2014:

- 6 out of 13 met the continuous enrollment requirement.

An additional report, **APR 2013 – APR 2014 - PPC.pdf**, demonstrates the progress that each health plan has made on "two year olds" blood lead tested over the past 12 months.

Please feel free to contact Qian (Daisy) Peng at 517-241-1388 or PengQ@Michigan.gov if you have any questions or concerns regarding these reports.

Thank you.

Medical Services Administration
Office of Medicaid Health Information Technology

MEDICAID BLOOD LEAD TESTING

April 2014

Produced by Data Management & Security Section
Office of Medicaid Health Information Technology
Cynthia Green-Edwards, Director

Blood Lead Testing Methodology

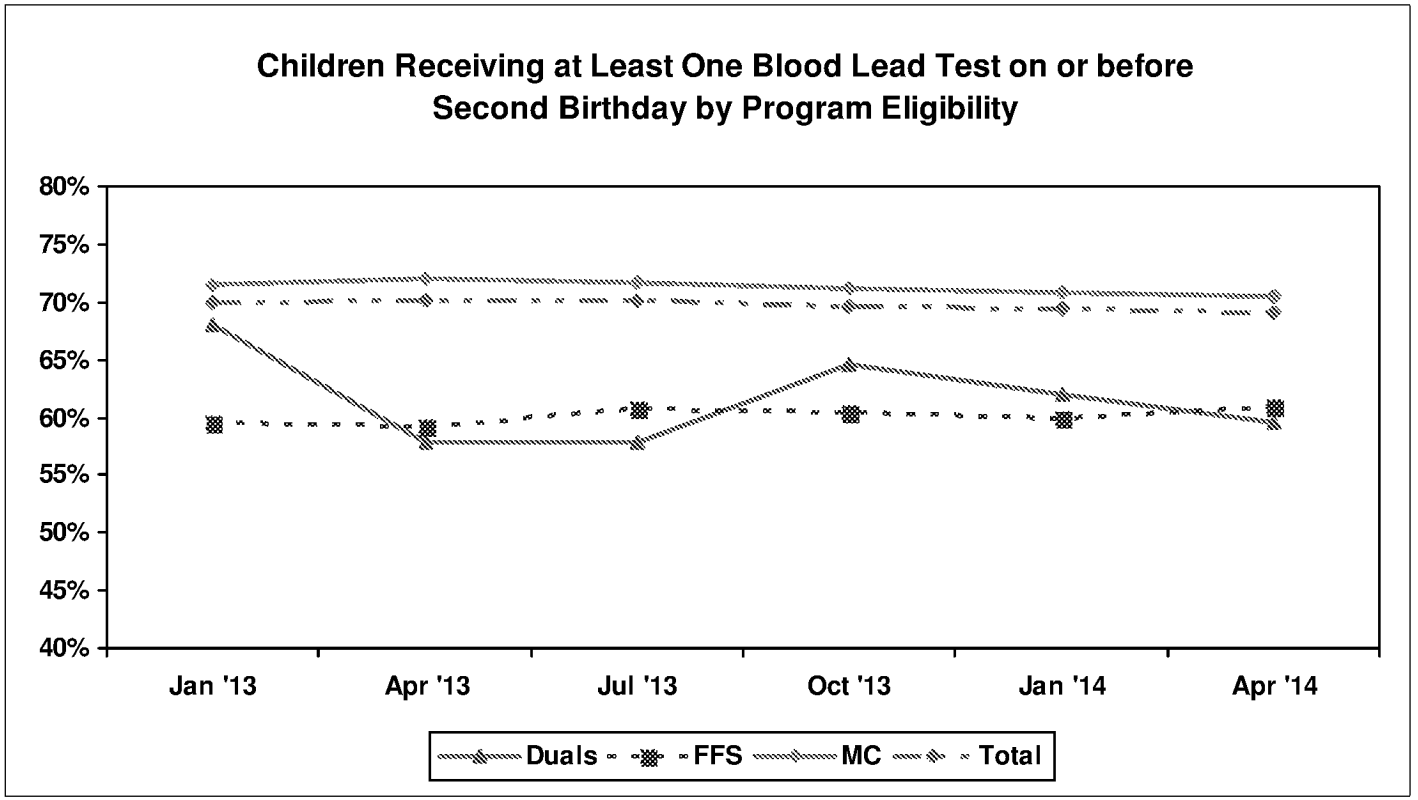
- **Children must have been eligible for one of the following programs in April 2014**
  - Medicaid Managed Care (MC)
    - enrolled in a Medicaid Health Plan (MHP)
  - Medicaid Fee-for-Service (FFS)
    - enrolled for Medicaid Only FFS coverage
  - Medicaid and CSHCS Dual Eligible (Duals)
    - dually eligible for both Medicaid and CSHCS
- **Blood Lead testing results include children tested:**
  - on or before indicated birthday for 2 and 3 year olds
  - at any time between ages 1 to 6
- **Unique Client Identifier (UCI) used to establish link between Medicaid and lead databases.**

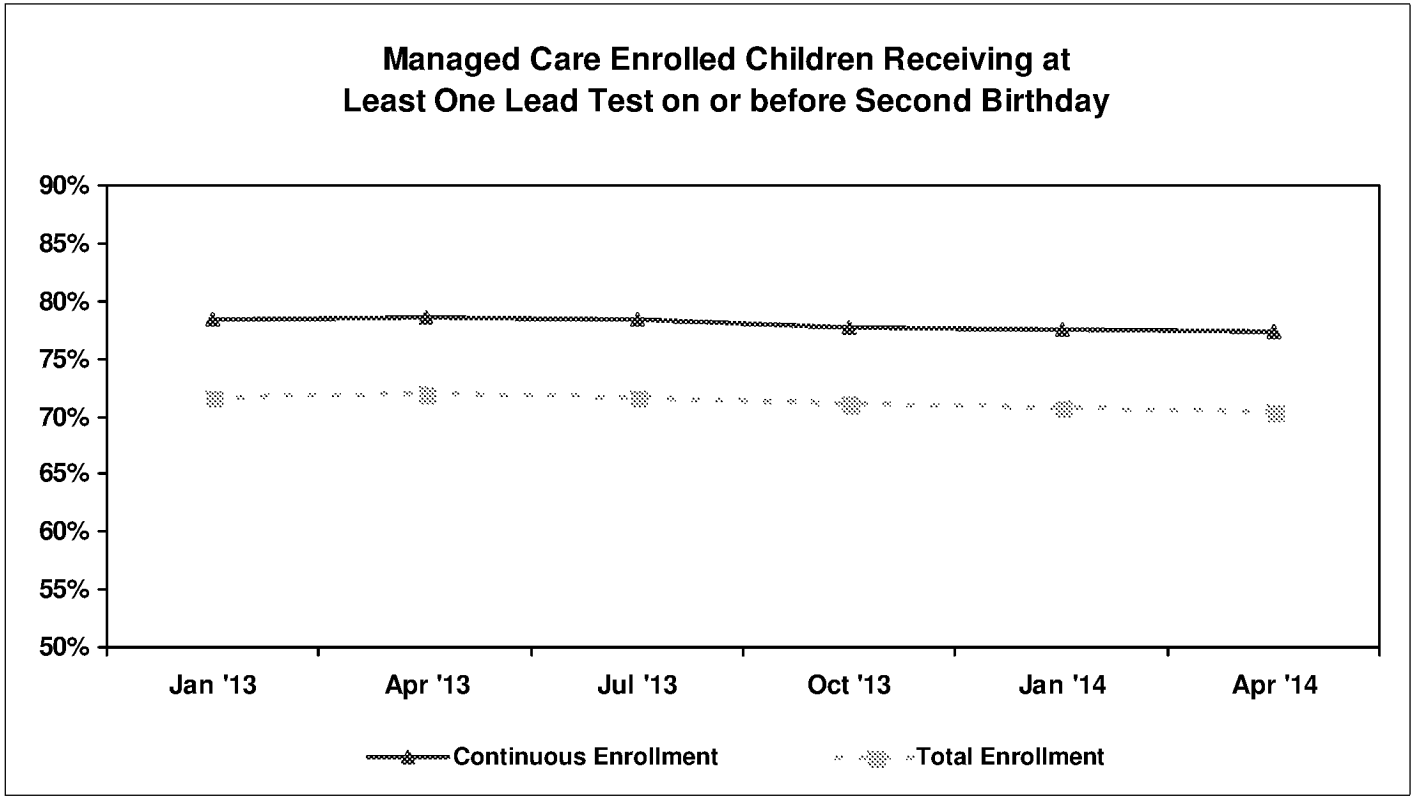
Questions should be directed to Qian Peng at (517) 241-1388, or pengq@michigan.gov

Blood Lead Testing Summary

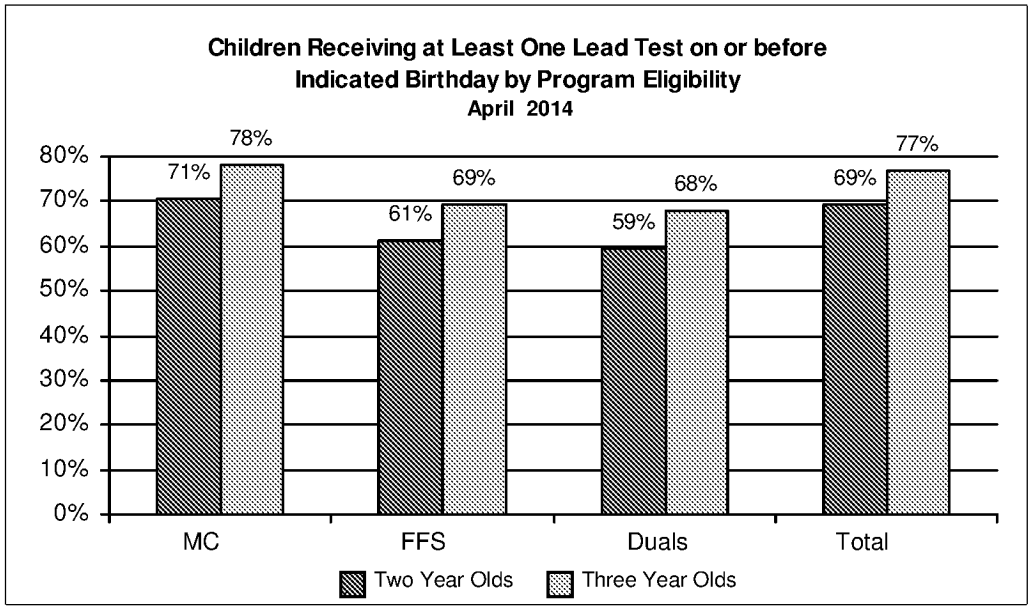
- **2 year old children tested on or before their 2nd birthday**
  - 69% Statewide
  - 69% City of Detroit
  - 71% Statewide for Medicaid MC
    - 77% Statewide for Medicaid MC with 12-Month Continuous Enrollment
  - 61% Statewide for Medicaid Only FFS Eligibles
  - 59% Statewide for CSHCS Duals

- **3 year old children tested on or before their 3rd birthday**
  - 77% Statewide
  - 81% City of Detroit
  - 78% Statewide for Medicaid MC
    - 84% Statewide for Medicaid MC with 12-Month Continuous Enrollment
  - 69% Statewide for Medicaid Only FFS Eligibles
  - 68% Statewide for CSHCS Duals


Children Receiving at Least One Blood Lead Test on or before Second Birthday by Program Eligibility
80%
75%
70%
65%
60%
55%
50%
45%
40%
Jan '13
Apr '13
Jul '13
Oct '13
Jan '14
Apr '14
Duals
FFS
MC
Total



Total Enrollment
-Enrolled in measurement month
Continuous Enrollment
-Based on MMIS eligibility system
-Enrolled in same health plan for the measurement month and 12 months preceding 2nd birthday, with a 1-month allowable gap.


Children Receiving at Least One Lead Test on or before Indicated Birthday by Program Eligibility
April 2014
80%
70%
60%
50%
40%
30%
20%
10%
0%
71%
78%
61%
69%
59%
68%
69%
77%
MC
FFS
Duals
Total
Two Year Olds
Three Year Olds

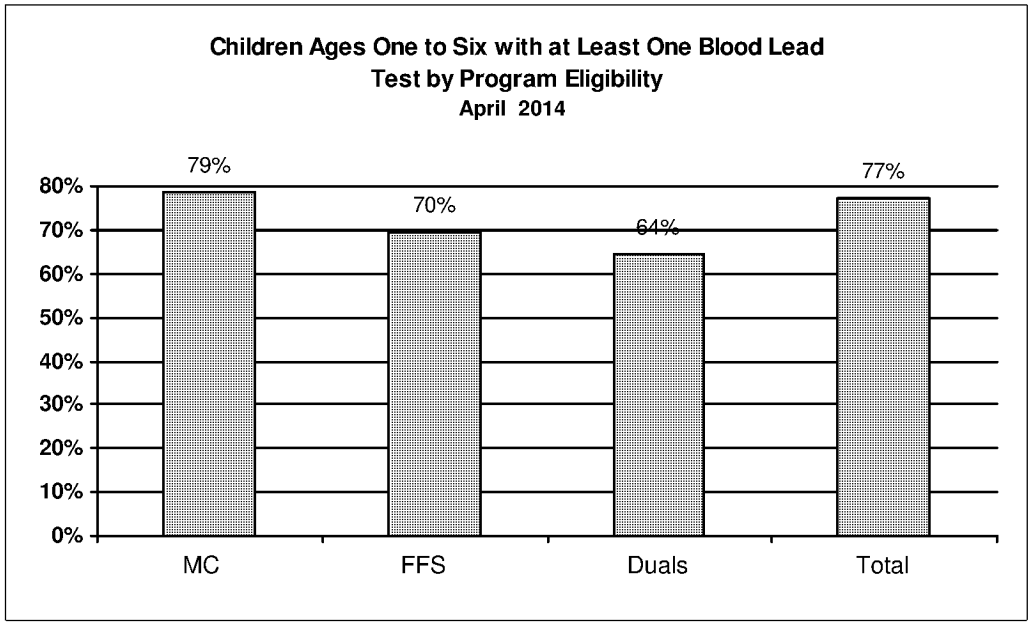

Children Ages One to Six with at Least One Blood Lead Test by Program Eligibility
April 2014
80%
70%
60%
50%
40%
30%
20%
10%
0%
79%
70%
64%
77%
MC
FFS
Duals
Total

Table 1. Percent of Children with at Least One Blood Lead Test on or before their Second Birthday

Program	Apr-13	May-13	Jun-13	Jul-13	Aug-13	Sep-13	Oct-13	Nov-13	Dec-13	Jan-14	Feb-14	Mar-14	Apr-14
MC	72.1%	72.1%	71.9%	71.6%	71.4%	71.5%	71.1%	71.0%	70.9%	70.9%	70.7%	70.7%	70.5%
FFS	59.2%	59.0%	61.0%	60.7%	60.3%	60.4%	60.5%	60.4%	60.0%	60.0%	60.5%	61.1%	61.0%
Duals	57.9%	62.5%	61.1%	57.9%	60.4%	62.0%	64.5%	62.3%	60.3%	62.0%	59.4%	60.7%	59.5%
Total	**70.2%**	**70.2%**	**70.3%**	**70.0%**	**69.9%**	**69.9%**	**69.6%**	**69.5%**	**69.4%**	**69.4%**	**69.4%**	**69.4%**	**69.1%**

Table 2. Percent of Children with at Least One Blood Lead Test on or before their Third Birthday

Program	Apr-13	May-13	Jun-13	Jul-13	Aug-13	Sep-13	Oct-13	Nov-13	Dec-13	Jan-14	Feb-14	Mar-14	Apr-14
MC	78.3%	78.5%	78.2%	78.4%	78.4%	78.4%	78.2%	78.2%	78.3%	78.2%	78.4%	78.3%	78.3%
FFS	68.1%	66.7%	67.6%	67.5%	67.1%	67.1%	67.5%	67.9%	68.0%	68.6%	68.4%	68.4%	69.3%
Duals	65.6%	67.3%	69.1%	69.8%	67.8%	67.2%	67.8%	67.4%	66.8%	67.1%	64.6%	65.7%	68.1%
Total	**76.7%**	**76.8%**	**76.6%**	**76.7%**	**76.7%**	**76.7%**	**76.6%**	**76.7%**	**76.8%**	**76.9%**	**77.0%**	**77.0%**	**76.9%**

Table 3. Percent of Children Ages One to Six with at Least One Blood Lead Test

Program	Apr-13	May-13	Jun-13	Jul-13	Aug-13	Sep-13	Oct-13	Nov-13	Dec-13	Jan-14	Feb-14	Mar-14	Apr-14
MC	79.2%	79.3%	79.0%	79.1%	79.0%	79.3%	79.3%	79.5%	79.2%	79.0%	78.7%	78.5%	78.5%
FFS	67.8%	67.4%	68.5%	68.2%	67.9%	68.3%	68.5%	68.5%	68.2%	68.4%	68.3%	68.8%	69.5%
Duals	65.6%	65.3%	65.0%	65.0%	63.5%	64.7%	64.6%	65.1%	65.1%	65.3%	65.0%	64.0%	64.3%
Total	**77.4%**	**77.5%**	**77.4%**	**77.5%**	**77.4%**	**77.6%**	**77.7%**	**77.8%**	**77.6%**	**77.5%**	**77.3%**	**77.2%**	**77.1%**

Table 4. Statewide Blood Lead Testing of Two and Three Year Old Children for All Programs

April 2014

County	2 Years of Age			3 Years of Age		
	Eligibles	Eligibles with at least 1 test on or before their 2nd birthday	Percent of Eligibles with at least 1 test on or before their 2nd birthday	Eligibles	Eligibles with at least 1 test on or before their 3rd birthday	Percent of Eligibles with at least 1 test on or before their 3rd birthday
ALCONA	39	24	**62%**	40	34	**85%**
ALGER	33	27	**82%**	39	30	**77%**
ALLEGAN	616	352	**57%**	624	404	**65%**
ALPENA	151	115	**76%**	154	128	**83%**
ANTRIM	130	92	**71%**	111	93	**84%**
ARENAC	73	56	**77%**	83	65	**78%**
BARAGA	56	41	**73%**	57	47	**82%**
BARRY	273	186	**68%**	271	215	**79%**
BAY	517	418	**81%**	543	487	**90%**
BENZIE	79	61	**77%**	74	61	**82%**
BERRIEN	1,010	554	**55%**	1,059	719	**68%**
BRANCH	304	205	**67%**	316	233	**74%**
CALHOUN	964	589	**61%**	957	673	**70%**
CASS	311	171	**55%**	265	177	**67%**
CHARLEVOIX	139	110	**79%**	126	108	**86%**
CHEBOYGAN	137	102	**74%**	137	107	**78%**
CHIPPEWA	176	131	**74%**	190	158	**83%**
CLARE	207	164	**79%**	192	157	**82%**
CLINTON	256	153	**60%**	277	216	**78%**
CRAWFORD	67	48	**72%**	73	54	**74%**
DELTA	206	154	**75%**	179	148	**83%**
DICKINSON	128	104	**81%**	128	102	**80%**
EATON	485	353	**73%**	491	372	**76%**
EMMET	156	114	**73%**	151	121	**80%**
GENESEE	3,020	2,097	**69%**	3,098	2,453	**79%**
GLADWIN	130	101	**78%**	135	107	**79%**
GOGEBIC	84	57	**68%**	76	56	**74%**
GRAND TRAVERSE	415	251	**60%**	407	301	**74%**
GRATIOT	254	178	**70%**	214	179	**84%**
HILLSDALE	285	210	**74%**	251	199	**79%**
HOUGHTON	173	109	**63%**	184	145	**79%**
HURON	138	108	**78%**	165	138	**84%**
INGHAM	1,579	1,184	**75%**	1,506	1,230	**82%**
IONIA	333	230	**69%**	377	296	**79%**
IOSCO	156	78	**50%**	158	101	**64%**
IRON	66	53	**80%**	48	41	**85%**
ISABELLA	286	209	**73%**	270	206	**76%**
JACKSON	895	745	**83%**	950	822	**87%**
KALAMAZOO	1,348	1,048	**78%**	1,375	1,133	**82%**
KALKASKA	104	89	**86%**	106	83	**78%**
KENT	3,905	3,167	**81%**	3,763	3,210	**85%**
KEWEENAW	10	7	**70%**	11	10	**91%**
LAKE	71	54	**76%**	65	50	**77%**
LAPEER	408	271	**66%**	393	299	**76%**
LEELANAU	57	41	**72%**	68	50	**74%**
LENAWEE	582	449	**77%**	503	387	**77%**
LIVINGSTON	479	346	**72%**	481	350	**73%**
LUCE	36	25	**69%**	42	34	**81%**
MACKINAC	34	24	**71%**	55	44	**80%**
MACOMB	4,022	2,595	**65%**	3,918	2,791	**71%**
MANISTEE	93	78	**84%**	100	88	**88%**
MARQUETTE	264	180	**68%**	260	216	**83%**
MASON	164	147	**90%**	159	144	**91%**
MECOSTA	223	170	**76%**	235	181	**77%**
MENOMINEE	101	70	**69%**	102	72	**71%**
MIDLAND	349	157	**45%**	351	218	**62%**
MISSAUKEE	101	83	**82%**	101	81	**80%**
MONROE	665	494	**74%**	677	541	**80%**
MONTCALM	376	240	**64%**	444	336	**76%**
MONTMORENCY	37	32	**86%**	34	26	**76%**
MUSKEGON	1,326	802	**60%**	1,257	867	**69%**
NEWAYGO	306	224	**73%**	342	245	**72%**
OAKLAND	4,099	2,698	**66%**	3,958	2,895	**73%**
OCEANA	202	158	**78%**	218	167	**77%**
OGEMAW	149	66	**44%**	116	64	**55%**
ONTONAGON	20	15	**75%**	22	20	**91%**
OSCEOLA	150	118	**79%**	152	122	**80%**
OSCODA	39	9	**23%**	42	26	**62%**
OTSEGO	168	122	**73%**	147	111	**76%**
OTTAWA	1,081	646	**60%**	1,028	678	**66%**
PRESQUE ISLE	56	44	**79%**	45	37	**82%**
ROSCOMMON	109	81	**74%**	121	97	**80%**
SAGINAW	1,362	1,103	**81%**	1,309	1,135	**87%**
SAINT CLAIR	900	720	**80%**	938	779	**83%**
SAINT JOSEPH	479	283	**59%**	416	297	**71%**
SANILAC	217	163	**75%**	226	175	**77%**
SCHOOLCRAFT	42	35	**83%**	38	31	**82%**
SHIAWASSEE	392	318	**81%**	385	312	**81%**
TUSCOLA	313	254	**81%**	321	266	**83%**
VAN BUREN	525	296	**56%**	523	349	**67%**
WASHTENAW	1,159	713	**62%**	1,165	768	**66%**
DETROIT, CITY OF	9,588	6,611	**69%**	9,759	7,882	**81%**
WAYNE, ex Detroit	5,135	3,200	**62%**	4,954	3,543	**72%**
WEXFORD	263	208	**79%**	280	210	**75%**
MICHIGAN	**55.836**	**38.588**	**69%**	**55.381**	**42.603**	**77%**

Table 5. Statewide Blood Lead Testing of Two and Three Year Old Children Enrolled in Managed Care

April 2014

County	2 Years of Age			3 Years of Age		
	Eligibles	Eligibles with at least 1 test on or before their 2nd birthday	Percent of Eligibles with at least 1 test on or before their 2nd birthday	Eligibles	Eligibles with at least 1 test on or before their 3rd birthday	Percent of Eligibles with at least 1 test on or before their 3rd birthday
ALCONA	35	22	**63%**	33	31	**94%**
ALGER	29	25	**86%**	32	26	**81%**
ALLEGAN	480	282	**59%**	486	326	**67%**
ALPENA	116	90	**78%**	117	98	**84%**
ANTRIM	99	73	**74%**	91	78	**86%**
ARENAC	60	48	**80%**	65	53	**82%**
BARAGA	31	26	**84%**	32	28	**88%**
BARRY	227	158	**70%**	218	171	**78%**
BAY	447	367	**82%**	458	414	**90%**
BENZIE	58	45	**78%**	60	50	**83%**
BERRIEN	859	484	**56%**	906	632	**70%**
BRANCH	253	175	**69%**	256	192	**75%**
CALHOUN	820	515	**63%**	782	559	**71%**
CASS	245	144	**59%**	220	154	**70%**
CHARLEVOIX	122	100	**82%**	96	83	**86%**
CHEBOYGAN	117	89	**76%**	114	90	**79%**
CHIPPEWA	105	80	**76%**	125	104	**83%**
CLARE	173	138	**80%**	150	125	**83%**
CLINTON	204	126	**62%**	223	179	**80%**
CRAWFORD	55	39	**71%**	62	47	**76%**
DELTA	167	126	**75%**	146	123	**84%**
DICKINSON	108	90	**83%**	101	80	**79%**
EATON	402	299	**74%**	405	310	**77%**
EMMET	123	92	**75%**	125	101	**81%**
GENESEE	2,660	1,881	**71%**	2,721	2,191	**81%**
GLADWIN	110	87	**79%**	112	90	**80%**
GOGEBIC	63	45	**71%**	59	44	**75%**
GRAND TRAVERSE	333	204	**61%**	334	254	**76%**
GRATIOT	197	149	**76%**	172	147	**85%**
HILLSDALE	240	181	**75%**	215	169	**79%**
HOUGHTON	151	94	**62%**	159	125	**79%**
HURON	111	90	**81%**	115	99	**86%**
INGHAM	1,373	1,042	**76%**	1,296	1,077	**83%**
IONIA	262	186	**71%**	286	228	**80%**
IOSCO	130	69	**53%**	134	85	**63%**
IRON	57	46	**81%**	38	32	**84%**
ISABELLA	231	176	**76%**	212	167	**79%**
JACKSON	765	646	**84%**	796	696	**87%**
KALAMAZOO	1,126	898	**80%**	1,154	966	**84%**
KALKASKA	82	74	**90%**	91	73	**80%**
KENT	3,216	2,655	**83%**	3,093	2,683	**87%**
KEWEENAW	9	6	**67%**	8	8	**100%**
LAKE	65	49	**75%**	54	42	**78%**
LAPEER	333	223	**67%**	323	253	**78%**
LEELANAU	52	36	**69%**	47	35	**74%**
LENAWEE	492	384	**78%**	413	326	**79%**
LIVINGSTON	383	287	**75%**	380	286	**75%**
LUCE	30	23	**77%**	36	29	**81%**
MACKINAC	26	18	**69%**	32	25	**78%**
MACOMB	3,478	2,306	**66%**	3,412	2,465	**72%**
MANISTEE	79	68	**86%**	74	66	**89%**
MARQUETTE	217	153	**71%**	223	187	**84%**
MASON	141	127	**90%**	133	123	**92%**
MECOSTA	188	152	**81%**	200	157	**79%**
MENOMINEE	80	56	**70%**	74	53	**72%**
MIDLAND	274	132	**48%**	285	187	**66%**
MISSAUKEE	82	66	**80%**	78	68	**87%**
MONROE	551	414	**75%**	554	449	**81%**
MONTCALM	294	195	**66%**	348	268	**77%**
MONTMORENCY	29	25	**86%**	29	21	**72%**
MUSKEGON	1,084	665	**61%**	1,016	725	**71%**
NEWAYGO	252	190	**75%**	280	206	**74%**
OAKLAND	3,509	2,387	**68%**	3,376	2,543	**75%**
OCEANA	167	137	**82%**	168	135	**80%**
OGEMAW	129	58	**45%**	96	53	**55%**
ONTONAGON	16	12	**75%**	21	19	**90%**
OSCEOLA	124	97	**78%**	124	100	**81%**
OSCODA	36	8	**22%**	39	26	**67%**
OTSEGO	140	100	**71%**	125	96	**77%**
OTTAWA	813	495	**61%**	770	535	**69%**
PRESQUE ISLE	49	37	**76%**	37	30	**81%**
ROSCOMMON	91	69	**76%**	99	80	**81%**
SAGINAW	1,188	973	**82%**	1,124	994	**88%**
SAINT CLAIR	777	641	**82%**	790	668	**85%**
SAINT JOSEPH	391	235	**60%**	313	223	**71%**
SANILAC	183	142	**78%**	189	155	**82%**
SCHOOLCRAFT	30	24	**80%**	32	27	**84%**
SHIAWASSEE	339	283	**83%**	318	270	**85%**
TUSCOLA	265	220	**83%**	254	217	**85%**
VAN BUREN	437	254	**58%**	440	306	**70%**
WASHTENAW	977	617	**63%**	995	664	**67%**
DETROIT, CITY OF	8,733	6,066	**69%**	8,776	7,120	**81%**
WAYNE, ex Detroit	4,428	2,817	**64%**	4,275	3,118	**73%**
WEXFORD	208	170	**82%**	221	168	**76%**
MICHIGAN	**47.611**	**33.573**	**71%**	**46.871**	**36.706**	**78%**

Table 6. Statewide Blood Lead Testing of Two and Three Year Old Children Eligible for Medicaid Only Fee-for-Service Coverage
April 2014

County	2 Years of Age			3 Years of Age		
	Eligibles	Eligibles with at least 1 test on or before their 2nd birthday	Percent of Eligibles with at least 1 test on or before their 2nd birthday	Eligibles	Eligibles with at least 1 test on or before their 3rd birthday	Percent of Eligibles with at least 1 test on or before their 3rd birthday
ALCONA	4	2	50%	6	3	50%
ALGER	4	2	50%	7	4	57%
ALLEGAN	132	69	52%	135	76	56%
ALPENA	35	25	71%	35	28	80%
ANTRIM	31	19	61%	18	13	72%
ARENAC	13	8	62%	17	11	65%
BARAGA	25	15	60%	25	19	76%
BARRY	44	28	64%	52	43	83%
BAY	70	51	73%	83	71	86%
BENZIE	21	16	76%	14	11	79%
BERRIEN	147	66	45%	149	84	56%
BRANCH	46	27	59%	59	40	68%
CALHOUN	142	74	52%	171	111	65%
CASS	66	27	41%	45	23	51%
CHARLEVOIX	17	10	59%	28	23	82%
CHEBOYGAN	19	12	63%	23	17	74%
CHIPPEWA	71	51	72%	64	53	83%
CLARE	32	25	78%	41	31	76%
CLINTON	51	26	51%	52	37	71%
CRAWFORD	12	9	75%	11	7	64%
DELTA	39	28	72%	33	25	76%
DICKINSON	20	14	70%	27	22	81%
EATON	81	52	64%	84	61	73%
EMMET	33	22	67%	24	18	75%
GENESEE	349	211	60%	368	256	70%
GLADWIN	20	14	70%	23	17	74%
GOGEBIC	21	12	57%	17	12	71%
GRAND TRAVERSE	80	46	58%	68	45	66%
GRATIOT	56	28	50%	42	32	76%
HILLSDALE	45	29	64%	34	28	82%
HOUGHTON	21	14	67%	23	19	83%
HURON	27	18	67%	50	39	78%
INGHAM	201	139	69%	204	149	73%
IONIA	68	42	62%	89	66	74%
IOSCO	26	9	35%	24	16	67%
IRON	9	7	78%	10	9	90%
ISABELLA	53	31	58%	57	38	67%
JACKSON	123	93	76%	147	121	82%
KALAMAZOO	214	144	67%	216	162	75%
KALKASKA	21	14	67%	14	9	64%
KENT	660	492	75%	634	502	79%
KEWEENAW	1	1	100%	3	2	67%
LAKE	6	5	83%	11	8	73%
LAPEER	72	45	63%	69	46	67%
LEELANAU	5	5	100%	20	14	70%
LENAWEE	85	62	73%	87	58	67%
LIVINGSTON	92	55	60%	99	64	65%
LUCE	6	2	33%	4	3	75%
MACKINAC	8	6	75%	22	18	82%
MACOMB	527	280	53%	490	317	65%
MANISTEE	13	9	69%	26	22	85%
MARQUETTE	47	27	57%	36	29	81%
MASON	21	18	86%	25	20	80%
MECOSTA	34	17	50%	35	24	69%
MENOMINEE	21	14	67%	27	19	70%
MIDLAND	67	23	34%	63	30	48%
MISSAUKEE	19	17	89%	23	13	57%
MONROE	111	78	70%	121	91	75%
MONTCALM	79	43	54%	94	67	71%
MONTMORENCY	8	7	88%	5	5	100%
MUSKEGON	234	132	56%	235	139	59%
NEWAYGO	54	34	63%	60	37	62%
OAKLAND	571	304	53%	562	340	60%
OCEANA	34	20	59%	49	32	65%
OGEMAW	19	8	42%	20	11	55%
ONTONAGON	4	3	75%	1	1	100%
OSCEOLA	25	20	80%	26	20	77%
OSCODA	3	1	33%	3	0	0%
OTSEGO	26	20	77%	22	15	68%
OTTAWA	260	145	56%	249	138	55%
PRESQUE ISLE	7	7	100%	8	7	88%
ROSCOMMON	17	11	65%	22	17	77%
SAGINAW	168	126	75%	181	140	77%
SAINT CLAIR	119	79	66%	147	111	76%
SAINT JOSEPH	86	48	56%	102	73	72%
SANILAC	33	21	64%	35	19	54%
SCHOOLCRAFT	10	9	90%	6	4	67%
SHIAWASSEE	53	35	66%	65	41	63%
TUSCOLA	48	34	71%	62	44	71%
VAN BUREN	88	42	48%	80	42	53%
WASHTENAW	178	94	53%	157	95	61%
DETROIT, CITY OF	843	539	64%	964	745	77%
WAYNE, ex Detroit	684	370	54%	656	409	62%
WEXFORD	53	37	70%	58	41	71%
MICHIGAN	**7.988**	**4.874**	**61%**	**8.253**	**5.722**	**69%**

Table 7: Blood Lead Testing of Two Year Old Children by Length of Enrollment

April 2014

Health Plan Name	Total Enrollment			Continuous Enrollment			
	Eligibles	Eligibles with at least 1 test on or before their 2nd birthday	Percent of Eligibles with at least 1 test on or before their 2nd birthday	Eligibles	Eligibles with at least 1 test on or before their 2nd birthday	Percent of Eligibles with at least 1 test on or before their 2nd birthday	Percentage Point Difference with Continuous Enrollment
Blue Cross Complete	1,584	928	59%	462	328	71%	12
CoventryCares of Michigan	1,202	847	70%	760	566	74%	4
HealthPlus Partners	2,204	1,676	76%	1,368	1,116	82%	6
McLaren Health Plan	4,694	3,338	71%	2,356	1,908	81%	10
Meridian Health Plan of Michigan	12,603	9,204	73%	7,640	6,077	80%	7
Midwest Health Plan	2,770	1,834	66%	1,603	1,162	72%	6
Molina Healthcare of Michigan	7,207	4,971	69%	4,530	3,371	74%	5
PHP-Mid-Michigan Family Care	707	515	73%	434	351	81%	8
Priority Health Govt Pgms	2,974	2,153	72%	1,607	1,294	81%	8
ProCare Health Plan	214	117	55%	74	43	58%	3
Total Health Care	1,792	1,118	62%	961	650	68%	5
United Healthcare-Great Lakes	8,602	6,087	71%	5,322	4,060	76%	6
Upper Peninsula Health Plan	1,117	823	74%	706	585	83%	9
Managed Care Totals/Percent	**47,670**	**33,611**	**71%**	**27,823**	**21,511**	**77%**	**6**
Current Performance Monitoring Standard			**N/A**			**80%**	
FFS (Title XIX only)	**8,011**	**4,884**	**61%**	**1,403**	**921**	**66%**	**5**
FFS (Title V/XIX)	**237**	**141**	**59%**	**114**	**63**	**55%**	**-4**
FFS Totals (Title XIX & V/XIX)	**8,248**	**5,025**	**61%**	**1,517**	**984**	**65%**	**4**

Total Enrollment

- Based on MMIS eligibility system
- Enrolled in plan (health plan or FFS) for the measurement month

Continuous Enrollment

- Based on MMIS eligibility system
- Enrolled in same plan (health plan or FFS) for the measurement month and 12 months preceding 2nd birthday, with 1-month allowable gap

Table 8. Blood Lead Testing of Three Year Old Children by Length of Enrollment

April 2014

Health Plan Name	Total Enrollment			Continuous Enrollment			
	Eligibles	Eligibles with at least 1 test on or before their 3rd birthday	Percent of Eligibles with at least 1 test on or before their 3rd birthday	Eligibles	Eligibles with at least 1 test on or before their 3rd birthday	Percent of Eligibles with at least 1 test on or before their 3rd birthday	Percentage Point Difference with Continuous Enrollment
Blue Cross Complete	1,584	1,088	69%	557	414	74%	5
CoventryCares of Michigan	1,253	1,015	81%	846	714	84%	3
HealthPlus Partners	2,299	1,935	84%	1,518	1,348	89%	5
McLaren Health Plan	4,508	3,549	79%	2,501	2,147	86%	7
Meridian Health Plan of Michigan	12,011	9,546	79%	7,782	6,607	85%	6
Midwest Health Plan	2,548	1,886	74%	1,587	1,249	79%	5
Molina Healthcare of Michigan	7,235	5,696	79%	4,881	4,027	83%	4
PHP-Mid-Michigan Family Care	687	551	80%	434	370	85%	5
Priority Health Govt Pgms	2,846	2,220	78%	1,659	1,401	84%	6
ProCare Health Plan	195	140	72%	94	71	76%	4
Total Health Care	1,838	1,358	74%	1,046	833	80%	6
United Healthcare-Great Lakes	8,806	6,845	78%	5,888	4,824	82%	4
Upper Peninsula Health Plan	1,123	914	81%	756	670	89%	8
Managed Care Totals/Percent	**46,933**	**36,743**	**78%**	**29,549**	**24,675**	**84%**	**6**
FFS (Title XIX only)	**8,274**	**5,735**	**69%**	**1,836**	**1,340**	**73%**	**4**
FFS (Title V/XIX)	**257**	**175**	**68%**	**126**	**81**	**64%**	**-4**
FFS Totals (Title XIX & V/XIX)	**8,531**	**5,910**	**69%**	**1,962**	**1,421**	**72%**	**3**

Total Enrollment

- Based on MMIS eligibility system
- Enrolled in plan (health plan or FFS) for the measurement month

Continuous Enrollment

- Based on MMIS eligibility system
- Enrolled in same plan (health plan or FFS) for the measurement month and 12 months preceding 3rd birthday, with 1-month allowable gap

Data Management and Security Section
Office of Medicaid Health Information Technology
Medical Services Administration
Department of Community Health
State of Michigan

Date Created: 4/21/2014

Medicaid Lead Testing Rates for Two Year Old Children

Percentage Point Changes from April 2013 to April 2014 for 2 Year Olds Blood Lead Tested

Health Plan Name	Percent of Eligibles with at least One Lead Test on or before 2nd Birthday					
	Total Enrollment			Continuous Enrollment		
	Apr-13	Apr-14	Percentage Point Difference Between 13 -- 14	Apr-13	Apr-14	Percentage Point Difference Between 13 -- 14
Blue Cross Complete	63%	59%	-4	71%	71%	0
CareSource Michigan						
CoventryCares of Michigan	72%	70%	-2	76%	74%	-2
HealthPlus Partners, Inc.	78%	76%	-2	83%	82%	-1
McLaren Health Plan	73%	71%	-2	86%	81%	-5
Meridian Health Plan of MI	74%	73%	-1	81%	80%	-1
Midwest Health Plan	65%	66%	1	72%	72%	0
Molina Healthcare of Michigan	71%	69%	-2	76%	74%	-2
PHP-MM Family Care	75%	73%	-2	79%	81%	2
Priority Health Government Programs, Inc.	75%	72%	-3	82%	81%	-1
ProCare Health Plan	58%	55%	-3	66%	58%	-8
Total Health Care	64%	62%	-2	69%	68%	-1
United Healthcare Great Lakes	72%	71%	-1	77%	76%	-1
Upper Peninsula Health Plan	77%	74%	-3	87%	83%	-4
Managed Care Average/Percent	**72%**	**71%**	**-1**	**79%**	**77%**	**-2**
Current Performance Monitoring Standard	**N/A**	**N/A**		**N/A**	**80%**	

FFS (Title XIX only)	**59%**	**61%**	**2**	**67%**	**66%**	**-1**
FFS (Title V/XIX)	**58%**	**59%**	**1**	**61%**	**55%**	**-6**
FFS Totals (Title XIX and V/XIX)	**59%**	**61%**	**2**	**67%**	**65%**	**-2**

Message

From: Scott, Robert L. (DCH) [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=1AEFBCAADA9A48AD8D643AA95E441DF1-SCOTT ROBERT L.]
Sent: 5/5/2014 8:03:13 PM
To: Gina.Schutter@priorityhealth.com
CC: Lishinski, Karen (DCH) [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=a2cf86239dfb462abb2b166fee46b9bc-Lishinski Karen]; Peeler, Nancy (DCH) [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=ec5ddcb9dcec411293aaafd42aef28bd-Peeler Nancy]
Subject: RE: Provider Education Workgroup - draft of Community Rx for Children with Elevated Blood Lead Levels 5 to 14 ug/dL
Attachments: Community Rx 050114_GSedits.docx

Gina,

Thanks for the feedback. I especially like the boxes—obviously I'm not a design person, but we have people who are. So the answer to your question becomes "yes, we'll run it by our Communications office, who are the experts in this sort of thing."

Bob

From: Gina.Schutter@priorityhealth.com [mailto:Gina.Schutter@priorityhealth.com]
Sent: Monday, May 05, 2014 3:47 PM
To: Scott, Robert L. (DCH)
Subject: RE: Provider Education Workgroup - draft of Community Rx for Children with Elevated Blood Lead Levels 5 to 14 ug/dL

Thanks Bob!

Do you know if MDCH is planning to "format" this letter so that it's less of a word-doc and more template looking? I made a couple of minor edits in green. See my vision in action, attached. I think it looks great though—clear, concise, and generic enough for the many stakeholders.

Thanks,

Gina

Gina Schutter, CPHQ

Medicaid Quality Manager
Priority Health

616.464.8976 (o)

PPI n)

PriorityHealth

From: Scott, Robert L. (DCH) [mailto:ScottR9@michigan.gov]
Sent: Monday, May 05, 2014 11:56 AM
To: Schutter, Gina M.
Subject: FW: Provider Education Workgroup - draft of Community Rx for Children with Elevated Blood Lead Levels 5 to 14 ug/dL

Gina, sorry, I missed the first dot in your email address on my first try. Please see below and attached.

From: Scott, Robert L. (DCH)
Sent: Monday, May 05, 2014 11:38 AM
To: Lounds, Elizabeth (DCH); Alexander, Linda; Bhambhani, Kanta (kbhambha@med.wayne.edu); Davis, Matthew (DCH); Frankovich, Dr. Teresa; Lawrence, Kyra; Reynolds, Dr. Lawrence; Schutter, Gina; Turner, Jane (DCH); Vempati, Dr. Anuradha
Cc: Howard, Javier (DCH); Lishinski, Karen (DCH); Cooper, Jessica (DCH); Peeler, Nancy (DCH); Davis, Matthew (DCH); Christian, Stella (DCH)
Subject: Provider Education Workgroup - draft of Community Rx for Children with Elevated Blood Lead Levels 5 to 14 ug/dL

Hello all,

Per our discussion at the 4/14/14 meeting of the Provider Education Workgroup, please review the attached draft. This is intended to be a customizable one-pager that primary care providers can give parent/guardians. Text in red indicates portions to be customized for each community, by each contracted local health department.

I made several changes to the previous draft in response to your suggestions (according to my notes and my somewhat leaky memory). Changes include:

- Making the first paragraph simpler and more direct
- Dividing the "follow-up instructions" into a set of three clear steps for the doctor and the remaining items for the family
- Removing the item for getting an inspection (too expensive to be realistic)
- Adding potential links to social media

There was also a suggestion of providing an example of a completed form, especially for the "Local Resources" section. I'll work with one of our local partners on that.

All of our local partners for Lead Prevention are awaiting this document with bated breath, so I'd appreciate any feedback you might have by Monday, May 19.

Please feel free to call if you have questions.

Thanks,

Bob Scott

Robert L. Scott

Childhood Lead Poisoning Prevention Program

Michigan Department of Community Health

(517) 335-8178

fax (517) 335-8509

[Insert your community] Rx for Children with Elevated Blood Lead Levels 5 to 14 µg/dL

Your child's name _____ Date _____

Your child's reported lead level is _____

Your child has a low level of lead poisoning. Lead poisoning is serious and can be harmful, especially if your child's level goes higher. It can cause lower IQ and behavior, learning and hearing problems.

You and your doctor can work together to help your child.

For the doctor:

1. Set a plan to retest the child within three months, and again as necessary.
2. Consider a blood test for all siblings, and other children in the home.
3. Educate the family on keeping their child safe from lead.

For the family:

- Make sure your child is getting the healthy foods that your doctor suggests. [INSERT LOCAL WIC CONTACT INFO]
- Contact the [INSERT] County Health Department to learn about cleaning up lead. [INSERT HEALTH DEPT LEAD CONTACT]
- Ask the [INSERT] County Health Department for an application to the Lead Safe Home Program [INSERT HEALTH DEPT LEAD CONTACT]

Learn more about lead, how to keep your child safe, and who can help.

Call:

[INSERT HEALTH DEPT LEAD CONTACT]
Michigan's Childhood Lead Poisoning Prevention Program, Nurse Consultant (888) 322-4453

On the Web:
www.leadfreekids.org
www.michigan.gov/lead
www.epa.gov/lead

Social Media:
[INSERT SOCIAL MEDIA LINKS
if your health department has useful information
available through Facebook, Twitter, Instagram, etc.]

Local Resources:

[INSERT LOCAL ORGANIZATIONS HERE, including name of organization, contact name, phone, and brief description of ways they can help. Include community-based and faith-based organizations, non-profits, safe housing resources, rental advocacy groups, free legal help, others as appropriate. Place a check box next to each resource, so the provider can check those that are appropriate for each family's situation.]

Comment [G1]: Removed "your" just due to repetition. Included "reported lead level" as a gentle reminder to reinforce that providers must report this data to MDCH!

Comment [G2]: Added boxes to visually separate PCP versus family responsibilities. Adds more of a template feel with highlighted call-to-action.

From: Peeler, Nancy (DHHS)
Sent: Monday, October 19, 2015 1:07 PM
To: Peeler, Nancy (DHHS)
Subject: notes from 12:30 briefing on Flint lead

recommendation - letter to families to go to PCP for testing, share education info WHO IS THE LETTER GOING OUT FROM?

recommendation - letter to PCPs, about how to respond to families

Q: DEQ water testing in schools - needs to be coordinated with what we do with schools - how do we get that information into any letter that goes out?

GEORGE KRISTZIAN - Linda write an email of introduction, then I add him to the group to review the letter, etc.

Can our CLPPP nurse start to pull pieces out into a 1-page protocol for testing? WE can draft something - (for Wednesday...Nick needs to update the Governor)

Aiming to start EBL as of November 1st...probably have to confirm through City of Flint that a house/person is on Flint water.

Case Management ?? visiting nurse agencies that work in the homes? stipend for someone to accompany the nurses?

Safety? law enforcement to accompany nurses/EBL investigators - can we contract with somebody in the community to accompany the people?

Sent from my iPad

From: Peeler, Nancy (DHHS)
Sent: Wednesday, October 21, 2015 11:51 AM
To: Emily Houk R2P
Subject: Fwd: Provider letter_DRAFT_October202015-3
Attachments: Provider letter_DRAFT_October202015 MHA rev.docx; ATT00001.htm

More comments

Sent from my iPad

Begin forwarded message:

> **From:** Mona Hanna-Attisha <MHanna1@hurleymc.com>
> **Date:** October 21, 2015 at 11:44:15 AM EDT
> **To:** "'Peeler, Nancy (DHHS)'" <PeelerN@michigan.gov>, "LaRocco, Toni" <tlarocco@gchd.us>
> **Cc:** "Travis, Rashmi (DHHS)" <TravisR@michigan.gov>, "Wells, Eden (DHHS)" <WellsE3@michigan.gov>
> **Subject: RE: Provider letter_DRAFT_October202015-3**
>
> My edits on provider letter.
>
> Couple comments:
>
> - Did CDC recommend that we screen all kids up to 6yrs? Should this be done annually now?
> - In the letter it says, that if the level is less than 5, we should recheck in 3-6 months? Not sure we need to do that??

From: Peeler, Nancy (DHHS) [mailto:PeelerN@michigan.gov]
Sent: Wednesday, October 21, 2015 11:05 AM
To: LaRocco, Toni
Cc: Travis, Rashmi (DHHS); Wells, Eden (DHHS); Mona Hanna-Attisha
Subject: Re: Provider letter_DRAFT_October202015-3

Thanks Toni, we appreciate the comments and will use them!

Sent from my iPad

On Oct 21, 2015, at 10:56 AM, LaRocco, Toni <tlarocco@gchd.us> wrote:

> Sorry I don't know how to add to sharepoint.
>
> <Provider letter_DRAFT_October202015-3.docx>

PROVIDER DRAFT LETTER
October 20, 2015

Dear Provider:

~~As you may be aware from recent news reports, elevated levels of lead have been found in the City of Flint's water system.~~

To help protect the children of Flint from ~~this serious health hazard~~the current lead in water exposure, the Michigan Department of Health and Human Services, with partners at the City of Flint, Genesee County Health Department, Genesee Intermediate School District and Hurley Children's Hospital~~Health Systems are contacting you~~want to assist you in providing guidance to support your families.

As you know, elevated levels of lead have been found in the drinking water in the City of Flint. Children can also be exposed to lead from old lead paint, soil, pottery, cosmetics and toys, and some home remedies. Adult jobs and hobbies, like auto repair, stained glass, jewelry making, and ammunitions handling can also put children at risk if they touch clothing or play in areas where lead is found.~~Lead poisoning is the #1 environmental health threat to young children. While lead paint is primary cause of lead poisoning in Michigan lead can also found in drinking water, soil, pottery, cosmetics and toys, and some home remedies. Adult jobs and hobbies, like auto repair, stained glass and jewelry making, and ammunitions handling can also put children at risk if they touch clothing or play in areas where lead is found.~~

~~Concerns about the safety and quality of drinking water in the City of Flint have reignited a conversation about appropriately identifying and managing lead poisoning cases.~~ As a primary care provider, you play a critical role in helping to ensure that children and families exposed to lead receive the care and reassurances they need to manage the potential health impacts of lead poisoning.

Identification. Children suffering from lead poisoning often fail to present with outward symptoms. However, early clinical symptoms can include anemia, anorexia, abdominal pain and constipation. Lead is a neuro-toxin, and exposure can result in violent and aggressive behaviors, lead to learning disorders, may cause attention Deficit Hyperactivity Disorder (ADHD) and has been known to reduction IQ by as many as 5-8 points with levels as low as 10 ug/dl. Lead is metabolized through the gastrointestinal system similar to iron and calcium, with uptake rates depending on the size and weight of the child. The blood half-life of lead is short (approximately 1 month) but the bone half-life can extend into decades.

- Due to multiple risk factors facing many residents in the City of Flint (including aging housing conditions, poor diet and water quality, **we recommend that Aall children under age 6 living in the City of Flint or attending school, childcare or spending time with a caregiver in the City of Flint should ~~be tested for lead poisoning~~receive a blood lead test.** ~~Pregnant and breastfeeding women living, working or attending school in Flint should also be tested. ?~~ Blood lead testing should be done through a child's primary care doctor to ensure adequate short-term and long-term follow-up.

~~Patients may be screened for lead poisoning using a capillary test and certified Lead Care machine. Capillary test of greater than 5ug/dl require a follow-up venous test confirmation. Do we need to tell them this? If your office does not use Lead Care equipment, please refer patients directly to ABC.~~

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~~Children suffering from lead poisoning often fail to present outward symptoms. However, early clinical symptoms can include anemia, anorexia, abdominal pain and constipation. Lead is a neuro-toxin, and exposure can result in violent and aggressive behaviors, lead to learning disorders, may cause attention Deficit Hyperactivity Disorder (ADHD) and has been known to reduction IQ by as many as 5-8 points with levels as low as 10 ug/dl. Lead is metabolized through the gastrointestinal system similar to iron and calcium, with uptake rates depending on the size and weight of the child. The blood half-life of lead is short (approximately 1 month) but the bone half-life can extend into decades.~~

- **Management of Blood Lead Levels (BLL)~~Guidance and Care of Lead Poisoned Patients~~.** ~~A lead level of less than 5 mcg/dl is not typically cause for concern. However, due to multiple risk factors facing many residents in the City of Flint (including aging housing conditions, poor diet and water quality) it is advisable to retest children within 3-6 months to ensure lead levels are not rising. All children with Medicaid insurance are required to be tested for lead at ages 1 and 2 years of age.~~
  a. BLL < 5 mcg/dL: ~~A lead level of less than 5 mcg/dL is not typically cause for concern. However, due to multiple risk factors facing many residents in the City of Flint (including aging housing conditions, poor diet and water quality) it is advisable to retest children within 3-6 months to ensure lead levels are not rising.~~
  b. BLL between 5 and 44 mcg/dL: Lead levels between 5mcg/dL and 44 mcg/dl require medical case management. Families should receive anticipatory guidance, nutrition counseling and instruction on safe cleaning techniques and appropriate follow-up care. Refer your patients to the Genesee County Health Department for assistance in identifying lead hazards in their homes. **Children with capillary results of 5 mcg/dl and higher must have a confirmatory venous blood draw.** Children with confirmed venous testing results greater than 5ug/dl within the past 18 months must be retested based on CDC and AAP periodicity guidelines. (See attached "Provider Quick Guidance document for reference). If a child has not been retested within these timeframes, retesting is recommended as soon as possible.
  - BLL > 44 mcg/dL: Lead levels over 44 mcg/dl require immediate referral to Children's Hospital of Michigan in Detroit.
  - ~~All households in the City of Flint are eligible for free water testing and filters and should be using a certified water filtration system.~~

~~In most cases, breastfeeding is considered safe. However, if the mother's blood lead level rises above 40ug/dl or her level is greater than 20 mcg/dk/dl and the baby has a level above 5 mcg/dl breastfeeding is not recommended.~~

~~Lead levels between 5mcg/dL and 44 mcg/dl require medical case management. Families should receive anticipatory guidance, nutrition counseling and instruction on safe cleaning techniques and appropriate follow-up care. Refer your patients to the Genesee County Health Department for assistance in identifying lead hazards in their homes.~~

~~Lead levels over 44 mcg/dl require immediate referral to Children's Hospital of Michigan in Detroit.~~

Comment [S1]: So are recommending that all kids less than 6yr with BLL <5, get a recheck in 3-6 months???

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Comment [S2]: So are recommending that all kids less than 6yr with BLL <5, get a recheck in 3-6 months???

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PROVIDER DRAFT LETTER
October 20, 2015

- ~~Follow-up Care.~~ **~~Children with capillary results of 5 mcg/dl and higher must have a confirmatory venous blood draw.~~** ~~Children with confirmed venous testing results greater than 5ug/dl within the past 18 months must be retested based on CDC and AAP periodicity guidelines. (See attached "Provider Quick Guidance document for reference). If a child has not been retested within these timeframes, retesting is recommended as soon as possible.~~

  Follow-up Care.

  We all want our patients to grow up to be happy, healthy, and contributing members of society. Working together, we can hopefully buffer the impact of the lead exposure! As providers, below are some steps that we can take to support our families.

  a. Continue to educate families regarding lead risks and preventative steps that they can take to minimize their risks.
  b. Healthy nutrition is critical for lead-exposed kids. Make sure your patients are consuming balanced diets high in iron, calcium and Vitamin C. If you have concerns about their nutrition, consider recommending a multivitamin with iron. WIC and SNAP provide assistance to parents and children who need fresh and healthy foods. Contact the Genesee County WIC office at (810) 237-4537 to learn more. SNAP allows offers a Double Bucks program (contact), where families can get more healthy foods for less.
     - Breastfeeding is highly protective and encouraged. ~~In most cases, breastfeeding is considered safe. However, if the mother's blood lead level rises above 40ug/dl or her level is greater than 20 mcg/dk/dl and the baby has a level above 5 mcg/dl breastfeeding is not recommended.~~
  c. Because lead is a neuro toxin, children with lead poisoning need longitudinal follow-up and may require developmental and behavioral health intervention services. Continue monitoring your patients' development at every visit. Refer to Early On with any concerns.
  d. Consider additional wrap-around and support services that will benefit your patients – home visiting programs, early head start, head start, transportation services. Call 211 for more info.

  ~~Because lead is a neuro toxin, children with lead poisoning may require behavioral health intervention services. In addition, parents may benefit from nutritional counseling and other health-related supports. The following agencies are partners in lead poisoning prevention and education efforts and are ready and able to help connect your patients to additional services.~~

  - ~~Blood Testing. Contact your doctor or the Genesee County Health Department to get a lead test.~~

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DRAFT

PROVIDER DRAFT LETTER
October 20, 2015

- ~~Water Testing. Water testing is free at the X,Y,Z. Contact ABC to find how to have your water tested.~~
- ~~WIC and SNAP. WIC and SNAP provide assistance to parents and children who need fresh and healthy foods. Contact the Genesee County WIC office at (810) 237-4537 to learn more.~~
- ~~Child Development. If you have concerns about your child's growth, development or learning contact the ABC to learn about an Early Childhood~~ ~~Home Visiting Program in your area.~~

DRAFT

This Document is a Non-Responsive Attachment.

From: Peeler, Nancy (DHHS)
Sent: Wednesday, October 21, 2015 5:13 PM
To: Wells, Eden (DHHS)
Cc: Travis, Rashmi (DHHS);Lishinski, Karen (DCH) (LishinskiK@michigan.gov);Emily Houk R2P (emily@r2pconsultants.com)
Subject: testing protocol
Attachments: Flint Blood Lead Level Testing Protocols.v1.docx; Flint Blood Lead level Testing Protocol table.v1.docx

Importance: High

Eden and Rashmi – Emily and Karen developed a document, and I was toying with it, put same info into a chart. Wanted to start by getting reactions from all of you to these 2 versions of the same protocol, just two different approaches.

Eden, is this what you were thinking of, will this work? Wanted to get your input first, then to the whole group testing protocol group.

Nancy

Flint Blood Lead Level Testing Protocols
October 21, 2015

Target Populations

Priority Level 1:

- Retesting of any child with an existing EBLL capillary >5
- Retesting of all of venous samples as directed by AAP periodicity follow-up schedule
- All children in Freeman, Brunnell, Eisenhower schools

Priority Level 2:

All Genesee County child care, preschool, and school facilities not listed above.

Methodology

Priority Level 1:

Encouraging patients to contact Medical Home to obtain testing through primary care provider

Priority Level 2:

- Community and Medicaid Health plan Testing Events
- Hurley Pediatric testing events

Outreach, Follow-up and Resources

- Genesee County Health Department case management and support for EBLL>5
- Distribution of letters to families via community partners for guidance, resource and support
- Distribution of letters to primary care provider with guidance and support

Flint Blood Lead level Testing Protocol

October 21, 2015

Target Population		Outreach methodology			Testing methodology		
		Case Management	Letter to Families	Letter to Providers	Primary Care Provider	Community/Health Plan event	Hurley Clinic
PRIORITY LEVEL 1	All children with elevated Capillary ≥ 5 since April 2014	X	X	X	X	X	X
	All children with elevated Venous ≥ 5 since April 2014	X	X	X	X	X	X
	All children attending Freeman, Brunnell, Eisenhower schools		X	X	X	X	X
PRIORITY LEVEL 2	All children from Flint who are in child care, or attend child care in Flint		X	X	X	X	X
	All children in preschool programs in Flint		X	X	X	X	X
	All children enrolled in school facilities in Flint not listed above		X	X	X	X	X

From: Peeler, Nancy (DHHS)
Sent: Wednesday, October 21, 2015 8:41 PM
To: Mona Hanna-Attisha (MHanna1@hurleymc.com);LaRocco, Toni (tlarocco@gchd.us)
Cc: Lishinski, Karen (DCH) (LishinskiK@michigan.gov);Wells, Eden (DHHS);Travis, Rashmi (DHHS)
Subject: testing protocol
Attachments: Flint Blood Lead level Testing Protocol table.v3.docx

Hi all – we've been bouncing this around, in terms of format, think this captures what we have talked about. Please take a look, share comments/questions on format, content, etc. Thanks!

Nancy

Flint Blood Lead level Testing Protocol

October 21, 2015

Target Population		Outreach methodology			Testing methodology		
		Case Management	Letter to Families	Letter to Providers	Primary Care Provider	Community/Health Plan event	Hurley Clinic
PRIORITY LEVEL 1	All children with elevated Capillary ≥ 5 since April 2014	GCHD will contact family to provide support, follow up services including testing	Letter to family encourages provides education and encourages testing through PCP. Sent by community partners.	Provides education and prepares PCP to work with families. Sent by medical society, health coalition and GCHD.	Office apt and order for lab test	Events offered in community for families to attend	Clinic site at Flint Farmers Market open to public for testing
	All children with newly elevated Venous ≥ 5 since April 2014	GCHD will contact family to provide support, follow up services including testing	Letter to family encourages provides education and encourages testing through PCP. Sent by community partners.	Provides education and prepares PCP to work with families. Sent by medical society, health coalition and GCHD.	Office apt and order for lab test	Events offered in community for families to attend	Clinic site at Flint Farmers Market open to public for testing
	All children with new elevated Venous ≥ 5 since October 2015	GCHD will contact family to provide support, follow up services including testing	Letter to family encourages provides education and encourages testing through PCP. Sent by community partners.	Provides education and prepares PCP to work with families. Sent by medical society, health coalition and GCHD.	Office apt and order for lab test	Events offered in community for families to attend	Clinic site at Flint Farmers Market open to public for testing

		Outreach methodology			Testing methodology		
Priority Level 2	All children attending Freeman, Brunnell, Eisenhower schools (Make priority 2)	GCHD will contact family to provide support, follow up services including testing	Letter to family encourages provides education and encourages testing through PCP. Sent by community partners.	Provides education and prepares PCP to work with families. Sent by medical society, health coalition and GCHD	Office apt and order for lab test	Events offered in community for families to attend	Clinic site at Flint Farmers Market open to public for testing
	All children from Flint who are in child care, or attend child care in Flint		Letter to family encourages provides education and encourages testing through PCP. Sent by community partners.	Provides education and prepares PCP to work with families. Sent by medical society, health coalition and GCHD.	Office apt and order for lab test	Events offered in community for families to attend	Clinic site at Flint Farmers Market open to public for testing
	All children in preschool programs in Flint		Letter to family encourages provides education and encourages testing through PCP. Sent by community partners.	Provides education and prepares PCP to work with families. Sent by medical society, health coalition and GCHD.	Office apt and order for lab test	Events offered in community for families to attend	Clinic site at Flint Farmers Market open to public for testing
PRIORITY LEVEL 3	All children enrolled in school facilities in Flint not listed above		Letter to family encourages provides education and encourages testing through PCP. Sent by community partners.	Provides education and prepares PCP to work with families. Sent by medical society, health coalition and GCHD.	Office apt and order for lab test	Events offered in community for families to attend	Clinic site at Flint Farmers Market open to public for testing

From: Peeler, Nancy (DHHS)
Sent: Wednesday, October 21, 2015 8:52 PM
To: Emily Houk R2P (emily@r2pconsultants.com)
Subject: FW: Blood Testing-Version 4 Call
Attachments: Parent Letter_DRAFT_October 202015 MHArev.docx; ATT00001.htm

Ok, just to be sure you have these. ☺

From: Wells, Eden (DHHS)
Sent: Wednesday, October 21, 2015 8:47 PM
To: Peeler, Nancy (DHHS)
Subject: Fwd: Blood Testing-Version 4 Call

Sent from my iPhone

Begin forwarded message:

> **From:** Mona Hanna-Attisha <MHanna1@hurleymc.com>
> **Date:** October 21, 2015 at 8:08:13 AM EDT
> **To:** "Peeler, Nancy (DHHS)" <PeelerN@michigan.gov>, "Rockefeller, Cheryl (DHHS)" <RockefellerC@michigan.gov>, "Wells, Eden (DHHS)" <WellsE3@michigan.gov>, "Toni Larocco tlarocco@gchd.us" <tlarocco@gchd.us>, "Krisztian, George (DEQ)" <krisztiang@michigan.gov>
> **Cc:** "Travis, Rashmi (DHHS)" <TravisR@michigan.gov>
> **Subject: RE: Blood Testing-Version 4 Call**
>
> I don't know if the "Tips for Flint Residents" is finalized, and I'm not even sure if I was supposed to look at it, but I have a few edits. Sorry, I'm totally OCD. Under #2, people can also just call 211 to get a filter (this can be added to all handouts for filter access). I'm not sure if it was literacy tested - some big words like accumulate, precautions, etc. Fine print at bottom is same as #1, can just add email to #1. I would also reword sentence under title to "Lead plumbing is common throughout Flint and in all homes built before 1986. Always follow the below steps to ensure safe drinking water."
>
> Attached are my revisions to the parent letter. I tried to simplify and consolidate – it's in markup mode. I have a 8:15 meeting, but will try to take a stab at provider letter as well before 9am meeting
>
> Mona Hanna-Attisha MD MPH
>
> Director, Pediatric Residency Program
>
> Hurley Children's Hospital at Hurley Medical Center

Assistant Professor, Department of Pediatrics and Human Development

Michigan State University College of Human Medicine

Office: 810-262-7257

mhanna1@hurleymc.com

From: Peeler, Nancy (DHHS) [PeelerN@michigan.gov]
Sent: Tuesday, October 20, 2015 3:10 PM
To: Rockefeller, Cheryl (DHHS); Wells, Eden (DHHS); Toni Larocco tlarocco@gchd.us; Mona Hanna-Attisha; Krisztian, George (DEQ)
Cc: Travis, Rashmi (DHHS)
Subject: RE: Blood Testing-Version 4 Call

HI all – draft letters for Providers and for Parents in Flint are posted in our Sharepoint folder called Flint Workgroup. We put them in both Word and .pdf formats, to assure you can open them. They are rough drafts, so please do add/suggest language where there are placeholders.

Appreciate if you can review and make comments/suggest edits. To find the letters:

Navigate to www.miclppp.org
On the dark blue navigation bar, click on Workgroups & Toolkits
Click on the FLINT WORKGROUP folder

Nancy

From: Peeler, Nancy (DHHS)
Sent: Monday, October 19, 2015 11:59 AM
To: Rockefeller, Cheryl (DHHS); Wells, Eden (DHHS); Toni Larocco tlarocco@gchd.us; Mona Hanna-Attisha (MHanna1@hurleymc.com)
Cc: Travis, Rashmi (DHHS)
Subject: RE: Blood Testing-Version 4 Call
Importance: High

Hi everyone – per our morning conversation, we have created a folder on our Sharepoint site where we can upload documents that we might want to attach to the letters we discussed this morning:

1. Letter for Flint area parents with children in daycare, EHS/HS, GSRP, schools
2. Letter for primary care providers serving children from the Flint area

Please send any materials you think could be good attachments to Emily Houk (HoukE@michigan.gov). Emily is standing by to upload the documents to the folder.

To access the folder, please go to www.miclppp.org
On the dark blue navigation bar, click on Workgroups & Toolkits
Click on the FLINT WORKGROUP folder – which is where we will post these materials

We agreed to review materials by Wednesday morning, 10am, to try to finalize the letters at that point.

We are drafting the letters now, will put the draft letters in the same folder, and I will email you once they are posted for your review and comment.

Thanks – let me know if you have questions or problems accessing the folder.

Nancy

-----Original Appointment-----
From: Rockefeller, Cheryl (DHHS)
Sent: Friday, October 16, 2015 8:50 AM
To: Rockefeller, Cheryl (DHHS); Wells, Eden (DHHS); Peeler, Nancy (DHHS); Toni Larocco tlarocco@gchd.us; Mona Hanna-Attisha (MHanna1@hurleymc.com)
Subject: Blood Testing-Version 4 Call
When: Monday, October 19, 2015 9:00 AM-9:30 AM (UTC-05:00) Eastern Time (US & Canada).
Where: PPI

CONFERENCE LINE:
PPI
PPI

OK folks, 9 AM Monday morning. Same Conference line- we will send it out,
Eden

From: Peeler, Nancy (DHHS)
Sent: Thursday, October 15, 2015 4:56 PM
To: Wells, Eden (DHHS)
Cc: Travis, Rashmi (DHHS); Mona Hanna-Attisha; LaRocco, Toni; Scott, Robert L. (DHHS)
Subject: RE: Blood testing- version4 October 15

Looks like Bob is out of the office on Monday. So we can go with 9am.

From: Wells, Eden (DHHS)
Sent: Thursday, October 15, 2015 4:36 PM
To: Peeler, Nancy (DHHS)
Cc: Travis, Rashmi (DHHS); Mona Hanna-Attisha; LaRocco, Toni; Scott, Robert L. (DHHS)
Subject: Re: Blood testing- version4 October 15

Thanks!

From: Peeler, Nancy (DHHS)
Sent: Thursday, October 15, 2015 4:31 PM
To: Wells, Eden (DHHS)
Cc: Travis, Rashmi (DHHS); Mona Hanna-Attisha; LaRocco, Toni; Scott, Robert L. (DHHS)
Subject: Re: Blood testing- version4 October 15

We're head home tomorrow afternoon. I'll ask Bob, or he may see this email before I get a chance to ask him.

Sent from my iPad

On Oct 15, 2015, at 4:03 PM, Wells, Eden (DHHS) <WellsE3@michigan.gov> wrote:
Do you think you can do 9? Are you both back already?

So sorry....
<OutlookEmoji-☹.png>

From: Peeler, Nancy (DHHS)
Sent: Thursday, October 15, 2015 3:59 PM
To: Wells, Eden (DHHS)
Cc: Travis, Rashmi (DHHS); Mona Hanna-Attisha; LaRocco, Toni; Scott, Robert L. (DHHS)
Subject: Re: Blood testing- version4 October 15

8am is open for me, but I can try to shuffle things to make 9am work.

Sent from my iPad

On Oct 15, 2015, at 3:57 PM, Wells, Eden (DHHS) <WellsE3@michigan.gov> wrote:
Sorry I-- for 9

Sent from my iPhone

On Oct 15, 2015, at 3:54 PM, Travis, Rashmi (DHHS) <TravisR@michigan.gov> wrote:
Eden
I am sorry but I have meetings at 8 and 9
Am. But it is more important that Nancy and Bob be available for the call along with others.
Rashmi

Sent from my iPhone

On Oct 15, 2015, at 3:50 PM, Wells, Eden (DHHS) <WellsE3@michigan.gov> wrote:
HI folks,

I thought I sent an email, but cannot find it. Toni and I can meet Monday morning by phone---**8 or 9 is better for Toni , she is busy at 10.** Need to follow up on the testing plan and begin to talk about case management, How about you all???

Eden

From: Wells, Eden (DHHS)
Sent: Thursday, October 15, 2015 8:36 AM
To: Mona Hanna-Attisha; Peeler, Nancy (DHHS); Travis, Rashmi (DHHS); GJOHNSON@gchd.us; LaRocco, Toni
Cc: Moran, Susan (DHHS); Miller, Corinne (DHHS); Miller, Mark (DHHS); Scott, Robert L. (DHHS); Scott, Linda (DHHS); Scott, Jackie (DHHS); Shah, Sandip (DHHS); Dykema, Linda D. (DHHS); Priem, Wesley F.

(DHHS); Lasher, Geralyn (DHHS); Hertel, Elizabeth (DHHS)
Subject: Fwd: Blood testing- version4 October 15

Today's draft- early next week the primary group will meet to plan case management planning. We will work on Nancy and Bob's questions in interim.

Wes- please advise as to exactly what information you would want to collect on any child getting a blood test/ in the event further case management or abatement is required-

Eden.

Begin forwarded message:
From: Eden <ewells@umich.edu>
Date: October 15, 2015 at 8:31:46 AM EDT
To: "Eden V. Wells" <wellse3@michigan.gov>
Subject: Fwd: Blood testing- version4 October 15

Sent from my iPhone- I apologize for typos and brevity

Begin forwarded message:
From: "Wells, Eden (DHHS)" <WellsE3@michigan.gov>
Date: October 14, 2015 at 4:29:58 PM EDT
To: "ewells@umich.edu" <ewells@umich.edu>, "Wells, Eden (DHHS)" <WellsE3@michigan.gov>
Subject: Blood testing- send out in AM 10/15

Eden V. Wells, MD, MPH, FACPM
Chief Medical Executive
Michigan Department of Health and Human Services
201 Townsend St., 5th Floor CVB
Lansing, MI 48913

DRAFT PARENT LETTER FOR PARTNER REVIEW v.1
October 20, 2015

Dear Parent,

~~As you may have heard in recent news reports, lead has been found in the City of Flint's water system.~~

To help make sure the children of Flint are safe from lead exposure, ~~this serious health hazard,~~ the Michigan Department of Health and Human Services, with partners at the City of Flint, Genesee County Health Department, Genesee Intermediate School District and Hurley ~~Health Systems~~Children's Hospital want to help ~~parents and caregivers~~you understand ~~to~~:

- Where does lead come from?
- What can I do to protect my family?
- ~~Understand more about lead poisoning and how to protect your family;~~
- Should I get my child tested for lead?~~Learn how to get your child tested~~
- ~~Understand how to get their~~your household water tested
- ~~Know how to get help if your~~a child has been exposed to lead.Where can I find more information about lead?

Where does lead come from? ~~Understanding Lead Poisoning~~

~~Where does lead come from?~~ Lead is a serious health hazard, especially for small children who become lead poisoned when they eat, drink or breathe lead. Elevated levels of lead have been found in the drinking water in the City of Flint. Kids can also be exposed to lead from old lead paint, soil, pottery, cosmetics and toys, and some home remedies. Adult jobs and hobbies, like auto repair, stained glass, jewelry making, and ammunitions handling can also put children at risk if they touch clothing or play in areas where lead is found.

~~Protect Your Family~~What can I do to protect my family?

Protecting your family from Lead in the Water ~~and Obtaining Water Filters~~.

- Get your water testing for lead. It's free. Just call …..
- ~~Testing of the water in your home is recommended and is free. If you live in Flint, use a NSF/ANSI 53 water filter in your home. Water filters are easy to install and available for free.Call 211 for a free water filter, or x.y.z.~~
- If you do not have a water filter, use bottled water for drinking and mixing formula.
- When cooking or washing dishes in tap water, run the water for at least five minutes before you use it.
- Use cold water.

Comment [1]: May also need to add Flint Community Schools - not always part of GISD

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DRAFT PARENT LETTER FOR PARTNER REVIEW v.1
October 20, 2015

~~**Lead in the Home.** Lead is a serious health hazard, especially for small children who become lead poisoned when they eat, drink or breathe lead. The most common cause of lead poisoning is lead paint. However, lead is also found in drinking water, soil, pottery, cosmetics and toys, and some home remedies. Adult jobs and hobbies, like auto repair, stained glass, jewelry making, and ammunitions handling can also put children at risk if they touch clothing or play in areas where lead is found.~~

~~**Lead in the Water and Obtaining Water Filters.** Elevated levels of lead have been found in the water in the City of Flint. Testing of the water in your home is recommended and is free. If you live in Flint, use a NSF/ANSI 53 water filter in your home. Water filters are easy to install and available for free at x,y,z. If you do not have a water filter, use bottled water for drinking and mixing formula. When cooking or washing dishes in tap water, run the water for at least five minutes before you use it.~~

~~**Protect Your Family**~~

~~**Nutrition Matters.** Some foods will help keep lead from being stored in a child's body. Foods with calcium like milk, cheese, yogurt, and tofu are helpful, as are green leafy vegetables like spinach and cabbage. Iron rich foods also help reduce lead from being stored. Iron is in beans, lean meats like fish and chicken, whole grain cereals and peanut butter. Foods with Vitamin C will also help protect your child. These are foods like oranges, orange juice, grapefruits, tomatoes and green peppers. Avoid fatty foods, like cookies, cakes, pizza, bacon, potato chips, french fries and hot dogs. GTalk to your pediatrician about giving your child a multivitamin every day.ive your child a Multivitamin each day.~~

Protecting your family from other lead sources:

Safe Cleaning is Important. Keeping your home clean and safe from lead hazards will help to protect your family.

- Keep children away from lead paint and dust.
- Use wet paper towels to clean up lead dust. Be sure to clean around windows, play areas and floors.
- Wash hands and toys often, using soap and water.

Nutrition Matters! Some foods will help keep lead from being stored in a child's body, especially foods with a lot of calcium, iron and vitamin C. Calcium containing foods include milk, cheese, yogurt, and tofu are helpful, as are green leafy vegetables like spinach and cabbage. Iron is in beans, lean meats like fish and chicken, whole grain cereals and peanut butter. Foods with a lot of Vitamin C include oranges, orange juice, grapefruits, tomatoes and green peppers. ~~Avoid fatty foods, like cookies, cakes, pizza, bacon, potato chips, french fries and hot dogs.~~ If you are concerned about your child's diet, talk with your pediatrician who may also recommend a daily multivitamin.

Comment [2]: avoidance of fatty foods is no longer recommended for lead. Concern about limiting fatty foods for kids with developing brains (less than 2yr)

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Comment [3]: avoidance of fatty foods is no longer recommended for lead. Concern about limiting fatty foods for kids with developing brains (less than 2yr)

WIC and SNAP provide assistance to parents and children who need fresh and healthy foods. Contact the Genesee County WIC office at (810) 237-4537 to learn more. SNAP also offers a Double Bucks program to purchase even more healthy food for no additional costs.

~~When Testing is Necessary~~Should my child get a blood lead test?

Children who live in the City of Flint or attend school, childcare or often spend time with a caregiver in the City of Flint should be tested for lead poisoning. ~~Pregnant and breastfeeding women living, working or attending school in Flint should also be tested.[2]~~

~~Where should I go to get a blood lead test for my child?~~

~~The best place to get your child's blood lead test is at your pediatrician's office. Your pediatrician will be able to follow up on the labs and provide you with the needed medical and preventative care. If you are unable to go to your doctor, you can also go to the Genesee County Health Department (phone number….).~~

~~What is a lead test? Testing for lead poisoning is a blood test and is most often done with a quick finger prick. Contact your doctor or the Genesee County Health Department to request a lead test.~~

Understanding your child's lead test result.

- Lead only stays in your blood for about one to two months, so the blood lead level that is done will only reflect recent exposure.
- A lead level below 5 mcg/dl means there is very little lead in your child's blood. You doctor ~~will probably~~may suggest retesting your child within the next 12 months to make sure the level is not going up.
- A lead level of 5-14 mcg/dl means that child has had some exposure to lead. Work with your doctor and local health department for further guidance on how to ~~make your home safe~~limit your lead exposure. Your doctor ~~will probably~~may ~~want to~~ retest your child in 1-3 months to make sure the level is not going up.
- Children with very high levels of lead (over 40) may require treatment at the hospital.

~~Follow-up testing. If your child has been exposed to lead, it is very important that they have follow-up testing to make sure the lead level is going down. Children with very high levels of lead (over 40) may require treatment at the hospital.~~

Transportation. If you need help with transportation to have your child tested at your doctor or health department, please call 211.

Where Can I get more information on lead? ~~to Find Help~~

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- Website for MDHSS lead stuff
- CDC
- County health dept, etc

Blood Testing. Contact your doctor or the Genesee County Health Department to get a lead test.

Water Testing. Water testing is free at the X,Y,Z. Contact ABC to find how to have your water tested.

WIC and SNAP. WIC and SNAP provide assistance to parents and children who need fresh and healthy foods. Contact the Genesee County WIC office at (810) 237-4537 to learn more.

Child Development. If you have concerns about your child's growth, development or learning contact the ABC to learn about an Early Childhood Home Visiting Program in your area.

DR

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This Document is a Non-Responsive Attachment.

From: Peeler, Nancy (DHHS)
Sent: Thursday, October 22, 2015 2:50 PM
To: Emily Houk R2P
Subject: Fwd: Time Sensitive-Updated Testing Protocol October 22, 2015
Attachments: Flint Blood Lead Level Testing Protocol Table v6.docx; ATT00001.htm

Help, I am still on iPad, can't see edits. Did the stuff under CM get removed for priorities 2 and 3?

Sent from my iPad

Begin forwarded message:

From: "Minicuci, Angela (DHHS)" <MinicuciA@michigan.gov>
Date: October 22, 2015 at 2:32:36 PM EDT
To: "Wells, Eden (DHHS)" <WellsE3@michigan.gov>, "LaRocco, Toni" <tlarocco@gchd.us>
Cc: "Peeler, Nancy (DHHS)" <PeelerN@michigan.gov>, Mona Hanna-Attisha <MHanna1@hurleymc.com>, "Lasher, Geralyn (DHHS)" <lasherg@michigan.gov>, "Eisner, Jennifer (DHHS)" <EisnerJ@michigan.gov>, Emily Houk <emily@r2pconsultants.com>, "Travis, Rashmi (DHHS)" <TravisR@michigan.gov>
Subject: RE: Time Sensitive-Updated Testing Protocol October 22, 2015

Given the case management edit and the GCHD testing information, please see the attached updated version. Feedback?

Angela

From: Wells, Eden (DHHS)
Sent: Thursday, October 22, 2015 11:55 AM
To: LaRocco, Toni <tlarocco@gchd.us>
Cc: Peeler, Nancy (DHHS) <PeelerN@michigan.gov>; Minicuci, Angela (DHHS) <MinicuciA@michigan.gov>; Mona Hanna-Attisha <MHanna1@hurleymc.com>; Lasher, Geralyn (DHHS) <lasherg@michigan.gov>; Eisner, Jennifer (DHHS) <EisnerJ@michigan.gov>; Emily Houk <emily@r2pconsultants.com>; Travis, Rashmi (DHHS) <TravisR@michigan.gov>
Subject: Re: Time Sensitive-Updated Testing Protocol October 22, 2015

Great!!

Sent from my iPhone

On Oct 22, 2015, at 11:53 AM, LaRocco, Toni <tlarocco@gchd.us> wrote:

After lunch conversation regarding printing of materials. I have spoken with both our Headstart/Early Headstart program, call in for GSRP, call in for non-licensed day care and have distribution list for licensed day care centers.

From: Peeler, Nancy (DHHS) [mailto:PeelerN@michigan.gov]
Sent: Thursday, October 22, 2015 11:36 AM
To: LaRocco, Toni
Cc: Minicuci, Angela (DHHS); Wells, Eden (DHHS); Mona Hanna-Attisha; Lasher, Geralyn (DHHS); Eisner, Jennifer (DHHS); Emily Houk; Travis, Rashmi (DHHS)
Subject: Re: Time Sensitive-Updated Testing Protocol October 22, 2015

I agree with Toni - the case management contract with GCHD will be based on actual elevated levels (e.g. Priority 1), and CM will do outreach to those kids. They will not be offering CM to children who don't have a test showing an elevated level (e.g. Priority 2 and 3).

However, if kids from Priority level 2 or 3 DO have an elevated level, that would bump them up into Priority 1.

Nancy

Sent from my iPad

On Oct 22, 2015, at 11:16 AM, LaRocco, Toni <tlarocco@gchd.us> wrote:

I don't think case management colum under priority level 2 is pertinent pending conversations tomorrow afternoon. Although anyone needing case management will be followed by GCHD

From: Minicuci, Angela (DHHS) [mailto:MinicuciA@michigan.gov]
Sent: Thursday, October 22, 2015 11:01 AM
To: Wells, Eden (DHHS)
Cc: Mona Hanna-Attisha; Lasher, Geralyn (DHHS); Eisner, Jennifer (DHHS); Emily Houk; Peeler, Nancy (DHHS); LaRocco, Toni; Travis, Rashmi (DHHS)
Subject: RE: Time Sensitive-Updated Testing Protocol October 22, 2015

The final draft from the site is attached for everyone's review. Any final edits?

Angela

From: Minicuci, Angela (DHHS)
Sent: Thursday, October 22, 2015 10:43 AM
To: Wells, Eden (DHHS) <WellsE3@michigan.gov>
Cc: Mona Hanna-Attisha <MHanna1@hurleymc.com>; Lasher, Geralyn (DHHS) <lasherg@michigan.gov>; Eisner, Jennifer (DHHS) <EisnerJ@michigan.gov>; Emily Houk <emily@r2pconsultants.com>; Peeler, Nancy (DHHS) <PeelerN@michigan.gov>; tlarocco@gchd.us; Travis, Rashmi (DHHS) <TravisR@michigan.gov>
Subject: RE: Time Sensitive-Updated Testing Protocol October 22, 2015

I don't believe I have access to the Sharepoint you referenced, Emily. Can you please send the final draft around for review to everyone here?

Angela

From: Wells, Eden (DHHS)
Sent: Thursday, October 22, 2015 10:33 AM
To: Minicuci, Angela (DHHS) <MinicuciA@michigan.gov>
Cc: Mona Hanna-Attisha <MHanna1@hurleymc.com>; Lasher, Geralyn (DHHS) <lasherg@michigan.gov>; Eisner, Jennifer (DHHS) <EisnerJ@michigan.gov>; Emily Houk <emily@r2pconsultants.com>; Peeler, Nancy (DHHS) <PeelerN@michigan.gov>; tlarocco@gchd.us; Travis, Rashmi (DHHS) <TravisR@michigan.gov>
Subject: Time Sensitive-Updated Testing Protocol October 22, 2015

Please review and let Angela know if ok sap
Sent from my iPhone

On Oct 22, 2015, at 10:06 AM, Minicuci, Angela (DHHS) <MinicuciA@michigan.gov> wrote:

Looks like the attachment fell off. Please use this cleaned up version.

Angela

From: Wells, Eden (DHHS)
Sent: Thursday, October 22, 2015 10:05 AM
To: Mona Hanna-Attisha <MHanna1@hurleymc.com>; Minicuci, Angela (DHHS) <MinicuciA@michigan.gov>; Lasher, Geralyn (DHHS) <lasherg@michigan.gov>; Eisner, Jennifer (DHHS) <EisnerJ@michigan.gov>
Cc: Emily Houk <emily@r2pconsultants.com>; Peeler, Nancy (DHHS) <PeelerN@michigan.gov>; tlarocco@gchd.us; Travis, Rashmi (DHHS) <TravisR@michigan.gov>
Subject: Re: Updated Testing Protocol October 22, 2015

Folks- looping in folks who are cleaning final drafts

Sent from my iPhone

On Oct 22, 2015, at 9:54 AM, Mona Hanna-Attisha <MHanna1@hurleymc.com> wrote:

I think GCHD needs to be a third column under testing methodology since testing can be done there. I may have missed this on a version.

From: Emily Houk [mailto:emily@r2pconsultants.com]
Sent: Thursday, October 22, 2015 9:13 AM
To: Wells, Eden (DHHS)
Cc: Mona Hanna-Attisha; Peeler, Nancy (DHHS); tlarocco@gchd.us; Travis, Rashmi (DHHS)
Subject: Re: Updated Testing Protocol October 22, 2015

Got it. I added "GCHD" under Case Management to help clarify this (I hope?).

Documents are now on sharepoint.

Mona, I apologize for missing your parent edits. I have incorporated most, if not all of them. Thank you for your help.

Emily

On Thu, Oct 22, 2015 at 8:54 AM, Wells, Eden (DHHS) <WellsE3@michigan.gov> wrote:
Agree

Sent from my iPhone

On Oct 22, 2015, at 8:15 AM, Mona Hanna-Attisha <MHanna1@hurleymc.com> wrote:

Looks super. Did you want to add GCHD as an outreach site since people can go there for testing?

From: Emily Houk [mailto:emily@r2pconsultants.com]
Sent: Thursday, October 22, 2015 7:59 AM
To: Nancy Peeler; tlarocco@gchd.us; Mona Hanna-Attisha; Wells, Eden (DCH); Travis, Rashmi (DHHS)
Subject: Updated Testing Protocol October 22, 2015

Good morning,

The updated testing protocol document is attached.

Based on emails from last night, I:

1. Removed the Hurley column

2. Did NOT include 2-1-1 in the testing protocol

Let me know if you have additional edits.

Emily

--

Emily Houk, President and Chief Mischief Maker

Research to Practice Consulting, LLC

216 North Chestnut

Lansing, Michigan 48933

517-896-2712

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--
Emily Houk, President and Chief Mischief Maker
Research to Practice Consulting, LLC
216 North Chestnut
Lansing, Michigan 48933
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<Flint Blood Lead level Testing Protocol table v5.docx>

Flint Blood Lead level Testing Protocol

October 22, 2015

Target Population		Outreach methodology			Testing methodology	
		Case Management	Letter to Families	Letter to Providers	Primary Care Provider	Community/Health Plan event
PRIORITY LEVEL 1	All children with elevated Capillary ≥ 5 since April 2014	GCHD will contact family to provide support, follow up services including testing	Letter to family provides education and encourages testing through PCP. Sent by community partners.	Provides education and prepares PCP to work with families. Sent by medical society, health coalition and GCHD.	Office appointment and order for lab test	Events offered in community for families to attend. Testing available at GCHD.
	All children with newly elevated Venous ≥ 5 since April 2014					
	All children with new elevated Venous ≥ 5 since October 2015					
PRIORITY LEVEL 2	All children attending Freeman, Brunnell, Eisenhower schools		Letter to family provides education and encourages testing through PCP. Sent by community partners.	Provides education and prepares PCP to work with families. Sent by medical society, health coalition and GCHD.	Office appointment and order for lab test	Events offered in community for families to attend. Testing available at GCHD.
	All children from Flint who are in child care, or attend child care in Flint		Letter to family provides education and encourages testing through PCP. Sent by community partners.	Provides education and prepares PCP to work with families. Sent by medical society, health coalition and GCHD.	Office appointment and order for lab test	Events offered in community for families to attend. Testing available at GCHD.
	All children in preschool programs in Flint					
PRIORITY LEVEL 3	All children enrolled in school facilities in Flint not listed above		Letter to family provides education and encourages testing through PCP. Sent by community partners.	Provides education and prepares PCP to work with families. Sent by medical society, health coalition and GCHD.	Office appointment and order for lab test	Events offered in community for families to attend. Testing available at GCHD.

This Document is a Non-Responsive Attachment.

From: Emily Houk <emily@r2pconsultants.com>
Sent: Thursday, October 22, 2015 2:56 PM
To: Peeler, Nancy (DHHS)
Subject: Re: Time Sensitive-Updated Testing Protocol October 22, 2015

Yes.

On Thu, Oct 22, 2015 at 2:50 PM, Peeler, Nancy (DHHS) <PeelerN@michigan.gov> wrote:
Help, I am still on iPad, can't see edits. Did the stuff under CM get removed for priorities 2 and 3?

Sent from my iPad

Begin forwarded message:

> **From:** "Minicuci, Angela (DHHS)" <MinicuciA@michigan.gov>
> **Date:** October 22, 2015 at 2:32:36 PM EDT
> **To:** "Wells, Eden (DHHS)" <WellsE3@michigan.gov>, "LaRocco, Toni" <tlarocco@gchd.us>
> **Cc:** "Peeler, Nancy (DHHS)" <PeelerN@michigan.gov>, Mona Hanna-Attisha <MHanna1@hurleymc.com>, "Lasher, Geralyn (DHHS)" <lasherg@michigan.gov>, "Eisner, Jennifer (DHHS)" <EisnerJ@michigan.gov>, Emily Houk <emily@r2pconsultants.com>, "Travis, Rashmi (DHHS)" <TravisR@michigan.gov>
>
> **Subject: RE: Time Sensitive-Updated Testing Protocol October 22, 2015**
>
> Given the case management edit and the GCHD testing information, please see the attached updated version. Feedback?
>
> Angela
>
> ---
>
> **From:** Wells, Eden (DHHS)
> **Sent:** Thursday, October 22, 2015 11:55 AM
> **To:** LaRocco, Toni <tlarocco@gchd.us>
> **Cc:** Peeler, Nancy (DHHS) <PeelerN@michigan.gov>; Minicuci, Angela (DHHS) <MinicuciA@michigan.gov>; Mona Hanna-Attisha <MHanna1@hurleymc.com>; Lasher, Geralyn (DHHS) <lasherg@michigan.gov>; Eisner, Jennifer (DHHS) <EisnerJ@michigan.gov>; Emily Houk <emily@r2pconsultants.com>; Travis, Rashmi (DHHS) <TravisR@michigan.gov>
> **Subject:** Re: Time Sensitive-Updated Testing Protocol October 22, 2015
>
> Great!!
>
> Sent from my iPhone

On Oct 22, 2015, at 11:53 AM, LaRocco, Toni <tlarocco@gchd.us> wrote:

> After lunch conversation regarding printing of materials. I have spoken with both our Headstart/Early Headstart program, call in for GSRP, call in for non-licensed day care and have distribution list for licensed day care centers.

From: Peeler, Nancy (DHHS) [mailto:PeelerN@michigan.gov]
Sent: Thursday, October 22, 2015 11:36 AM
To: LaRocco, Toni
Cc: Minicuci, Angela (DHHS); Wells, Eden (DHHS); Mona Hanna-Attisha; Lasher, Geralyn (DHHS); Eisner, Jennifer (DHHS); Emily Houk; Travis, Rashmi (DHHS)
Subject: Re: Time Sensitive-Updated Testing Protocol October 22, 2015

I agree with Toni - the case management contract with GCHD will be based on actual elevated levels (e.g. Priority 1), and CM will do outreach to those kids. They will not be offering CM to children who don't have a test showing an elevated level (e.g. Priority 2 and 3).

However, if kids from Priority level 2 or 3 DO have an elevated level, that would bump them up into Priority 1.

Nancy

Sent from my iPad

On Oct 22, 2015, at 11:16 AM, LaRocco, Toni <tlarocco@gchd.us> wrote:

> I don't think case management colum under priority level 2 is pertinent pending conversations tomorrow afternoon. Although anyone needing case management will be followed by GCHD

From: Minicuci, Angela (DHHS) [mailto:MinicuciA@michigan.gov]
Sent: Thursday, October 22, 2015 11:01 AM
To: Wells, Eden (DHHS)
Cc: Mona Hanna-Attisha; Lasher, Geralyn (DHHS); Eisner, Jennifer (DHHS); Emily Houk; Peeler, Nancy (DHHS); LaRocco, Toni; Travis, Rashmi (DHHS)
Subject: RE: Time Sensitive-Updated Testing Protocol October 22, 2015

The final draft from the site is attached for everyone's review. Any final edits?

Angela

From: Minicuci, Angela (DHHS)
Sent: Thursday, October 22, 2015 10:43 AM
To: Wells, Eden (DHHS) <WellsE3@michigan.gov>
Cc: Mona Hanna-Attisha <MHanna1@hurleymc.com>; Lasher, Geralyn (DHHS) <lasherg@michigan.gov>; Eisner, Jennifer (DHHS) <EisnerJ@michigan.gov>; Emily Houk <emily@r2pconsultants.com>; Peeler, Nancy (DHHS) <PeelerN@michigan.gov>; tlarocco@gchd.us; Travis, Rashmi (DHHS) <TravisR@michigan.gov>
Subject: RE: Time Sensitive-Updated Testing Protocol October 22, 2015

I don't believe I have access to the Sharepoint you referenced, Emily. Can you please send the final draft around for review to everyone here?

Angela

From: Wells, Eden (DHHS)
Sent: Thursday, October 22, 2015 10:33 AM
To: Minicuci, Angela (DHHS) <MinicuciA@michigan.gov>
Cc: Mona Hanna-Attisha <MHanna1@hurleymc.com>; Lasher, Geralyn (DHHS) <lasherg@michigan.gov>; Eisner, Jennifer (DHHS) <EisnerJ@michigan.gov>; Emily Houk <emily@r2pconsultants.com>; Peeler, Nancy (DHHS) <PeelerN@michigan.gov>; tlarocco@gchd.us; Travis, Rashmi (DHHS) <TravisR@michigan.gov>
Subject: Time Sensitive-Updated Testing Protocol October 22, 2015

Please review and let Angela know if ok sap
Sent from my iPhone

On Oct 22, 2015, at 10:06 AM, Minicuci, Angela (DHHS) <MinicuciA@michigan.gov> wrote:

Looks like the attachment fell off. Please use this cleaned up version.

Angela

From: Wells, Eden (DHHS)
Sent: Thursday, October 22, 2015 10:05 AM
To: Mona Hanna-Attisha <MHanna1@hurleymc.com>; Minicuci, Angela (DHHS) <MinicuciA@michigan.gov>; Lasher, Geralyn (DHHS) <lasherg@michigan.gov>; Eisner, Jennifer (DHHS) <EisnerJ@michigan.gov>
Cc: Emily Houk <emily@r2pconsultants.com>; Peeler, Nancy (DHHS) <PeelerN@michigan.gov>; tlarocco@gchd.us; Travis, Rashmi (DHHS) <TravisR@michigan.gov>
Subject: Re: Updated Testing Protocol October 22, 2015

Folks- looping in folks who are cleaning final drafts

Sent from my iPhone

On Oct 22, 2015, at 9:54 AM, Mona Hanna-Attisha <MHanna1@hurleymc.com> wrote:

> I think GCHD needs to be a third column under testing methodology since testing can be done there. I may have missed this on a version.
>
> **From:** Emily Houk [mailto:emily@r2pconsultants.com]
> **Sent:** Thursday, October 22, 2015 9:13 AM
> **To:** Wells, Eden (DHHS)
> **Cc:** Mona Hanna-Attisha; Peeler, Nancy (DHHS); tlarocco@gchd.us; Travis, Rashmi (DHHS)
> **Subject:** Re: Updated Testing Protocol October 22, 2015

Got it. I added "GCHD" under Case Management to help clarify this (I hope?).

Documents are now on sharepoint.

Mona, I apologize for missing your parent edits. I have incorporated most, if not all of them. Thank you for your help.

Emily

On Thu, Oct 22, 2015 at 8:54 AM, Wells, Eden (DHHS) <WellsE3@michigan.gov> wrote:

Agree

Sent from my iPhone

On Oct 22, 2015, at 8:15 AM, Mona Hanna-Attisha <MHanna1@hurleymc.com> wrote:

> Looks super. Did you want to add GCHD as an outreach site since people can go there for testing?
>
> **From:** Emily Houk [mailto:emily@r2pconsultants.com]
> **Sent:** Thursday, October 22, 2015 7:59 AM
> **To:** Nancy Peeler; tlarocco@gchd.us; Mona Hanna-Attisha; Wells, Eden (DCH);

Travis, Rashmi (DHHS)
Subject: Updated Testing Protocol
October 22, 2015

Good morning,

The updated testing protocol document is attached.

Based on emails from last night, I:

1. Removed the Hurley column

2. Did NOT include 2-1-1 in the testing protocol

Let me know if you have additional edits.

Emily

--

Emily Houk,
President and Chief Mischief Maker

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Research to Practice Consulting, LLC
216 North Chestnut
Lansing, Michigan 48933
517-896-2712
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From: Scott, Robert L. (DHHS)
Sent: Friday, October 23, 2015 8:13 AM
To: Peeler, Nancy (DHHS)
Subject: RE: briefing for Nick
Attachments: Summary - Flint Children Needing Retesting Hurley or not.pdf

The only thing I can think of is the attached, right side, but that's not an answer to Sue's question.

The actual number of children originally on those lists who have since been retested is more like 5 or so, as of last Friday's processing. Today's weekly processing will no doubt show a few more.

From: Peeler, Nancy (DHHS)
Sent: Thursday, October 22, 2015 6:25 PM
To: Scott, Robert L. (DHHS) <ScottR9@michigan.gov>
Subject: Fwd: briefing for Nick

Not sure where Eden got the 76 number? Familiar to you?

Sent from my iPad

Begin forwarded message:

> **From:** "Wells, Eden (DHHS)" <WellsE3@michigan.gov>
> **Date:** October 22, 2015 at 5:19:40 PM EDT
> **To:** "Moran, Susan (DHHS)" <MoranS@michigan.gov>
> **Cc:** "Peeler, Nancy (DHHS)" <PeelerN@michigan.gov>, "Dykema, Linda D. (DHHS)" <DykemaL@michigan.gov>, "Eisner, Jennifer (DHHS)" <EisnerJ@michigan.gov>, "Hertel, Elizabeth (DHHS)" <HertelE@michigan.gov>, "Lasher, Geralyn (DHHS)" <lasherg@michigan.gov>, "Miller, Mark (DHHS)" <millerm1@michigan.gov>, "Robinson, Mikelle (DHHS)" <RobinsonM18@michigan.gov>, "Schoenow, Kris (DHHS)" <SchoenowK@michigan.gov>, "Thompson, Sheryl D. (DHHS)" <ThompsonS2@michigan.gov>, "Travis, Rashmi (DHHS)" <TravisR@michigan.gov>, "Anderson, Paula (DHHS)" <AndersonP3@michigan.gov>, "Rockefeller, Cheryl (DHHS)" <RockefellerC@michigan.gov>
> **Subject: Re: briefing for Nick**
>
> About 76
>
> Sent from my iPhone
>
> On Oct 22, 2015, at 4:58 PM, Moran, Susan (DHHS) <MoranS@michigan.gov> wrote:
>
> > And do we know how many of those kids have been reached/tested?
> >
> > ---
> >
> > **From:** Peeler, Nancy (DHHS)
> > **Sent:** Thursday, October 22, 2015 4:54 PM
> > **To:** Moran, Susan (DHHS)
> > **Cc:** Dykema, Linda D. (DHHS); Eisner, Jennifer (DHHS); Hertel, Elizabeth (DHHS); Lasher, Geralyn (DHHS); Miller, Mark (DHHS); Robinson, Mikelle (DHHS); Schoenow, Kris (DHHS); Thompson, Sheryl D. (DHHS); Travis, Rashmi (DHHS); Wells, Eden (DHHS);

Anderson, Paula (DHHS); Rockefeller, Cheryl (DHHS)
Subject: Re: briefing for Nick

One comment, regarding the testing protocol section. Our highest priority group (comprised of children with test results dating back to April 2014) is the kids with elevated capillary tests needing venous confirmatory test, along with kids with elevated venous tests due for follow-up testing. That group is not reflected in your notes.

Nancy

Sent from my iPad

On Oct 22, 2015, at 2:19 PM, Moran, Susan (DHHS) <MoranS@michigan.gov> wrote:

> Hello all- Nick has asked for a daily briefing summarizing MDHHS actions in response to Flint water situation, please see attached draft. NEED COMMENTS BY 5PM TODAY.
>
> Susan Moran MPH, Senior Deputy Director
> Population Health and Community Services Administration
> Capitol View Building
> 201 Townsend St 6th Floor
> Lansing, MI
> 48913
> Phone: 517 335 8024
> Fax: 517 335 9032
> morans@michigan.gov
>
> <Nick 10-22-15_Daily Activity Summary.docx>

Children less than Six Years of Age, Living in ZIP Codes 48501-48507, with Elevated Blood Lead Levels Since April 1, 2014, Who Currently Require Follow-Up Testing

Among 75 Children Needing Confirmation of Elevated Capillary BLL

	Number	Percentage
Medicaid-eligible	74	98.7
Not Medicaid	1	1.3
BLL 5-14	74	98.7
BLL > 14	1	1.3
Current Age 1-2 years	54	72.0
Current Age 3-6 years	21	28.0
ZIP 48502	1	1.3
ZIP 48503	16	21.3
ZIP 48504	27	36.0
ZIP 48505	12	16.0
ZIP 48506	6	8.0
ZIP 48507	13	17.3
Elevated Capillary is Only Test to Date	58	77.3
Previous Test was < 5	15	20.0
Previous Test was Elevated Capillary	2	2.7
Last Test from Hurley	15	20.0
Last Test from Other Provider	60	80.0

Among 76 Children with Elevated Venous BLL, Needing Retesting

	Number	Percentage
Medicaid-eligible	70	92.1
Not Medicaid	6	7.9
BLL 5-14	70	92.1
BLL > 14	6	7.9
Current Age 1-2 years	28	36.8
Current Age 3-6 years	48	63.2
ZIP 48502	2	2.6
ZIP 48503	18	23.7
ZIP 48504	21	27.6
ZIP 48505	15	19.7
ZIP 48506	13	17.1
ZIP 48507	5	6.6
Currently in Other ZIP	2	2.6
BLL 5-14 Due for Retest	63	82.9
BLL 5-14 Not Due Yet	7	9.2
BLL >14 Due for Retest	6	7.9
Last Test is Follow-up to Previous Elevated Venous	10	13.2
Have Never Had Follow-up Venous Test	66	86.8
Last Test from Hurley	58	76.3
Last Test from Other Provider	18	23.7

October 13, 2015

Source: MDHHS Data Warehouse

From: Peeler, Nancy (DHHS)
Sent: Friday, October 23, 2015 8:46 AM
To: Robert L. Scott (ScottR9@michigan.gov);Lishinski, Karen (DCH) (LishinskiK@michigan.gov);Jessica Cooper (CooperJ3@michigan.gov)
Subject: Flint Water Talking Points 100215
Attachments: Flint Water Talking Points 100215.docx

FYI – at one point we discussed needing for all of us to have the talking points about Flint water that MDHHS released at the beginning of October – boy, that feels like a long time ago. Interesting, in that it shows what the Epi study (using CLPPP data) showed about the situation. Happy reading!

Nancy

Blood Lead Levels in Flint Talking Points
October 1, 2015

- Initial analysis of MDHHS data found that blood lead levels (BLLs) of children in Flint have followed an expected seasonal trend; due to small numbers further analysis was initiated.
- While this analysis of blood lead levels in Flint as a whole remains true, after a comprehensive and detailed review down to the zip code level, we have found that the state analysis is consistent with that presented by Hurley.
- Director Lyon is working closely with DEQ and the administration to take active steps to reduce all potential lead exposures in Flint, and across the state.
- Our Chief Medical Executive has been in communication with the lead investigator at Hurley Children's Hospital, and we continue to work with Hurley, the city of Flint, local and state leaders to verify and analyze data trends.
- Zip code-level data does show that there has been an increase in elevated childhood blood lead levels in specific communities.
    - This does not conclusively mean that the water source change is the sole cause of the increase, but data does show an association.
    - There is an increased proportion of children with elevated Blood Levels (ELBs) in several zip codes, particularly 03 and 04. These appear to have increased over the last 1.5 years.
    - Lead exposure can occur from a number of different sources (such as paint, gasoline, solder, and consumer products) and through different pathways (such as air, food, water, dust, and soil).
    - Although there are several exposure sources, lead-based paint is still the most widespread and dangerous high-dose source of lead exposure for young children in the US and Michigan.
- We reviewed MDHHS statewide data using the same methodology used by Hurley, looking at our numbers by zip code and age ranges, and filtering out non-Flint children.
- Routine surveillance of blood lead levels does not analyze data down to the zip code level. Detailed analysis like this occurs when there is reason to focus in on precise locations or populations.
- MDHHS will be working closely with the Michigan Department of Environmental Quality, Hurley Children's Hospital, the Genesee County Health Department, and community organizations to initiate further action steps.
- We understand that cost may be a barrier to following the recommendations of the local health department. We are actively working with public and private partners to make resources available to those who may need assistance.

- MDHHS is recommending that residents follow the Public Health Advisory issued by the Genesee County Health Department, as well as take further steps to reduce exposures to all forms of lead in and around their homes.

MDHHS Stats and Facts

- 'High Risk' Zip codes (48503 and 48504)
    - Blood lead level rates among children under six years of age in the high risk zip codes (48503, 48504) were 2.7 times higher than the rest of Genesee County before the switch to Flint River Water.
    - After the switch to Flint River Water, rates in the high risk Zip codes were 3.2 times that of the rest of Genesee County.
- Other Zip codes in Flint
    - Rates of elevated blood lead levels among children under six years of age in other parts of the city of Flint were 2 times that of the rest of Genesee County before the switch to Flint River Water.
    - The magnitude of the elevated rate remained roughly the same during the period after the water source switch.
- Lead abatement through MDHHS was federally funded up until FY14 when Michigan began providing additional funds to abate homes.
- In FY14, $1.25M General Fund was added. In FY15, General Fund was bumped up to $1.75M and FY16, General Fund remains at $1.75M.

Water Filters

- Our first action item is to work closely with our public and private partners to provide water filters to Flint residents and MDHHS clients.
- To meet this priority, the governor has identified one million dollars in state funding to purchase water filters for Flint residents.
- Given the questions and concerns regarding the change in water source in Flint, MDHHS has authorized the use of emergency services funding to provide water filters for MDHHS clients receiving assistance in the city of Flint.
- We are pursuing a plan for clients who are active Family Independence Program (FIP), Food Assistance Program (FAP), Child Development and Care (CDC), State Disability Assistance (SDA), State Disability Assistance (SDA), or Social Security Insurance (SSI) to that they can obtain filters that are National Sanitation Foundation (NSF) certified to remove lead and ANSI Standard 53.
- We are in discussions with local retailers and will share additional information about where residents can go to purchase filters as soon as those details have been finalized.

- MDHHS currently serves approximately 25,000 households in Flint.

Reducing and Removing Lead Exposure

- In housing built before 1978, it can be assumed that the paint has lead unless tests show otherwise.
- Make sure your child does not have access to peeling paint or chewable surfaces painted with lead-based paint.
- Children and pregnant women should not be present in housing built before 1978 that is undergoing renovation. They should not participate in activities that disturb old paint or in cleaning up paint debris after work is completed.
- Create barriers between living/play areas and lead sources. Until environmental clean-up is completed, you should clean and isolate all sources of lead.
    - Close and lock doors to keep children away from chipping or peeling paint on walls. You can also apply temporary barriers such as contact paper or duct tape, to cover holes in walls or to block children's access to other sources of lead.
- Regularly wash children's hands and toys. Hands and toys can become contaminated from household dust or exterior soil. Both are known lead sources.
- Regularly wet-mop floors and wet-wipe window components. Because household dust is a major source of lead, you should wet-mop floors and wet-wipe horizontal surfaces every 2-3 weeks.
    - Windowsills and wells can contain high levels of leaded dust. They should be kept clean. If feasible, windows should be shut to prevent abrasion of painted surfaces or opened from the top sash.
- Take off shoes when entering the house to prevent bringing lead-contaminated soil in from outside.
- Prevent children from playing in bare soil; if possible, provide them with sandboxes. Plant grass on areas of bare soil or cover the soil with grass seed, mulch, or wood chips, if possible.
    - Until the bare soil is covered, move play areas away from bare soil and away from the sides of the house. If you have a sandbox, cover the box when not in use to prevent cats from using it as a litter box. That will help protect children from exposure to animal waste.
- Avoid using makeup, containers, cookware, or tableware to store or cook foods or liquids that are not shown to be lead free.
- Remove recalled toys and toy jewelry immediately from children.
- Use only cold water from the tap for drinking, cooking, and making baby formula. Hot water is more likely to contain higher levels of lead. Most of the lead in household water usually comes from the plumbing in your house, not from the local water supply.

- Shower and change clothes after finishing a task that involves working with lead-based products such as stained glass, making bullets, or using a firing range.

WIC Children

- There are 855 infants participating in WIC in Flint.
- We are working with partners at the United Way to ensure that WIC families have access to water filters and bottled water.
- In homes with infants on WIC, if the household has documentation from an official source of unsanitary water supply issues, that family may be eligible to receive ready-to-feed formula. Families should contact WIC to see if they are eligible.
- Each household would have to be looked at on an individual basis.
- WIC cannot cover bottled water.

Background

- The results of the Hurley Children's Hospital were reviewed by MDHHS after the study was released last week.
- The analysis that Hurley conducted was different from the initial MDHHS data regarding blood lead levels in Flint.
- MDHHS initial data looked at the entire blood lead levels for the Flint area for the past five years and showed the annual seasonal trends in the area.
- Seasonal exposure is higher in the summer for a variety of reasons including children playing outside in the soil, and when windows are open and lead paint is more likely to be in the air. Further, seasonal variations in water can occur due to changes in temperature, pH , and other factors

From: Travis, Rashmi (DHHS)
Sent: Friday, October 23, 2015 3:42 PM
To: LaRocco, Toni
Cc: Peeler, Nancy (DHHS)
Subject: FW: Time Sensitive-Updated Testing Protocol October 22, 2015
Attachments: Flint Blood Lead Level Testing Protocol Table FINAL.pdf

Toni,
Were you planning on sending out the letters to the providers and parents? How are these materials going to be distributed?
Thanks,
Rashmi

From: Minicuci, Angela (DHHS)
Sent: Friday, October 23, 2015 1:43 PM
To: Travis, Rashmi (DHHS); Wells, Eden (DHHS)
Cc: LaRocco, Toni; Mona Hanna-Attisha; Peeler, Nancy (DHHS); Lasher, Geralyn (DHHS); Eisner, Jennifer (DHHS); Emily Houk
Subject: RE: Time Sensitive-Updated Testing Protocol October 22, 2015

Excellent. The final table is attached. We are working on finalizing the letter now. Are the provider and parent letters being sent out by GCHD?

Angela

From: Travis, Rashmi (DHHS)
Sent: Friday, October 23, 2015 1:41 PM
To: Wells, Eden (DHHS) <WellsE3@michigan.gov>; Minicuci, Angela (DHHS) <MinicuciA@michigan.gov>
Cc: LaRocco, Toni <tlarocco@gchd.us>; Mona Hanna-Attisha <MHanna1@hurleymc.com>; Peeler, Nancy (DHHS) <PeelerN@michigan.gov>; Lasher, Geralyn (DHHS) <lasherg@michigan.gov>; Eisner, Jennifer (DHHS) <EisnerJ@michigan.gov>; Emily Houk <emily@r2pconsultants.com>
Subject: RE: Time Sensitive-Updated Testing Protocol October 22, 2015

As far as dissemination, I think the protocol can go out with the provider letter.
Rashmi

From: Wells, Eden (DHHS)
Sent: Friday, October 23, 2015 12:48 PM
To: Minicuci, Angela (DHHS)
Cc: LaRocco, Toni; Mona Hanna-Attisha; Peeler, Nancy (DHHS); Lasher, Geralyn (DHHS); Eisner, Jennifer (DHHS); Emily Houk; Travis, Rashmi (DHHS)
Subject: Re: Time Sensitive-Updated Testing Protocol October 22, 2015

Good for me.

Folks, what is the dissemination plan for the protocol? Can this go to providers? THOUGHTS?

Eden V. Wells, MD, MPH, FACPM
MDHHS
Sent from my iPad

On Oct 23, 2015, at 12:44 PM, Minicuci, Angela (DHHS) <MinicuciA@michigan.gov> wrote:

I'm still not clear if the language is changing to screening vs testing, and I think adding a third row makes this chart even more redundant but given the feedback I've received, here is an updated version. Is this good to consider final at this point?

Angela

From: LaRocco, Toni [mailto:tlarocco@gchd.us]
Sent: Friday, October 23, 2015 12:18 PM
To: Minicuci, Angela (DHHS) <MinicuciA@michigan.gov>
Cc: Mona Hanna-Attisha <MHanna1@hurleymc.com>; Wells, Eden (DHHS) <WellsE3@michigan.gov>; Peeler, Nancy (DHHS) <PeelerN@michigan.gov>; Lasher, Geralyn (DHHS) <lasherg@michigan.gov>; Eisner, Jennifer (DHHS) <EisnerJ@michigan.gov>; Emily Houk <emily@r2pconsultants.com>; Travis, Rashmi (DHHS) <TravisR@michigan.gov>
Subject: RE: Time Sensitive-Updated Testing Protocol October 22, 2015

I will defer to the entire group as we have not been making that distinction. Most of the stuff done both at GCHD and PCPs is screening not testing. Might not want to confuse the matter.

From: Minicuci, Angela (DHHS) [mailto:MinicuciA@michigan.gov]
Sent: Friday, October 23, 2015 12:16 PM
To: LaRocco, Toni
Cc: Mona Hanna-Attisha; Wells, Eden (DHHS); Peeler, Nancy (DHHS); Lasher, Geralyn (DHHS); Eisner, Jennifer (DHHS); Emily Houk; Travis, Rashmi (DHHS)
Subject: RE: Time Sensitive-Updated Testing Protocol October 22, 2015

Do you want the language to continue to say 'Testing Available at GCHD'? Or did we want to edit the language?

Angela

From: LaRocco, Toni [mailto:tlarocco@gchd.us]
Sent: Friday, October 23, 2015 12:11 PM
To: Minicuci, Angela (DHHS) <MinicuciA@michigan.gov>
Cc: Mona Hanna-Attisha <MHanna1@hurleymc.com>; Wells, Eden (DHHS) <WellsE3@michigan.gov>; Peeler, Nancy (DHHS) <PeelerN@michigan.gov>; Lasher, Geralyn (DHHS) <lasherg@michigan.gov>; Eisner, Jennifer (DHHS) <EisnerJ@michigan.gov>; Emily Houk <emily@r2pconsultants.com>; Travis, Rashmi (DHHS) <TravisR@michigan.gov>
Subject: RE: Time Sensitive-Updated Testing Protocol October 22, 2015

I like Mona's idea of creating a "Second" column under **Testing Methodology"** placing GCHD as the second of three in that section. In that case remove "Testing available at GCHD" from the third column…. and in all reality……the bulk we are talking about screening not testing.
From: Minicuci, Angela (DHHS) [mailto:MinicuciA@michigan.gov]
Sent: Friday, October 23, 2015 11:56 AM
To: LaRocco, Toni
Subject: RE: Time Sensitive-Updated Testing Protocol October 22, 2015

Here you are!

Angela

From: LaRocco, Toni [mailto:tlarocco@gchd.us]
Sent: Friday, October 23, 2015 11:35 AM
To: Minicuci, Angela (DHHS) <MinicuciA@michigan.gov>
Subject: RE: Time Sensitive-Updated Testing Protocol October 22, 2015

Okay....just out of meetings. Can you please email the latest copy and I will review.

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Cc: Peeler, Nancy (DHHS); Lasher, Geralyn (DHHS); Eisner, Jennifer (DHHS); Emily Houk; Travis, Rashmi (DHHS)
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I'm happy to move it to the second column and change the language however Toni would prefer. Just let me know what that language would be and I will update.

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Cc: Peeler, Nancy (DHHS) <PeelerN@michigan.gov>; Lasher, Geralyn (DHHS) <lasherg@michigan.gov>; Eisner, Jennifer (DHHS) <EisnerJ@michigan.gov>; Emily Houk <emily@r2pconsultants.com>; Travis, Rashmi (DHHS) <TravisR@michigan.gov>
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You can of course do whatever you want, but GCHD is an independent and constant place to get blood tested – it is not one of these community/health plan events that are popping up to do single day mass screenings.

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And under the GCHD, it would include the process - walk-in, appt, lab test, etc. Toni can clarify this.

But of course, it's up to you.

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Instead of adding another column that would say the exact same thing in every row, we added a line to the community column as the GCHD is located in the community. The language says: Testing available at GCHD.

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Cc: Peeler, Nancy (DHHS); Mona Hanna-Attisha; Lasher, Geralyn (DHHS); Eisner, Jennifer (DHHS); Emily Houk; Travis, Rashmi (DHHS)
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As we received no edits to this last night, circulating tonight. Looks like this is the final version?

Also, any insight to the difference between Priority levels 2 and 3? Any help would be appreciated!

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Cc: Peeler, Nancy (DHHS) <PeelerN@michigan.gov>; 'Mona Hanna-Attisha' <MHanna1@hurleymc.com>; Lasher, Geralyn (DHHS) <lasherg@michigan.gov>; Eisner, Jennifer (DHHS) <EisnerJ@michigan.gov>; 'Emily Houk' <emily@r2pconsultants.com>; Travis, Rashmi (DHHS) <TravisR@michigan.gov>
Subject: RE: Time Sensitive-Updated Testing Protocol October 22, 2015

Attached is a cleaned up version for Priority 2.

Can someone help me understand the difference between the priority levels? Now that P2 and P3 have the same actions associated with them, hoping to be able to explain why we've set these different audiences under different priority levels.

Angela

From: Minicuci, Angela (DHHS)
Sent: Thursday, October 22, 2015 2:33 PM
To: Wells, Eden (DHHS) <WellsE3@michigan.gov>; LaRocco, Toni <tlarocco@gchd.us>
Cc: Peeler, Nancy (DHHS) <PeelerN@michigan.gov>; Mona Hanna-Attisha <MHanna1@hurleymc.com>; Lasher, Geralyn (DHHS) <lasherg@michigan.gov>; Eisner, Jennifer (DHHS) <EisnerJ@michigan.gov>; Emily Houk

<emily@r2pconsultants.com>; Travis, Rashmi (DHHS) <TravisR@michigan.gov>
Subject: RE: Time Sensitive-Updated Testing Protocol October 22, 2015

Given the case management edit and the GCHD testing information, please see the attached updated version. Feedback?

Angela

From: Wells, Eden (DHHS)
Sent: Thursday, October 22, 2015 11:55 AM
To: LaRocco, Toni <tlarocco@gchd.us>
Cc: Peeler, Nancy (DHHS) <PeelerN@michigan.gov>; Minicuci, Angela (DHHS) <MinicuciA@michigan.gov>; Mona Hanna-Attisha <MHanna1@hurleymc.com>; Lasher, Geralyn (DHHS) <lasherg@michigan.gov>; Eisner, Jennifer (DHHS) <EisnerJ@michigan.gov>; Emily Houk <emily@r2pconsultants.com>; Travis, Rashmi (DHHS) <TravisR@michigan.gov>
Subject: Re: Time Sensitive-Updated Testing Protocol October 22, 2015

Great!!

Sent from my iPhone

On Oct 22, 2015, at 11:53 AM, LaRocco, Toni <tlarocco@gchd.us> wrote:

After lunch conversation regarding printing of materials. I have spoken with both our Headstart/Early Headstart program, call in for GSRP, call in for non-licensed day care and have distribution list for licensed day care centers.

From: Peeler, Nancy (DHHS) [mailto:PeelerN@michigan.gov]
Sent: Thursday, October 22, 2015 11:36 AM
To: LaRocco, Toni
Cc: Minicuci, Angela (DHHS); Wells, Eden (DHHS); Mona Hanna-Attisha; Lasher, Geralyn (DHHS); Eisner, Jennifer (DHHS); Emily Houk; Travis, Rashmi (DHHS)
Subject: Re: Time Sensitive-Updated Testing Protocol October 22, 2015

I agree with Toni - the case management contract with GCHD will be based on actual elevated levels (e.g. Priority 1), and CM will do outreach to those kids. They will not be offering CM to children who don't have a test showing an elevated level (e.g. Priority 2 and 3).

However, if kids from Priority level 2 or 3 DO have an elevated level, that would bump them up into Priority 1.

Nancy

Sent from my iPad

On Oct 22, 2015, at 11:16 AM, LaRocco, Toni <tlarocco@gchd.us> wrote:

I don't think case management colum under priority level 2 is pertinent pending conversations tomorrow afternoon. Although anyone needing case management will be followed by GCHD

From: Minicuci, Angela (DHHS) [mailto:MinicuciA@michigan.gov]
Sent: Thursday, October 22, 2015 11:01 AM
To: Wells, Eden (DHHS)
Cc: Mona Hanna-Attisha; Lasher, Geralyn (DHHS); Eisner, Jennifer (DHHS); Emily Houk; Peeler, Nancy (DHHS); LaRocco,

Toni; Travis, Rashmi (DHHS)
Subject: RE: Time Sensitive-Updated Testing Protocol October 22, 2015

The final draft from the site is attached for everyone's review. Any final edits?

Angela

From: Minicuci, Angela (DHHS)
Sent: Thursday, October 22, 2015 10:43 AM
To: Wells, Eden (DHHS) <WellsE3@michigan.gov>
Cc: Mona Hanna-Attisha <MHanna1@hurleymc.com>; Lasher, Geralyn (DHHS) <lasherg@michigan.gov>; Eisner, Jennifer (DHHS) <EisnerJ@michigan.gov>; Emily Houk <emily@r2pconsultants.com>; Peeler, Nancy (DHHS) <PeelerN@michigan.gov>; tlarocco@gchd.us; Travis, Rashmi (DHHS) <TravisR@michigan.gov>
Subject: RE: Time Sensitive-Updated Testing Protocol October 22, 2015

I don't believe I have access to the Sharepoint you referenced, Emily. Can you please send the final draft around for review to everyone here?

Angela

From: Wells, Eden (DHHS)
Sent: Thursday, October 22, 2015 10:33 AM
To: Minicuci, Angela (DHHS) <MinicuciA@michigan.gov>
Cc: Mona Hanna-Attisha <MHanna1@hurleymc.com>; Lasher, Geralyn (DHHS) <lasherg@michigan.gov>; Eisner, Jennifer (DHHS) <EisnerJ@michigan.gov>; Emily Houk <emily@r2pconsultants.com>; Peeler, Nancy (DHHS) <PeelerN@michigan.gov>; tlarocco@gchd.us; Travis, Rashmi (DHHS) <TravisR@michigan.gov>
Subject: Time Sensitive-Updated Testing Protocol October 22, 2015

Please review and let Angela know if ok sap
Sent from my iPhone

On Oct 22, 2015, at 10:06 AM, Minicuci, Angela (DHHS) <MinicuciA@michigan.gov> wrote:

Looks like the attachment fell off. Please use this cleaned up version.

Angela

From: Wells, Eden (DHHS)
Sent: Thursday, October 22, 2015 10:05 AM
To: Mona Hanna-Attisha <MHanna1@hurleymc.com>; Minicuci, Angela (DHHS) <MinicuciA@michigan.gov>; Lasher, Geralyn (DHHS) <lasherg@michigan.gov>; Eisner, Jennifer (DHHS) <EisnerJ@michigan.gov>
Cc: Emily Houk <emily@r2pconsultants.com>; Peeler, Nancy (DHHS) <PeelerN@michigan.gov>; tlarocco@gchd.us; Travis, Rashmi (DHHS) <TravisR@michigan.gov>
Subject: Re: Updated Testing Protocol October 22, 2015

Folks- looping in folks who are cleaning final drafts

Sent from my iPhone

On Oct 22, 2015, at 9:54 AM, Mona Hanna-Attisha <MHanna1@hurleymc.com> wrote:

I think GCHD needs to be a third column under testing methodology since testing can be done there. I may have missed this on a version.

From: Emily Houk [mailto:emily@r2pconsultants.com]
Sent: Thursday, October 22, 2015 9:13 AM
To: Wells, Eden (DHHS)
Cc: Mona Hanna-Attisha; Peeler, Nancy (DHHS); tlarocco@gchd.us; Travis, Rashmi (DHHS)
Subject: Re: Updated Testing Protocol October 22, 2015

Got it. I added "GCHD" under Case Management to help clarify this (I hope?).

Documents are now on sharepoint.

Mona, I apologize for missing your parent edits. I have incorporated most, if not all of them. Thank you for your help.

Emily

On Thu, Oct 22, 2015 at 8:54 AM, Wells, Eden (DHHS) <WellsE3@michigan.gov> wrote:
Agree

Sent from my iPhone

On Oct 22, 2015, at 8:15 AM, Mona Hanna-Attisha <MHanna1@hurleymc.com> wrote:

Looks super. Did you want to add GCHD as an outreach site since people can go there for testing?

From: Emily Houk [mailto:emily@r2pconsultants.com]
Sent: Thursday, October 22, 2015 7:59 AM
To: Nancy Peeler; tlarocco@gchd.us; Mona Hanna-Attisha; Wells, Eden (DCH); Travis, Rashmi (DHHS)
Subject: Updated Testing Protocol October 22, 2015

Good morning,

The updated testing protocol document is attached.

Based on emails from last night, I:

1. Removed the Hurley column

2. Did NOT include 2-1-1 in the testing protocol

Let me know if you have additional edits.

Emily

--

Emily Houk, President and Chief Mischief Maker

Research to Practice Consulting, LLC

216 North Chestnut

Lansing, Michigan 48933

517-896-2712

r2pconsultants.com

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Emily Houk, President and Chief Mischief Maker
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<Flint Blood Lead level Testing Protocol table v5.docx>
<Flint Blood Lead Level Testing Protocol Table v8.docx>

Flint Blood Lead level Testing Protocol

October 23, 2015

Target Population		Outreach methodology			Testing methodology		
		Case Management	Letter to Families	Letter to Providers	Primary Care Provider	Health Department	Community/ Health Plan event
PRIORITY LEVEL 1	All children with elevated Capillary ≥ 5 since April 2014	GCHD will contact family to provide support, follow up services including testing	Letter to family provides education and encourages testing through PCP. Sent by community partners.	Provides education and prepares PCP to work with families. Sent by medical society, health coalition and GCHD.	Office appointment and order for lab test	Testing offered at GCHD	Events offered in community for families to attend
	All children with newly elevated Venous ≥ 5 since April 2014						
	All children with new elevated Venous ≥ 5 since October 2015						
PRIORITY LEVEL 2	All children attending Freeman, Brunnell, Eisenhower schools		Letter to family provides education and encourages testing through PCP. Sent by community partners.	Provides education and prepares PCP to work with families. Sent by medical society, health coalition and GCHD.	Office appointment and order for lab test	Testing offered at GCHD	Events offered in community for families to attend
	All children from Flint who are in child care, or attend child care in Flint						
	All children in preschool programs in Flint						
PRIORITY LEVEL 3	All children enrolled in school facilities in Flint not listed above		Letter to family provides education and encourages testing through PCP. Sent by community partners.	Provides education and prepares PCP to work with families. Sent by medical society, health coalition and GCHD.	Office appointment and order for lab test	Testing offered at GCHD	Events offered in community for families to attend

From: LaRocco, Toni <tlarocco@gchd.us>
Sent: Friday, October 23, 2015 4:06 PM
To: Travis, Rashmi (DHHS)
Cc: Peeler, Nancy (DHHS)
Subject: RE: Time Sensitive-Updated Testing Protocol October 22, 2015

On the conference call we were just on.....my understanding is for Providers to all go electronically. Parents would go through the Early Childhood education programs and all Flint schools in back packs.....I just confirmed this with the Flint Schools nurse Eileen Tomasi and she said they could do it. I am still trying to get some numbers on licensed and unlicensed day cares. Looking like we will need at the very least 10K of each item (potentially more).

From: Travis, Rashmi (DHHS) [mailto:TravisR@michigan.gov]
Sent: Friday, October 23, 2015 3:42 PM
To: LaRocco, Toni
Cc: Peeler, Nancy (DHHS)
Subject: FW: Time Sensitive-Updated Testing Protocol October 22, 2015

Toni,
Were you planning on sending out the letters to the providers and parents? How are these materials going to be distributed?
Thanks,
Rashmi

From: Minicuci, Angela (DHHS)
Sent: Friday, October 23, 2015 1:43 PM
To: Travis, Rashmi (DHHS); Wells, Eden (DHHS)
Cc: LaRocco, Toni; Mona Hanna-Attisha; Peeler, Nancy (DHHS); Lasher, Geralyn (DHHS); Eisner, Jennifer (DHHS); Emily Houk
Subject: RE: Time Sensitive-Updated Testing Protocol October 22, 2015

Excellent. The final table is attached. We are working on finalizing the letter now. Are the provider and parent letters being sent out by GCHD?

Angela

From: Travis, Rashmi (DHHS)
Sent: Friday, October 23, 2015 1:41 PM
To: Wells, Eden (DHHS) <WellsE3@michigan.gov>; Minicuci, Angela (DHHS) <MinicuciA@michigan.gov>
Cc: LaRocco, Toni <tlarocco@gchd.us>; Mona Hanna-Attisha <MHanna1@hurleymc.com>; Peeler, Nancy (DHHS) <PeelerN@michigan.gov>; Lasher, Geralyn (DHHS) <lasherg@michigan.gov>; Eisner, Jennifer (DHHS) <EisnerJ@michigan.gov>; Emily Houk <emily@r2pconsultants.com>
Subject: RE: Time Sensitive-Updated Testing Protocol October 22, 2015

As far as dissemination, I think the protocol can go out with the provider letter.
Rashmi

From: Wells, Eden (DHHS)
Sent: Friday, October 23, 2015 12:48 PM
To: Minicuci, Angela (DHHS)
Cc: LaRocco, Toni; Mona Hanna-Attisha; Peeler, Nancy (DHHS); Lasher, Geralyn (DHHS); Eisner, Jennifer (DHHS); Emily Houk; Travis, Rashmi (DHHS)
Subject: Re: Time Sensitive-Updated Testing Protocol October 22, 2015

Good for me.

Folks, what is the dissemination plan for the protocol? Can this go to providers? THOUGHTS?

Eden V. Wells, MD, MPH, FACPM
MDHHS
Sent from my iPad

On Oct 23, 2015, at 12:44 PM, Minicuci, Angela (DHHS) <MinicuciA@michigan.gov> wrote:

> I'm still not clear if the language is changing to screening vs testing, and I think adding a third row makes this chart even more redundant but given the feedback I've received, here is an updated version. Is this good to consider final at this point?
>
> Angela
>
> **From:** LaRocco, Toni [mailto:tlarocco@gchd.us]
> **Sent:** Friday, October 23, 2015 12:18 PM
> **To:** Minicuci, Angela (DHHS) <MinicuciA@michigan.gov>
> **Cc:** Mona Hanna-Attisha <MHanna1@hurleymc.com>; Wells, Eden (DHHS) <WellsE3@michigan.gov>; Peeler, Nancy (DHHS) <PeelerN@michigan.gov>; Lasher, Geralyn (DHHS) <lasherg@michigan.gov>; Eisner, Jennifer (DHHS) <EisnerJ@michigan.gov>; Emily Houk <emily@r2pconsultants.com>; Travis, Rashmi (DHHS) <TravisR@michigan.gov>
> **Subject:** RE: Time Sensitive-Updated Testing Protocol October 22, 2015
>
> I will defer to the entire group as we have not been making that distinction. Most of the stuff done both at GCHD and PCPs is screening not testing. Might not want to confuse the matter.
>
> **From:** Minicuci, Angela (DHHS) [mailto:MinicuciA@michigan.gov]
> **Sent:** Friday, October 23, 2015 12:16 PM
> **To:** LaRocco, Toni
> **Cc:** Mona Hanna-Attisha; Wells, Eden (DHHS); Peeler, Nancy (DHHS); Lasher, Geralyn (DHHS); Eisner, Jennifer (DHHS); Emily Houk; Travis, Rashmi (DHHS)
> **Subject:** RE: Time Sensitive-Updated Testing Protocol October 22, 2015
>
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Angela

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To: Wells, Eden (DHHS) <WellsE3@michigan.gov>; 'LaRocco, Toni' <tlarocco@gchd.us>
Cc: Peeler, Nancy (DHHS) <PeelerN@michigan.gov>; 'Mona Hanna-Attisha' <MHanna1@hurleymc.com>; Lasher, Geralyn (DHHS) <lasherg@michigan.gov>; Eisner, Jennifer (DHHS) <EisnerJ@michigan.gov>; 'Emily Houk' <emily@r2pconsultants.com>; Travis, Rashmi (DHHS) <TravisR@michigan.gov>
Subject: RE: Time Sensitive-Updated Testing Protocol October 22, 2015

Attached is a cleaned up version for Priority 2.

Can someone help me understand the difference between the priority levels? Now that P2 and P3 have the same actions associated with them, hoping to be able to explain why we've set these different audiences under different priority levels.

Angela

From: Minicuci, Angela (DHHS)
Sent: Thursday, October 22, 2015 2:33 PM
To: Wells, Eden (DHHS) <WellsE3@michigan.gov>; LaRocco, Toni <tlarocco@gchd.us>
Cc: Peeler, Nancy (DHHS) <PeelerN@michigan.gov>; Mona Hanna-Attisha <MHanna1@hurleymc.com>; Lasher, Geralyn (DHHS) <lasherg@michigan.gov>; Eisner, Jennifer (DHHS) <EisnerJ@michigan.gov>; Emily Houk <emily@r2pconsultants.com>; Travis, Rashmi (DHHS) <TravisR@michigan.gov>
Subject: RE: Time Sensitive-Updated Testing Protocol October 22, 2015

Given the case management edit and the GCHD testing information, please see the attached updated version. Feedback?

Angela

From: Wells, Eden (DHHS)
Sent: Thursday, October 22, 2015 11:55 AM
To: LaRocco, Toni <tlarocco@gchd.us>
Cc: Peeler, Nancy (DHHS) <PeelerN@michigan.gov>; Minicuci, Angela (DHHS) <MinicuciA@michigan.gov>; Mona Hanna-Attisha <MHanna1@hurleymc.com>; Lasher, Geralyn (DHHS) <lasherg@michigan.gov>; Eisner, Jennifer (DHHS) <EisnerJ@michigan.gov>; Emily Houk <emily@r2pconsultants.com>; Travis, Rashmi (DHHS) <TravisR@michigan.gov>
Subject: Re: Time Sensitive-Updated Testing Protocol October 22, 2015

Great!!

Sent from my iPhone

On Oct 22, 2015, at 11:53 AM, LaRocco, Toni <tlarocco@gchd.us> wrote:

> After lunch conversation regarding printing of materials. I have spoken with both our Headstart/Early Headstart program, call in for GSRP, call in for non-licensed day care and have distribution list for licensed day care centers.
>
> ---
>
> **From:** Peeler, Nancy (DHHS) [mailto:PeelerN@michigan.gov]
> **Sent:** Thursday, October 22, 2015 11:36 AM
> **To:** LaRocco, Toni
> **Cc:** Minicuci, Angela (DHHS); Wells, Eden (DHHS); Mona Hanna-Attisha; Lasher, Geralyn (DHHS); Eisner, Jennifer (DHHS); Emily Houk; Travis, Rashmi (DHHS)
> **Subject:** Re: Time Sensitive-Updated Testing Protocol October 22, 2015
>
> I agree with Toni - the case management contract with GCHD will be based on actual elevated levels (e.g. Priority 1), and CM will do outreach to those kids. They will not be offering CM to children who don't have a test showing an elevated level (e.g. Priority 2 and 3).

However, if kids from Priority level 2 or 3 DO have an elevated level, that would bump them up into Priority 1.

Nancy

Sent from my iPad

On Oct 22, 2015, at 11:16 AM, LaRocco, Toni <tlarocco@gchd.us> wrote:

> I don't think case management colum under priority level 2 is pertinent pending conversations tomorrow afternoon. Although anyone needing case management will be followed by GCHD
>
> ---
>
> **From:** Minicuci, Angela (DHHS) [mailto:MinicuciA@michigan.gov]
> **Sent:** Thursday, October 22, 2015 11:01 AM
> **To:** Wells, Eden (DHHS)
> **Cc:** Mona Hanna-Attisha; Lasher, Geralyn (DHHS); Eisner, Jennifer (DHHS); Emily Houk; Peeler, Nancy (DHHS); LaRocco, Toni; Travis, Rashmi (DHHS)
> **Subject:** RE: Time Sensitive-Updated Testing Protocol October 22, 2015
>
> The final draft from the site is attached for everyone's review. Any final edits?
>
> Angela
>
> ---
>
> **From:** Minicuci, Angela (DHHS)
> **Sent:** Thursday, October 22, 2015 10:43 AM
> **To:** Wells, Eden (DHHS) <WellsE3@michigan.gov>
> **Cc:** Mona Hanna-Attisha <MHanna1@hurleymc.com>; Lasher, Geralyn (DHHS) <lasherg@michigan.gov>; Eisner, Jennifer (DHHS) <EisnerJ@michigan.gov>; Emily Houk <emily@r2pconsultants.com>; Peeler, Nancy (DHHS) <PeelerN@michigan.gov>; tlarocco@gchd.us; Travis, Rashmi (DHHS) <TravisR@michigan.gov>
> **Subject:** RE: Time Sensitive-Updated Testing Protocol October 22, 2015
>
> I don't believe I have access to the Sharepoint you referenced, Emily. Can you please send the final draft around for review to everyone here?
>
> Angela
>
> ---
>
> **From:** Wells, Eden (DHHS)
> **Sent:** Thursday, October 22, 2015 10:33 AM
> **To:** Minicuci, Angela (DHHS) <MinicuciA@michigan.gov>
> **Cc:** Mona Hanna-Attisha <MHanna1@hurleymc.com>; Lasher, Geralyn (DHHS) <lasherg@michigan.gov>; Eisner, Jennifer (DHHS) <EisnerJ@michigan.gov>; Emily Houk <emily@r2pconsultants.com>; Peeler, Nancy (DHHS) <PeelerN@michigan.gov>; tlarocco@gchd.us; Travis, Rashmi (DHHS) <TravisR@michigan.gov>
> **Subject:** Time Sensitive-Updated Testing Protocol October 22, 2015

Please review and let Angela know if ok sap
Sent from my iPhone

On Oct 22, 2015, at 10:06 AM, Minicuci, Angela (DHHS) <MinicuciA@michigan.gov> wrote:

> Looks like the attachment fell off. Please use this cleaned up version.
>
> Angela
>
> ---
>
> **From:** Wells, Eden (DHHS)
> **Sent:** Thursday, October 22, 2015 10:05 AM
> **To:** Mona Hanna-Attisha <MHanna1@hurleymc.com>; Minicuci, Angela (DHHS) <MinicuciA@michigan.gov>; Lasher, Geralyn (DHHS) <lasherg@michigan.gov>; Eisner, Jennifer (DHHS) <EisnerJ@michigan.gov>
> **Cc:** Emily Houk <emily@r2pconsultants.com>; Peeler, Nancy (DHHS) <PeelerN@michigan.gov>; tlarocco@gchd.us; Travis, Rashmi (DHHS) <TravisR@michigan.gov>
> **Subject:** Re: Updated Testing Protocol October 22, 2015
>
> Folks- looping in folks who are cleaning final drafts
>
> Sent from my iPhone
>
> On Oct 22, 2015, at 9:54 AM, Mona Hanna-Attisha <MHanna1@hurleymc.com> wrote:
>
> > I think GCHD needs to be a third column under testing methodology since testing can be done there. I may have missed this on a version.
> >
> > **From:** Emily Houk [mailto:emily@r2pconsultants.com]
> > **Sent:** Thursday, October 22, 2015 9:13 AM
> > **To:** Wells, Eden (DHHS)
> > **Cc:** Mona Hanna-Attisha; Peeler, Nancy (DHHS); tlarocco@gchd.us; Travis, Rashmi (DHHS)
> > **Subject:** Re: Updated Testing Protocol October 22, 2015
> >
> > Got it. I added "GCHD" under Case Management to help clarify this (I hope?).
> >
> > Documents are now on sharepoint.

Mona, I apologize for missing your parent edits. I have incorporated most, if not all of them. Thank you for your help.

Emily

On Thu, Oct 22, 2015 at 8:54 AM, Wells, Eden (DHHS) <WellsE3@michigan.gov> wrote:
Agree

Sent from my iPhone

On Oct 22, 2015, at 8:15 AM, Mona Hanna-Attisha <MHanna1@hurleymc.com> wrote:

> Looks super. Did you want to add GCHD as an outreach site since people can go there for testing?
>
> **From:** Emily Houk [mailto:emily@r2pconsultants.com]
> **Sent:** Thursday, October 22, 2015 7:59 AM
> **To:** Nancy Peeler; tlarocco@gchd.us; Mona Hanna-Attisha; Wells, Eden (DCH); Travis, Rashmi (DHHS)
> **Subject:** Updated Testing Protocol October 22, 2015
>
> Good morning,
>
> The updated testing protocol document is attached.

Based on emails from last night, I:

1. Removed the Hurley column

2. Did NOT include 2-1-1 in the testing protocol

Let me know if you have additional edits.

Emily

--

Emily Houk,
President and Chief Mischief Maker

Research to Practice Consulting, LLC

216 North Chestnut

Lansing, Michigan 48933

517-896-2712

r2pconsultants.com

--
Emily Houk, President and Chief Mischief Maker
Research to Practice Consulting, LLC
216 North Chestnut
Lansing, Michigan 48933
517-896-2712

r2pconsultants.com

<Flint Blood Lead level Testing Protocol table v5.docx>

<Flint Blood Lead Level Testing Protocol Table v8.docx>

From: Peeler, Nancy (DHHS)
Sent: Friday, October 23, 2015 4:36 PM
To: Lasher, Geralyn (DHHS);Wells, Eden (DHHS);Lishinski, Karen (DCH) (LishinskiK@michigan.gov);LaRocco, Toni (tlarocco@gchd.us)
Cc: Moran, Susan (DHHS);Emily Houk R2P (emily@r2pconsultants.com)
Subject: FW: Parent Letter Attachments
Attachments: Handout_Parent_Is Your Child Safe from Lead.pdf; FightLead_HealthyDiet.pdf; 2015-10-21 - Lead - Flint Water FINAL (1).pdf

Geralyn, forwarding Emily's email that has all 3 attachments for the parent letter, including the nutrition document I mentioned before.

nancy

From: Houk, Emily (DHHS)
Sent: Thursday, October 22, 2015 4:27 PM
To: Minicuci, Angela (DHHS)
Cc: Peeler, Nancy (DHHS)
Subject: Parent Letter Attachments

Here you go. Again. All docs are CLPPP docs except the FAQ.

Em

Emily Houk, Communications Consultant
Michigan Department of Community Health
517-896-2712

This Document is a Non-Responsive Attachment.

From: Moran, Susan (DHHS)
Sent: Monday, October 26, 2015 10:00 AM
To: Peeler, Nancy (DHHS)
Subject: RE: addresses and parent names

Can you call me/get in touch with me today about this- thanks.

From: Peeler, Nancy (DHHS)
Sent: Monday, October 26, 2015 9:58 AM
To: Moran, Susan (DHHS)
Cc: Schoenow, Kris (DHHS); Scott, Robert L. (DHHS)
Subject: Re: addresses and parent names

We will pass this information on to GCHD as they get Case Management activities underway, so they can be sure to build discussions about filters into those contacts/visits.

Nancy

Sent from my iPad

On Oct 26, 2015, at 9:27 AM, Moran, Susan (DHHS) <MoranS@michigan.gov> wrote:

> So we have a total of 147 names, and of those 147, 28 names matched and we can confirm a filter was distributed to the residence at the address.
> 80% (n = 119) of addresses on the list **do not have filter**
> 20% (n = 28) do have a filter.
>
> Correct?
>
> ---
>
> **From:** Schoenow, Kris (DHHS)
> **Sent:** Monday, October 26, 2015 9:03 AM
> **To:** Peeler, Nancy (DHHS)
> **Cc:** Scott, Robert L. (DHHS); Moran, Susan (DHHS)
> **Subject:** RE: addresses and parent names
>
> I completed the data comparison this weekend. The first tab has a summary and the second tab lists the addresses with and without filters.
>
> Kris Schoenow
> Executive Director
> Bureau of Community Action and Economic Opportunity
> Michigan Department of Health and Human Services
> 235 Grand Avenue
> Suite 202
> PO Box 30037
> Lansing, MI 48909
>
> 517-241-4871
> 517-373-8896

schoenowk@michigan.gov

From: Peeler, Nancy (DHHS)
Sent: Friday, October 23, 2015 8:11 PM
To: Schoenow, Kris (DHHS) <SchoenowK@michigan.gov>
Cc: Scott, Robert L. (DHHS) <ScottR9@michigan.gov>
Subject: Re: addresses and parent names

Sounds good, Kris, thanks!

Sent from my iPhone

On Oct 23, 2015, at 6:34 PM, Schoenow, Kris (DHHS) <SchoenowK@michigan.gov> wrote:

> Hi Nancy,
>
> Thank you for the list. I was out of the office all day. I will compare the list with our data and identify the addresses that have a filter and the addresses that don't. I should have it done this weekend.
>
> Thank you for the data,
> Kris
>
> Kris Schoenow
> Executive Director
> Bureau of Community Action and Economic Opportunity
> Michigan Department of Health and Human Services
> 235 Grand Avenue
> Suite 202
> PO Box 30037
> Lansing, MI 48909
>
> 517-241-4871
> 517-373-8896
> schoenowk@michigan.gov

From: Peeler, Nancy (DHHS)
Sent: Friday, October 23, 2015 10:39 AM
To: Schoenow, Kris (DHHS) <SchoenowK@michigan.gov>
Cc: Scott, Robert L. (DHHS) <ScottR9@michigan.gov>
Subject: FW: addresses and parent names
Importance: High

Hi Kris – attached is the file of addresses and Guardian names we have associated with children for whom our data indicates elevated blood lead levels. I am hoping to touch base about the best way to compare this list with your database of who has received filters. You had indicated (a week ago?) that your area could do the comparison – is that still true, or how can we assist?

Nancy Peeler, Manager
Early Childhood Health Section

Bob Scott, Surveillance Manager
Childhood Lead Poisoning Prevention Program

From: Scott, Robert L. (DHHS)
Sent: Friday, October 23, 2015 9:45 AM
To: Peeler, Nancy (DHHS)
Subject: addresses and parent names

Please see attached. I removed two lines where most recent address is not in one of the seven zip codes (i.e., family moved).

Robert L. Scott
Childhood Lead Poisoning Prevention Program
Michigan Department of Health & Human Services
(517) 335-8178
fax (517) 335-8509

From: Peeler, Nancy (DHHS)
Sent: Monday, October 26, 2015 11:54 AM
To: Emily Houk R2P (emily@r2pconsultants.com)
Subject: FW: Time sensitive:Final Press Release/ with attachments

FYI – any suggestions?

From: Wells, Eden (DHHS)
Sent: Monday, October 26, 2015 11:30 AM
To: Minicuci, Angela (DHHS)
Cc: tbrickey@gchd.us; Peeler, Nancy (DHHS); Dykema, Linda D. (DHHS); Lishinski, Karen (DHHS)
Subject: Time sensitive:Final Press Release/ with attachments

Nancy, Ljnda or Tamara- please respond ASAP--- thoughts?

Sent from my iPhone

On Oct 26, 2015, at 10:18 AM, Minicuci, Angela (DHHS) <MinicuciA@michigan.gov> wrote:

> Thanks Tamara and Eden. What's the language I should be using instead? Happy to make whatever changes you all think is best.
>
> Angela
>
> ---
>
> **From:** Wells, Eden (DHHS)
> **Sent:** Monday, October 26, 2015 8:39 AM
> **To:** tbrickey@gchd.us; Peeler, Nancy (DHHS) <PeelerN@michigan.gov>; Dykema, Linda D. (DHHS) <DykemaL@michigan.gov>; Lishinski, Karen (DHHS) <LishinskiK@michigan.gov>
> **Cc:** Minicuci, Angela (DHHS) <MinicuciA@michigan.gov>
> **Subject:** Fwd: Final Press Release/ with attachments
>
> can you all find a better statement in the parent letter that Tamara refers to? Good pick up Tamara!!
>
> Eden V. Wells, MD, MPH, FACPM
> MDHHS
> Sent from my iPad
>
> Begin forwarded message:
>
> > **From:** "Brickey, Tamara" <tbrickey@gchd.us>
> > **Date:** October 26, 2015 at 8:15:22 AM EDT
> > **To:** "Moran, Susan (DHHS)" <MoranS@michigan.gov>, "Wells, Eden (DHHS)" <WellsE3@michigan.gov>, "Robinson, Mikelle (DHHS)" <RobinsonM18@michigan.gov>, "Miller, Mark (DHHS)" <millerm1@michigan.gov>, "Lasher, Geralyn (DHHS)" <lasherg@michigan.gov>, "Hertel, Elizabeth (DHHS)" <HertelE@michigan.gov>, "Travis, Rashmi (DHHS)" <TravisR@michigan.gov>,

"LaRocco, Toni" <tlarocco@gchd.us>, "Valacak, Mark" <MVALACAK@gchd.us>, "McShane, Hilda" <hmcshane@gchd.us>, "Thompson, Sheryl D. (DHHS)" <ThompsonS2@michigan.gov>, "Schoenow, Kris (DHHS)" <SchoenowK@michigan.gov>
Subject: RE: Final Press Release/ with attachments

Hi all,

I was out of the office Friday so I apologize for the late response. With the parent letter, do you mean to communicate that you need to run the tap for five minutes before you can wash your hands? "You can use unfiltered tap water for washing your hands, and washing dishes. If using unfiltered water, run the water for at least five minutes before you use it." This sentence reads as though every time you wash your hands with unfiltered water, you need to run the tap for five minutes. I know most families will have concern with that.

Thanks,

Tamara Brickey, MS, CHES

Public Health Division Director
Genesee County Health Department
630 S. Saginaw Street
Suite 4
Flint, MI 48502
(810) 257-3202 Fax: (810) 257-3147
tbrickey@gchd.us

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From: Moran, Susan (DHHS) [mailto:MoranS@michigan.gov]
Sent: Sunday, October 25, 2015 6:56 PM
To: Wells, Eden (DHHS); Robinson, Mikelle (DHHS); Miller, Mark (DHHS); Lasher, Geralyn (DHHS); Hertel, Elizabeth (DHHS); Travis, Rashmi (DHHS); LaRocco, Toni; Valacak, Mark; McShane, Hilda; Thompson, Sheryl D. (DHHS); Schoenow, Kris (DHHS); Brickey, Tamara
Subject: RE: Final Press Release/ with attachments

Documents look great, a couple edits—

Press Release:

"As we continue to find ways to inform and guide the Flint community towards reducing lead exposures, we are ~~appreciate~~ appreciative of the collaboration with Genesee County Health Department," said Dr. Eden Wells, Chief Medical Executive with MDHHS. "Parents and providers can take a number of steps to help reduce exposure, identify signs of lead poisoning, and begin follow up care as needed. Working together we can all help to protect the health of families in Flint."

Parent Letter: The word doctor is used throughout the document- we should stay consistent.

Where should I go to get a blood lead test for my child?

The best place to get your child's blood lead test is your doctor's office. Your doctor ~~pediatrician~~ will follow up with you on lab tests and provide you with information on what to do next. You can also have a lead test at the Genesee County Health Department. If you need transportation, contact 2-1-1 for help.

From: Wells, Eden (DHHS)
Sent: Sunday, October 25, 2015 6:37 PM
To: Moran, Susan (DHHS); Robinson, Mikelle (DHHS); Miller, Mark (DHHS); Lasher, Geralyn (DHHS); Hertel, Elizabeth (DHHS); Travis, Rashmi (DHHS); LaRocco, Toni; Valacak, Mark; hmcshane@gchd.us; Thompson, Sheryl D. (DHHS); Schoenow, Kris (DHHS); tbrickey@gchd.us
Subject: Fwd: Final Press Release/ with attachments

Sorry- attached.

Sent from my iPhone

Begin forwarded message:

> **From:** "Minicuci, Angela (DHHS)" <MinicuciA@michigan.gov>
> **Date:** October 25, 2015 at 1:44:23 PM EDT
> **To:** "Wells, Eden (DHHS)" <WellsE3@michigan.gov>
> **Subject: Re: Final Press Release**
>
> Hi Eden,
>
> Attached are the updated letters and press release with the Governor's office edits. Can you please circulate with those on the 3pm call to make sure that these are final?
>
> Thanks!

Angela

From: Minicuci, Angela (DHHS)
Sent: Friday, October 23, 2015 5:00 PM
To: Wells, Eden (DHHS)
Subject: RE: Final Press Release

Have fun and have a good weekend!

Angela

From: Wells, Eden (DHHS)
Sent: Friday, October 23, 2015 4:56 PM
To: Minicuci, Angela (DHHS) <MinicuciA@michigan.gov>
Subject: Re: Final Press Release

You ROCK!!!
Hey- gotta talk about polio tonight wearingh CME hat at 7. Here at UM oddly. Have a good weekend! Hope you feel better

Sent from my iPhone

On Oct 23, 2015, at 4:48 PM, Minicuci, Angela (DHHS) <MinicuciA@michigan.gov> wrote:

> Updated letters with the correct numbers attached. Do these look good?
>
> The press release was intended for GCHD distribution when the letters go. If there are no additional changes, the attached is ready to go out whenever the letters are. Just let us know ahead of time so that we can be ready for calls! Thank you!
>
> Angela
>
> ---
>
> **From:** LaRocco, Toni [mailto:tlarocco@gchd.us]
> **Sent:** Friday, October 23, 2015 4:44 PM
> **To:** Wells, Eden (DHHS) <WellsE3@michigan.gov>; McShane, Hilda <hmcshane@gchd.us>; Valacak, Mark <MVALACAK@gchd.us>
> **Cc:** Eisner, Jennifer (DHHS) <EisnerJ@michigan.gov>; Minicuci, Angela (DHHS) <MinicuciA@michigan.gov>
> **Subject:** RE: Final Press Release
>
> So is all this coming back in one email with all the blessed attachments? Parent and provider?

From: Wells, Eden (DHHS)
[mailto:WellsE3@michigan.gov]
Sent: Friday, October 23, 2015 4:42 PM
To: LaRocco, Toni; McShane, Hilda; Valacak, Mark
Cc: Eisner, Jennifer (DHHS); Minicuci, Angela (DHHS)
Subject: Final Press Release

Just FYI, as we had some things we wanted to fix---I know HIlda is out but so she gets final version.

E

From: Minicuci, Angela (DHHS)
Sent: Friday, October 23, 2015 4:05 PM
To: Wells, Eden (DHHS)
Cc: Lasher, Geralyn (DHHS); Eisner, Jennifer (DHHS)
Subject: RE: UPDATED Letters and Press Release

RESENDING -

Hi Eden,

As we discussed, attached is the current draft of the letters (provider and UPDATED parent), and the updated press release, to reflect the changes to the parent letter. Please circulate this with those on the 3pm call.

Thank you,

Angela Minicuci

Office of External Relations and Communications

Michigan Department of Health and Human Services

Office: (517) 241-2112
Mobile: PPI
minicucia@michigan.gov
www.michigan.gov/mdhhs

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<GCHD MDHHS Letters PR DRAFT 4.docx>

<Parent Letter_Draft 6_October 22.docx>

<Provider letter_DRAFT3_edited.docx>

<Parent Letter_Draft 7.docx>

<Provider letter_DRAFT4_edited.docx>

<GCHD MDHHS Letters PR DRAFT 4.docx>

From: Peeler, Nancy (DHHS)
Sent: Monday, October 26, 2015 1:04 PM
To: Emily Houk R2P (emily@r2pconsultants.com)
Subject: FW: Time sensitive:Final Press Release/ with attachments
Attachments: Parent Letter_Draft 9 102615 LDD.docx

From: Dykema, Linda D. (DHHS)
Sent: Monday, October 26, 2015 1:02 PM
To: Wells, Eden (DHHS); Peeler, Nancy (DHHS)
Cc: Minicuci, Angela (DHHS); Brickey, Tamara; Lishinski, Karen (DHHS)
Subject: RE: Time sensitive:Final Press Release/ with attachments

My suggestions/comments attached. Let me know if you'd like to have Michelle Bruneau or another health educator review the draft.

From: Wells, Eden (DHHS)
Sent: Monday, October 26, 2015 12:28 PM
To: Peeler, Nancy (DHHS)
Cc: Minicuci, Angela (DHHS); Brickey, Tamara; Dykema, Linda D. (DHHS); Lishinski, Karen (DHHS)
Subject: Re: Time sensitive:Final Press Release/ with attachments

I just talked to Linda Dykema. I am sending her the parent letter. Well Mark Bella check and I thought eight hours was appropriate she feel Linda thanks APA states you should do a mid day flush as well so that if the line is not been flushed for 3 to 4 hours. She will look at this and then I will go with whatever her recommendation is on the time. That note Nancy that at least on the other letters in general you flush the line 5 minutes but that's not meant to happen every single time one washes their hands or has need for unfiltered tap water during the day.

Sent from my iPhone

On Oct 26, 2015, at 12:08 PM, Peeler, Nancy (DHHS) <PeelerN@michigan.gov> wrote:

> Two concerns –
>
> 1. The new language is not at a 4th grade reading level like the rest of the letter.
> 2. It isn't consistent with what the information in other documents – we have been basing our documents on the EPA recommendations, and have consistently referenced running the water for 5 minutes. Nowhere else do we include in the information about running the tap first thing in the morning or if the faucet has not been used in more than 8 hours.
>
> So – we can try to wordsmith it more, to bring the new bullet down in reading level. And, if we go with all of this information, do we need to change other attachments (Parent Handout, etc.) to talk about running the tap in the morning/if not used in 8 hours?
>
> Angela, we defer to you as to whether to make more changes. I'll wait to hear back from you before I have Emily do anything else –

Nancy

From: Minicuci, Angela (DHHS)
Sent: Monday, October 26, 2015 11:50 AM
To: Wells, Eden (DHHS); Brickey, Tamara
Cc: Peeler, Nancy (DHHS); Dykema, Linda D. (DHHS); Lishinski, Karen (DHHS)
Subject: RE: Time sensitive:Final Press Release/ with attachments
Importance: High

Excellent. The updated Parent letter is attached, along with the final Provider letter and Press Release circulated yesterday. I will send around to the full group in a moment.

Angela

From: Wells, Eden (DHHS)
Sent: Monday, October 26, 2015 11:38 AM
To: Brickey, Tamara <tbrickey@gchd.us>
Cc: Minicuci, Angela (DHHS) <MinicuciA@michigan.gov>; Peeler, Nancy (DHHS) <PeelerN@michigan.gov>; Dykema, Linda D. (DHHS) <DykemaL@michigan.gov>; Lishinski, Karen (DHHS) <LishinskiK@michigan.gov>
Subject: Re: Time sensitive:Final Press Release/ with attachments

Agree separate bullet/ and add (per GCHD Mark V and Toni)

Do this first thing in morning or if not have used faucet for over 8 hours.

Sent from my iPhone

On Oct 26, 2015, at 11:35 AM, Brickey, Tamara <tbrickey@gchd.us> wrote:

> I would make it a separate bullet so it doesn't run into the handwashing guidance, such as "If unfiltered water must be used for consumption, run the tap for five minutes prior to consuming."
>
> Please feel free to reword that.
>
> Thanks,
>
> Tamara
>
> ---
>
> **From:** Wells, Eden (DHHS) [mailto:WellsE3@michigan.gov]
> **Sent:** Monday, October 26, 2015 11:30 AM
> **To:** Minicuci, Angela (DHHS)
> **Cc:** Brickey, Tamara; Peeler, Nancy (DHHS); Dykema, Linda D. (DHHS); Lishinski, Karen (DHHS)
> **Subject:** Time sensitive:Final Press Release/ with attachments
>
> Nancy, Ljnda or Tamara- please respond ASAP--- thoughts?
>
> Sent from my iPhone

On Oct 26, 2015, at 10:18 AM, Minicuci, Angela (DHHS) <MinicuciA@michigan.gov> wrote:

> Thanks Tamara and Eden. What's the language I should be using instead? Happy to make whatever changes you all think is best.
>
> Angela
>
> ---
>
> **From:** Wells, Eden (DHHS)
> **Sent:** Monday, October 26, 2015 8:39 AM
> **To:** tbrickey@gchd.us; Peeler, Nancy (DHHS) <PeelerN@michigan.gov>; Dykema, Linda D. (DHHS) <DykemaL@michigan.gov>; Lishinski, Karen (DHHS) <LishinskiK@michigan.gov>
> **Cc:** Minicuci, Angela (DHHS) <MinicuciA@michigan.gov>
> **Subject:** Fwd: Final Press Release/ with attachments
>
> can you all find a better statement in the parent letter that Tamara refers to? Good pick up Tamara!!
>
> Eden V. Wells, MD, MPH, FACPM
> MDHHS
> Sent from my iPad
>
> Begin forwarded message:
>
> > **From:** "Brickey, Tamara" <tbrickey@gchd.us>
> > **Date:** October 26, 2015 at 8:15:22 AM EDT
> > **To:** "Moran, Susan (DHHS)" <MoranS@michigan.gov>, "Wells, Eden (DHHS)" <WellsE3@michigan.gov>, "Robinson, Mikelle (DHHS)" <RobinsonM18@michigan.gov>, "Miller, Mark (DHHS)" <millerm1@michigan.gov>, "Lasher, Geralyn (DHHS)" <lasherg@michigan.gov>, "Hertel, Elizabeth (DHHS)" <HertelE@michigan.gov>, "Travis, Rashmi (DHHS)" <TravisR@michigan.gov>, "LaRocco, Toni" <tlarocco@gchd.us>, "Valacak, Mark" <MVALACAK@gchd.us>, "McShane, Hilda" <hmcshane@gchd.us>, "Thompson, Sheryl D. (DHHS)" <ThompsonS2@michigan.gov>, "Schoenow, Kris (DHHS)" <SchoenowK@michigan.gov>
> > **Subject: RE: Final Press Release/ with attachments**
> >
> > Hi all,
> >
> > I was out of the office Friday so I apologize for the late response. With the parent letter, do you mean to communicate that you need to run the tap for five minutes before you can wash your hands? "You can use

unfiltered tap water for washing your hands, and washing dishes. If using unfiltered water, run the water for at least five minutes before you use it." This sentence reads as though every time you wash your hands with unfiltered water, you need to run the tap for five minutes. I know most families will have concern with that.

Thanks,

Tamara Brickey, MS, CHES

Public Health Division Director
Genesee County Health Department
630 S. Saginaw Street
Suite 4
Flint, MI 48502
(810) 257-3202 Fax: (810) 257-3147
tbrickey@gchd.us

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From: Moran, Susan (DHHS) [mailto:MoranS@michigan.gov]
Sent: Sunday, October 25, 2015 6:56 PM
To: Wells, Eden (DHHS); Robinson, Mikelle (DHHS); Miller, Mark (DHHS); Lasher, Geralyn (DHHS); Hertel, Elizabeth (DHHS); Travis, Rashmi (DHHS); LaRocco, Toni; Valacak, Mark; McShane, Hilda; Thompson, Sheryl D. (DHHS); Schoenow, Kris (DHHS); Brickey, Tamara
Subject: RE: Final Press Release/ with attachments

Documents look great, a couple edits----

Press Release:

"As we continue to find ways to inform and guide the Flint community towards reducing lead

exposures, we are ~~appreciate~~ appreciative of the collaboration with Genesee County Health Department," said Dr. Eden Wells, Chief Medical Executive with MDHHS. "Parents and providers can take a number of steps to help reduce exposure, identify signs of lead poisoning, and begin follow up care as needed. Working together we can all help to protect the health of families in Flint."

~~Parent Letter:~~ The word doctor is used throughout the document- we should stay consistent.

Where should I go to get a blood lead test for my child?

The best place to get your child's blood lead test is your doctor's office. Your doctor ~~pediatrician~~ will follow up with you on lab tests and provide you with information on what to do next. You can also have a lead test at the Genesee County Health Department. If you need transportation, contact 2-1-1 for help.

From: Wells, Eden (DHHS)
Sent: Sunday, October 25, 2015 6:37 PM
To: Moran, Susan (DHHS); Robinson, Mikelle (DHHS); Miller, Mark (DHHS); Lasher, Geralyn (DHHS); Hertel, Elizabeth (DHHS); Travis, Rashmi (DHHS); LaRocco, Toni; Valacak, Mark; hmcshane@gchd.us; Thompson, Sheryl D. (DHHS); Schoenow, Kris (DHHS); tbrickey@gchd.us
Subject: Fwd: Final Press Release/ with attachments

Sorry- attached.

Sent from my iPhone

Begin forwarded message:

> **From:** "Minicuci, Angela (DHHS)" <MinicuciA@michigan.gov>
> **Date:** October 25, 2015 at 1:44:23 PM EDT
> **To:** "Wells, Eden (DHHS)" <WellsE3@michigan.gov>
> **Subject: Re: Final Press Release**
>
> Hi Eden,

Attached are the updated letters and press release with the Governor's office edits. Can you please circulate with those on the 3pm call to make sure that these are final?

Thanks!

Angela

From: Minicuci, Angela (DHHS)
Sent: Friday, October 23, 2015 5:00 PM
To: Wells, Eden (DHHS)
Subject: RE: Final Press Release

Have fun and have a good weekend!

Angela

From: Wells, Eden (DHHS)
Sent: Friday, October 23, 2015 4:56 PM
To: Minicuci, Angela (DHHS) <MinicuciA@michigan.gov>
Subject: Re: Final Press Release

You ROCK!!!
Hey- gotta talk about polio tonight wearingh CME hat at 7. Here at UM oddly. Have a good weekend! Hope you feel better

Sent from my iPhone

On Oct 23, 2015, at 4:48 PM, Minicuci, Angela (DHHS) <MinicuciA@michigan.gov> wrote:

> Updated letters with the correct numbers attached. Do these look good?

The press release was intended for GCHD distribution when the letters go. If there are no additional changes, the attached is ready to go out whenever the letters are. Just let us know ahead of time so that we can be ready for calls! Thank you!

Angela

From: LaRocco, Toni [mailto:tlarocco@gchd.us]
Sent: Friday, October 23, 2015 4:44 PM
To: Wells, Eden (DHHS) <WellsE3@michigan.gov>; McShane, Hilda <hmcshane@gchd.us>; Valacak, Mark <MVALACAK@gchd.us>
Cc: Eisner, Jennifer (DHHS) <EisnerJ@michigan.gov>; Minicuci, Angela (DHHS) <MinicuciA@michigan.gov>
Subject: RE: Final Press Release

So is all this coming back in one email with all the blessed attachments? Parent and provider?

From: Wells, Eden (DHHS) [mailto:WellsE3@michigan.gov]
Sent: Friday, October 23, 2015 4:42 PM
To: LaRocco, Toni; McShane, Hilda; Valacak, Mark
Cc: Eisner, Jennifer (DHHS); Minicuci,

Angela (DHHS)
Subject: Final Press Release

Just FYI, as we had some things we wanted to fix---I know HIlda is out but so she gets final version.

E

From: Minicuci, Angela (DHHS)
Sent: Friday, October 23, 2015 4:05 PM
To: Wells, Eden (DHHS)
Cc: Lasher, Geralyn (DHHS); Eisner, Jennifer (DHHS)
Subject: RE: UPDATED Letters and Press Release

RESENDING -

Hi Eden,

As we discussed, attached is the current draft of the letters (provider and UPDATED parent), and the updated press release, to reflect the changes to the parent letter. Please circulate this with those on the 3pm call.

Thank you,

Angela Minicuci

Office of External Relations and Communications

Michigan Department of Health and Human Services

Office: (517) 241-2112
Mobile: PPI
minicucia@michigan.gov
www.michigan.gov/mdhhs

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<GCHD MDHHS Letters PR DRAFT 4.docx>

<Parent Letter_

Draft 6_October 22.docx>

<Provider letter_DRAFT 3_edited.docx>

<Parent Letter_Draft 7.docx>

<Provider letter_DRAFT4_edited.docx>

<GCHD MDHHS Letters PR DRAFT 4.docx>

October 26, 2015

Dear Parent,

To help make sure the children of Flint are safe from lead exposure, the Genesee County Health Department and the Michigan Department of Health and Human Services want to help you understand:

- Where does lead come from?
- What can I do to protect my family?
- Should I get my child tested for lead?
- Where can I find more information about lead?

Where does lead come from?

Lead is a serious health hazard, especially for small children who become lead poisoned when they eat, drink or breathe lead. Elevated levels of lead have been found in the drinking water from lead pipes in the City of Flint. Kids can also be exposed to lead from old lead paint, soil, pottery, cosmetics and toys and some home remedies. Adult jobs and hobbies, like auto repair, stained glass, jewelry making and ammunitions handling can also put children at risk if they touch clothing or play in areas where lead is found.

Should my child get a blood lead test?

Children who live in the City of Flint, live in a home using City of Flint water, or who attend school, childcare or often spend time with a caregiver in the City of Flint should be tested for lead poisoning. *This should be done as soon as possible.*

Where should I go to get a blood lead test for my child?

The best place to get your child's blood lead test is your doctor's office. Your pediatrician will follow up with you on lab tests and provide you with information on what to do next. You can also have a lead test at the Genesee County Health Department. If you need transportation, contact 2-1-1 for help.

Understanding your child's lead test result.

A lead level below 5 means there is little or no lead in your child's blood. Use the tips below to help keep your child safe. Your doctor may suggest retesting your child within the next 12 months to make sure the level does not go up.

Comment [DLD1]: Redundant with previous help

Comment [DLD2]: This doesn't address where lead comes from. A section (question) about health effects should be added.

Comment [DLD3]: Incomplete sentence

Comment [DLD4]: This statement is wrong. A blood level below 5 does not mean there is no lead in the blood. Even with a level below the method detection limit (MDL) of 1 or 3 it cannot be stated that there is no lead in the blood. Suggest: A lead level below 5 mean there is a little lead in your child's blood. Should also include a sentence to explain results below the MDL as evidenced by my recent experience with a Flint family.

A lead level of 5-14 means that your child has had some exposure to lead. Work with your doctor and local health department for further guidance on how to limit your lead exposure. Your doctor may retest your child in 1-3 months to make sure the level does not go up.

Children with very high levels of lead **(over 40)** may require treatment at the hospital.

Comment [DLD5]: Always at the hospital or are there out patient treatments?

What Can I Do to Keep My Family Safe?

The following steps should be taken right away to help protect you and your child.

Protecting your family from lead in the water:

- Get your water tested for lead. It's free. Call (810) 787-6537 to learn more.
- Use a water filter in your home. Call 2-1-1 for information on free water filters.
- Run only cold water through the filter.
- If you do not have a water filter, use bottled water for drinking and mixing formula.
- Use filtered or bottled tap water for drinking (including making coffee, drink mixes, juice, baby formula), and cooking (even if you boil the water, the lead will stay in the water and food). ~~Always use cold water when cooking.~~
- You can use unfiltered tap water for washing your hands, and washing dishes.
- If you must use unfiltered water ~~must be used for consumption,~~for drinking or cooking, run the tap for five minutes ~~prior to consuming~~ before using the water. ~~Do this first thing in morning or if the faucet has not been used in more than 8 hours.~~

Safe cleaning:

Safe Cleaning is important. Keeping your home clean and safe from lead hazards will help to protect your family.

- You can use unfiltered tap water ~~for the following~~to wip~~ing~~ down countertops, mop~~ping~~ floors, and wash~~ing~~ clothes.
- Keep children away from lead paint and dust.
- Use wet paper towels to clean up lead dust. Be sure to clean around windows, play areas and floors.
- Wash hands and toys often, using soap and water.

Comment [DLD6]: This direction is not very useful as there's no way for the average person to identify lead paint and dust without testing.

Comment [DLD7]: Same comment

Good nutrition:

Some foods will help keep lead from being stored in a child's body. These are foods with a lot of calcium, iron and vitamin C. These foods include:

Calcium Rich Foods	Iron Rich Foods	Foods with Vitamin C

- Milk
- Cheese
- Yogurt
- Tofu
- Spinach
- Beans
- Lean meats like fish and chicken
- Whole grain cereals
- Peanut butter
- Oranges
- Orange juice
- Grapefruits
- Tomatoes
- Green peppers

Always wash your fruits with filtered water. If you are concerned about your child's diet, talk with your pediatrician who may also recommend a daily multivitamin.

WIC and SNAP provide assistance to parents and children who need fresh and healthy foods. Contact the **Genesee County WIC office at (810) 237-4537** to learn more. SNAP also offers a Double Bucks program to purchase even more healthy food for no additional costs.

Where can I get more information on lead?

- Genesee County Health Department Lead Program
  (810) 257-3833
- Michigan Department of Health and Human Services Childhood Lead Poisoning Prevention Program
  (888) 322-4453
  www.michigan.gov/lead
- United States Environmental Protection Agency
  www.epa.gov/lead
- U.S. Centers for Disease Control and Prevention (CDC) Web site
  www.cdc.gov/nceh/lead

From: Moran, Susan (DHHS)
Sent: Monday, October 26, 2015 9:29 PM
To: Peeler, Nancy (DHHS)
Cc: Scott, Robert L. (DHHS)
Subject: RE: BLLs Latest

Yes, let's discuss at the 12:30 call.

From: Peeler, Nancy (DHHS)
Sent: Monday, October 26, 2015 9:27 PM
To: Moran, Susan (DHHS)
Cc: Scott, Robert L. (DHHS)
Subject: Fw: BLLs Latest

Hi Sue, here's is today's update, sorry you didn't get it with the first email. There are so many people involved in different aspects of this work, at different levels. Can you help us think about who all this should go to on a weekly basis?

Sue Moran
Eden Wells
Angela Minicuci
Rashmi Travis
Brenda Fink and our CLPPP program staff, as an FYI

Others you want to be sure are on the email each week? Mikelle, Mark? Corinne? Linda? Who from Flint? Anyone from DEQ? Thanks for helping us to think about this - perhaps we could discuss during the 12:30 call on Tuesday.

Nancy

From: Scott, Robert L. (DHHS)
Sent: Monday, October 26, 2015 4:42 PM
To: Minicuci, Angela (DHHS); Peeler, Nancy (DHHS); Wells, Eden (DHHS)
Cc: Eisner, Jennifer (DHHS)
Subject: RE: BLLs Latest

Please see attached.

From: Minicuci, Angela (DHHS)
Sent: Monday, October 26, 2015 3:13 PM
To: Scott, Robert L. (DHHS) <ScottR9@michigan.gov>; Peeler, Nancy (DHHS) <PeelerN@michigan.gov>; Wells, Eden (DHHS) <WellsE3@michigan.gov>
Cc: Eisner, Jennifer (DHHS) <EisnerJ@michigan.gov>
Subject: RE: BLLs Latest

Hi Bob,

Do we have an updated report? Thanks so much!

Angela

From: Minicuci, Angela (DHHS)
Sent: Friday, October 23, 2015 10:57 AM
To: Scott, Robert L. (DHHS) <ScottR9@michigan.gov>; Peeler, Nancy (DHHS) <PeelerN@michigan.gov>; Wells, Eden (DHHS) <WellsE3@michigan.gov>
Subject: RE: BLLs Latest

Yea, I think that would be awesome.

Angela

From: Scott, Robert L. (DHHS)
Sent: Friday, October 23, 2015 10:52 AM
To: Minicuci, Angela (DHHS) <MinicuciA@michigan.gov>; Peeler, Nancy (DHHS) <PeelerN@michigan.gov>; Wells, Eden (DHHS) <WellsE3@michigan.gov>
Subject: RE: BLLs Latest

I can do it. How about this?

1) Total number of children tested since 9/28/15 press conference.
2) Total number of children with capillary EBLLs since 4/1/14 water change, still needing confirmation.
3) Total number of confirmed EBLL cases since 4/1/14.
4) Total number of children with capillary EBLLs since 9/28/15, needing confirmation.
5) Total number of confirmed EBLL cases since 9/28/15.

From: Minicuci, Angela (DHHS)
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Subject: RE: BLLs Latest

Hi Bob, my only thought on this is can we include something on each page that has a cumulative number of tests done, and number of EBLL cases?

Angela

From: Scott, Robert L. (DHHS)
Sent: Thursday, October 22, 2015 5:16 PM
To: Peeler, Nancy (DHHS) <PeelerN@michigan.gov>; Wells, Eden (DHHS) <WellsE3@michigan.gov>; Minicuci, Angela (DHHS) <MinicuciA@michigan.gov>
Subject: RE: BLLs Latest

Eden and Angela,

Per your request, please see attached. Consider this a 1st (well, 3rd) draft, and let me know if you have suggestions or questions.

Thanks,
Bob

From: Peeler, Nancy (DHHS)
Sent: Wednesday, October 21, 2015 4:16 PM
To: Wells, Eden (DHHS) <WellsE3@michigan.gov>; Minicuci, Angela (DHHS) <MinicuciA@michigan.gov>; Scott, Robert L. (DHHS) <ScottR9@michigan.gov>
Subject: RE: BLLs Latest

We've been having the same conversation here -- yes, we can do that, happy to do that. Bob was starting to work on a format this morning. If you have specific information you would want in a weekly report, let us know, as that will help us to pull what you really need. I know Epi was also talking about a weekly analysis of sorts, which I think would go more in-depth than the counts and such we can give you as a starting point.

Nancy

From: Wells, Eden (DHHS)
Sent: Wednesday, October 21, 2015 1:41 PM
To: Minicuci, Angela (DHHS); Peeler, Nancy (DHHS); Scott, Robert L. (DHHS)
Subject: RE: BLLs Latest

Yes,

I almost think we should get weekly summary. How many test have been done since the first press conference (9/28?)

From: Minicuci, Angela (DHHS)
Sent: Wednesday, October 21, 2015 1:05 PM
To: Peeler, Nancy (DHHS); Scott, Robert L. (DHHS); Wells, Eden (DHHS)
Subject: BLLs Latest

Hi Nancy and Bob,

Out of curiosity, could we begin looking at pulling some data about recent Flint BLL data? I think all results have to be reported to us within 5 days of the test result, correct?

If so, is there any chance we can begin taking a look at what that data is telling us? Not wanting to do anything with it yet, but just trying to think a little more proactively.

Thanks,

Angela Minicuci
Office of External Relations and Communications
Michigan Department of Health and Human Services
Office: (517) 241-2112
Mobile: PPI
minicuciA@michigan.gov
www.michigan.gov/mdhhs

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Message

From: Peeler, Nancy (DHHS) [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=EC5DDCB9DCEC411293AAAFD42AEF28BD-PEELER NANCY]
Sent: 10/27/2015 1:48:30 AM
To: Scott, Robert L. (DHHS) [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=1aefbcaada9a48ad8d643aa95e441df1-Scott Robert L.]
Subject: Re: BLLs Latest

Hi Bob - we can work on the email list for this report tomorrow - too many cooks in the kitchen to track everyone - I saw your previous email and didn't even think about who else to send it to. So we'll just have the many cooks help us out with developing the list.

I do have a question about the report - how do the new EBL numbers work with the summary numbers on the upper left? For example, I see 8 new elevated results for children < age 6. But the summary numbers seem the same as last week.

Similarly, I see that there were 2 venous confirmatory tests for prior capillary tests - would that then adjust any of the summary numbers (e.g. would 2 kids drop off the capillary list)?

It may be that by the time you did all the addition and subtraction, the numbers look the same. But I wanted to check! Thanks -

Nancy

From: Scott, Robert L. (DHHS)
Sent: Monday, October 26, 2015 4:42 PM
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Cc: Eisner, Jennifer (DHHS)
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Angela Minicuci
Office of External Relations and Communications
Michigan Department of Health and Human Services
Office: (517) 241-2112
Mobile: PPI
minicucia@michigan.gov
www.michigan.gov/mdhhs

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From: AlKhafaji, May (DHHS)
Sent: Tuesday, October 27, 2015 8:31 AM
To: ifink@gchd.us
Cc: Peeler, Nancy (DHHS);Taylor, Lucie (DHHS)
Subject: Time Sensitive: CO-2016 Genesee County Health Dept.--Emergency Elevated Lead Management in Flint

Importance: High

Good Moring Ingrid,

The Emergency Elevated Lead Management in Flint, for CO-2016 Genesee County Health Dept. has been released. Please complete this with all other FY16 outstanding projects asap. Upon your completion and programs review/approval this will be added to your original agreement.

Let me know if I can be of any further assistance.

Thank you,

May-
517-241-0176
Department of Health & Human Services
Financial Operations Administration
Bureau of Budget and Purchasing, Grants Section
Great Minds discuss ideas, Average minds discuss events, and Small minds discuss people...
Eleanor Roosevelt…

From: Peeler, Nancy (DHHS)
Sent: Wednesday, October 28, 2015 12:37 PM
To: Miller, Corinne (DHHS)
Subject: RE: Dr. Franzblau request

Yes, I'm here 5-9230

From: Miller, Corinne (DHHS)
Sent: Wednesday, October 28, 2015 12:36 PM
To: Peeler, Nancy (DHHS)
Subject: RE: Dr. Franzblau request

Eden was going to talk to him but didn't. I think he was looking for summary data only. Are you available to talk now? It would be brief and maybe MSU has a report he could be provided and that would be it.

From: Peeler, Nancy (DHHS)
Sent: Wednesday, October 28, 2015 12:30 PM
To: Miller, Corinne (DHHS)
Subject: RE: Dr. Franzblau request

I honestly don't know. The request didn't come to us, and I don't think we have Dr. Franzblau's contact information. So no, I don't think we have taken any action on it. Did someone send him the DUA to complete and send to Bob? Are you thinking that Eden would talk to him first? Not sure of the steps in the process you are envisioning – would it help to talk by phone?

From: Miller, Corinne (DHHS)
Sent: Wednesday, October 28, 2015 11:45 AM
To: Peeler, Nancy (DHHS)
Subject: Dr. Franzblau request

Flint:

We had discussed a request from Dr. Franzblau about provision of adult blood leads, 2010 to as current as possible. Is that something that was sent to Eden?

Corinne

From: Scott, Robert L. (DHHS)
Sent: Monday, November 02, 2015 4:59 PM
To: 'Genesee'
Cc: July, Jori (jjuly@gchd.us);Peeler, Nancy (DHHS)
Subject: updated list of Flint children

Sherry,

I've posted an updated list—" Flint Retesting List for GCHD 110215"—to your MIBLOODLEAD 112 area of DCH-File Transfer.

Bob

Robert L. Scott
Childhood Lead Poisoning Prevention Program
Michigan Department of Health & Human Services
(517) 335-8178
fax (517) 335-8509

From: Scott, Robert L. (DHHS)
Sent: Tuesday, November 03, 2015 10:39 AM
To: Peeler, Nancy (DHHS)
Subject: RE: NBC News/Lead Data

Colin has let me take a pass on the 2013 data, as it had been made public before he started looking it over. The reporter has already seen the PDF version, which has exactly the same info as the Excel version I'll provide to Jennifer.

Anything for 2014, which I won't send, is a different matter.

From: Peeler, Nancy (DHHS)
Sent: Tuesday, November 03, 2015 10:35 AM
To: Scott, Robert L. (DHHS) <ScottR9@michigan.gov>
Subject: Re: NBC News/Lead Data

If you were to lay it out the way the reporter requested (by county, or by zip), would we have any cells with less than 5, such that we would need to be concerned about supression of data? I supposed you may not be able to answer that until you look at the spreadsheet...

Since it is de-identified data, would Legal want there to be a DUA or IRB application or anything like that? I realize that there is already a report on the website, so I'm thinking no, but just checking!

Sent from my iPad

On Nov 3, 2015, at 9:24 AM, Scott, Robert L. (DHHS) <ScottR9@michigan.gov> wrote:

> Jennifer,
>
> This reporter first called, then suggested an email. Please advise.
>
> Thanks,
> Bob
>
> Robert L. Scott
> Childhood Lead Poisoning Prevention Program
> Michigan Department of Health & Human Services
> (517) 335-8178
> fax (517) 335-8509
>
> **From:** Lisa Riordan Seville [mailto:lriordanseville@gmail.com]
> **Sent:** Tuesday, November 03, 2015 9:28 AM
> **To:** Scott, Robert L. (DHHS) <ScottR9@michigan.gov>
> **Subject:** NBC News/Lead Data

Hi Scott,

As I mentioned by phone, I was looking to see if I could get the "children tested for lead poisoning" 2012/2013 data that you all publish in your reports in spreadsheet rather than PDF format.

As this data does, I'd like the spreadsheet to include the number of kids younger than six, the number of children children tested, and the number of those found to have blood levels higher than 5 and 10 ug/DL, all broken down by county. If possible, I'd like it broken down by zip code.

We're taking a national look at lead and childhood lead poisoning, and I'm making similar requests to each state. My deadline is Thursday, if possible, and I am available anytime by phone or email.

Thank you very much for your assistance, and for forwarding this along.

Best,

Lisa Riordan Seville
NBC News
415.412.1667

From: Travis, Rashmi (DHHS)
Sent: Saturday, November 07, 2015 5:54 AM
To: Peeler, Nancy (DHHS)
Subject: Fwd: updated Flint Action Plan
Attachments: Flint Action Plan 11-6-15.docx; ATT00001.htm

FYI

Sent from my iPhone

Begin forwarded message:

> **From:** "Robinson, Mikelle (DHHS)" <RobinsonM18@michigan.gov>
> **Date:** November 6, 2015 at 5:06:31 PM EST
> **To:** "Lyon, Nick (DHHS)" <LyonN2@michigan.gov>
> **Cc:** "Grijalva, Nancy (DHHS)" <GrijalvaN@michigan.gov>, "Wells, Eden (DHHS)" <WellsE3@michigan.gov>, "Moran, Susan (DHHS)" <MoranS@michigan.gov>, "Becker, Timothy (DHHS)" <beckert1@michigan.gov>, "Lasher, Geralyn (DHHS)" <lasherg@michigan.gov>, "Miller, Mark (DHHS)" <millerm1@michigan.gov>, "Miller, Corinne (DHHS)" <MillerC39@michigan.gov>, "Dykema, Linda D. (DHHS)" <DykemaL@michigan.gov>, "Travis, Rashmi (DHHS)" <TravisR@michigan.gov>
> **Subject: updated Flint Action Plan**
>
> FYI. Please let me know if you have questions.

Flint Water Public Health Response: MDHHS Action Plan

Updated ~~11~~0-~~28~~6-15

TASK	STATUS	ACTION	DATE COMPLETED
Filter Distribution	Residents may continue to obtain filters from GCCARD (both sites 9-4PM) and MDHHS clients can continue to obtain filters at the two MDHHS office locations or the GCCARD sites. **As of ~~October 29,~~ November 5, DHHS/GCCARD distributed over 13,469 filters.** ~~has issued 9880 filters and pitchers.~~	No action indicated, informational only.	NA
Filter Replacement Distribution	The procedure is in place for replacement cartridge distribution including an abbreviated application for residents to apply for and obtain cartridge replacement. Cartridge replacement will occur at same locations as filter sites. DHHS is also placing an order for 750 replacement filters for the 8-cup Zerowater filters. 9000 Brita replacement filters on hand with an additional 10,000 readily available when needed. Total available= 19,000 MDHHS is currently coordinating with GCARD on publicity for distribution of the replacement filters. United Way will provide Pur Filter Replacements. **United Way will also be purchasing filter units for school water fountains**.	DHHS and GCCARD will begin issuing the replacement filters the week of November 2nd. Press release planned Monday 11/2 re:pick up of replacement filters, videos to be posted on websites and you tube.	~~Pending~~Ongoing Completed 11/2
Public Education Proper Filter Use	When used improperly, the filters will exceed their capacity limit in a much shorter time frame thereby increasing need for filter	Jen Eisner will work with Hilda McShane	Completed

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TASK	STATUS	ACTION	DATE COMPLETED
	replacement much sooner than expected. Develop NEW public education material about proper use of cartridge AND how to obtain filter replacement cartridges, targeted for release week of October 26 during lead awareness week. **Request made for written instructions on filter cartridge replacements for nurse case managers to take on home visits.**	**Linda D. will draft and share with media office for finalizing.**	**Pending**
	Video created with Home Depot demonstrating replacement of the Brita replacement filter. **-DEQ receiving questions about meters on the water filter pitchers delivered to the schools which are likely Zerowater Filters.**	The video ~~will be posted~~added ~~on~~ to the gov/flintwater website. **Angela will work on instructions. Video will be added to nurse training- CLPPP.**	Completed 11/2 **Pending** **Training scheduled for 11/10**
Lead Testing Protocol:	Draft protocol has been completed, undergoing final review. Protocol calls for testing: Priority groups- • Confirmatory venous testing for children who had venous testing (115 children) • Children in day care, Head Start • children attending 3 schools (Freeman, Eisenhower, Brownell) • Children residing in high risk zip codes (03, 04) • All other students **Protocol will be announced in a joint MDHHS/GCHD Press release.**	Press release -has been cleared with Governor's Office.	Completed 10-28
Blood Lead Testing: 9/28/15-10/23/15	CLPPP processed 580 tests from Flint zip codes since 9-28-15; 5 children were reported with elevated lead blood levels. There are currently 147 children that have been identified for follow-up.	MDHHS has arranged a contract with the GCHD to provide nurses for the follow-up.	Contract completed in E-grams as of 10-23-~~15~~
	Cross reference list of children with elevated lead levels with	Send list to Kris S	

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TASK	STATUS	ACTION	DATE COMPLETED
	filter distribution data to ensure household has a filter. (Peeler/Scott) So far only about 20% of ~~the~~ ~~147~~approximately 200 children with EBL are known to have received a filter. GCHD will deliver filters to these homes as they are doing the case follow-up. GCHD will provide weekly updates.	(done)	~~;~~ **In process**
	Would like to obtain the student list from the three schools and cross reference with our lead testing data to determine children tested/not tested A group will develop reporting metrics and system to track same: Linda Dykema, Wes Priem, Michele Bruneau,, Bob Scott Group met to discuss metrics. plan to produce first detailed report for internal review the week of Nov. 9th A simplified version for external dissemination will be released after internal review. Linda is working on an analysis of blood lead tests done since 9-28-25. Epi will assist with this analysis **Still fine-tuning the report.**	Hertel to contact MDE	~~**Estimated completion date: 11-2-15**~~ **Pending** **November 9**
Parent education	Parent education material completed. Discuss dissemination of parent material through Flint schools.	Call with Flint school superintendent, GCHD, and MDHHS scheduled 10-26-15 to discuss dissemination process.	**Completed**
	Schools require 6000+ information packets for distribution to all students. Print order sent to DTMB. Hardcopy will be distributed to GCHD for issuing to the schools, and to Headstart, daycare, and other agencies in Flint with children ages 0-5. Mark will drop off hard copies at GCHD.	Geralyn Lasher arranged for printing.	~~10-30-15~~ 10/30 printing completed and Mark dropped off 6,000 copies at the Flint School Admin. Building , and 2,500 to health dept. Remainder ~~will be~~

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TASK	STATUS	ACTION	DATE COMPLETED
	Toni LaRocco will take the lead in distribution of the materials to the schools and other agencies.		dropped off on ~~Monday~~11/2.
	Ensure legislators receive material in advance	Elizabeth Hertel coordinate legislator notification	Completed
Provider Education	Provider Education material completed. Communication to providers will occur through GCHD and MDHHS networks (GCMS, GCARD, hospitals, etc).MDHHS will distribute through the Medicaid Health Plans. Hurley providers received the packet and the remainder of providers will receive the information next week.	Mark Valacek Wells/Peeler Electronic distribution through various listservs next week.	completed 10/30/~~15~~ Completed 11/2
Community public education and testing event	McLaren Health Plan in conjunction with GCHD host~~inged~~ a public testing and awareness event on November 5 at the Burton GCHD site. **42 children were tested.** McLaren will have providers on site to perform testing for their members; GCHD onsite to perform testing for all others. Event will also include Medicaid application assistance. Tony Larocco (GCHD) has contacted Molina and Meridian Health Plan regarding sponsorship of community testing and awareness event. Molina and Meridian Health Plan testing dates to be determined. GCHD will be at a community event on Nov. 12, from 2 PM to 7 PM, to focus on testing for children 0-5. (Brownell and Holmes Schools)> **Molina doesn't have the staff to offer lead testing events.**	**Request that Molina send out a letter to members with kids between 0-2 to encourage testing. Mark requested sample letter from GCHD and will follow-up with Medicaid.~~Elizabeth will follow up with Molina~~**	**Pending**
	There will be a combination school testing/townhall/education event, sponsored by Rep. Neeley, on Nov. 2nd. A telephonic townhall is slated for Oct. 28 by Rep. Neely. Gongwer reported that 4,000 people participated in this call.		

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TASK	STATUS	ACTION	DATE COMPLETED
Environmental Investigation	$275 k contract with ETC requested on Oct. 21st, 2015. Wes will work with GCHD to coordinate with Flint Housing/other authorities to deal with recalcitrant landlords. DEH meeting on 11/5 with MDEQ staff to harmonize EBL investigation protocol with water testing protocol.	Wes Priem to finalize contract with MDHHS Contracts.	Contract completed 10/29~~/15~~
Nurse Follow Up	Project sent to Contracts for inclusion in E-grams 10-23-15. 10-21-15 Funding for case management nurses will be disseminated to GCHD through new project: *Flint Water*, for $425,000 through the Comprehensive Contract E-grams system, to fund the: Follow-up of Children Reported with Elevated Lead Levels: Case Management Services. GCHD advised to secure approvals for use of these funds and begin procedures to place staff in appropriate positions to conduct the work. GCHD has shifted one nurse over for follow-up. That nurse if fully trained on elevated lead patient management. 1.5 nurse FTE's will be assigned and trained on 11-10-15. ~~Mark V. said that the nurses will start a week earlier than expected. Rashmi will look into whether training can occur earlier than the 10th.~~ **Lead Safe Home Program worked with GCHD on protocol to harmonize the flow of outreach to families with children with elevated blood levels.**	Eden will contact Bob to send the list to Toni at GCHD so they can facilitate case management of children with elevated lead levels (done). Contract approved by GCHD Board on 10/26	Completed 10/27
Water Testing	DEQ will be testing at Freeman Elementary the week of 10-26-15, with plans to expand to 14 schools. Residential testing will have a different protocol. GCHD has been in contact with DEQ to possibly assist in sampling. Linda Dykema has a draft Executive Summary for Health-Based Drinking Water Lead Levels developed. Once testing is completed, this document will serve as a decision guide on	No action indicated, informational only – DEQ. **Need to decide the health threshold for school water testing.**	Pending

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TASK	STATUS	ACTION	DATE COMPLETED
	reopening of school and/or daycare water fountains/faucets for student use. Linda will revise the model to include paint chip values/risk levels. GCHD sanitarians are assisting DEQ with water sampling.		
Misc.	City of Flint is asking when the county will lift the emergency order. Jim Henry from GCHD mentioned he was hearing some concerns raised again about Legionella. Eden said that Jim Collins can help address this. Mark V. said that an extensive data analysis was done on this previously and it isn't an issue. DEQ gave permission to increase phosphate levels in the water temporarily. Some health concerns might be raised about this particularly for infants. Dr. Eden Wells said that it is unlikely to cause health problems but we can add information on the FAQ to help reassure citizens. **DEQ is planning to release its school water testing results on 11/9. EPA will be releasing a report 11/10 from its expedited review of the response.**	Add a statement on the FAQ document on phosphates FYI only~~Add a statement on the FAQ document on phosphates?~~	~~11/6~~Pending

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From: Peeler, Nancy (DHHS)
Sent: Tuesday, November 10, 2015 1:02 PM
To: Lishinski, Karen (DCH) (LishinskiK@michigan.gov);Dykema, Linda D. (DHHS);Priem, Wesley F. (DHHS)
Cc: Fink, Brenda (DHHS)
Subject: follow up monitoring for Genesee PH

Here are the metrics that were included in our Case Management contract with GCHD:

Metrics for Contract Monitoring

Contract monitoring will be based on data recorded in the Healthy Homes and Lead Poisoning Surveillance System (HHLPSS), Medicaid Claims data from the MDHHS data warehouse, and via weekly review and status calls.

1. Number and percentage of target children with elevated blood lead levels of ≥ **5 ug/dL** that are successfully contacted and offered case management services.
2. Number and percentage of target children receiving case management services.
3. Number of Medicaid claims filed for children enrolled in Medicaid who receive testing or nursing assessment visits.

Karen – on your weekly calls, we will need to get updates on these metrics. We will need them organized based on the testing protocol, so we can understand what is happening for each group of children listed in that protocol, and then overall. Karen, I will send you some additional information, wanted to make sure we put this on our list to review together.

Wes – Karen has weekly calls scheduled with GCHD; do you want to have someone participate on those calls related to linking the case management and EBL investigation activities?

Nancy

From: Peeler, Nancy (DHHS)
Sent: Tuesday, November 10, 2015 1:26 PM
To: Lishinski, Karen (DCH) (LishinskiK@michigan.gov)
Subject: FLINT BLOOD LEAD CM - weekly status tracking form
Attachments: FLINT BLOOD LEAD CM - weekly status tracking form.docx

Importance: High

HI – when you are back, this is what I want to review/refine for the weekly status calls with Flint. Hope all went well with CM and HHLPSS training! Have a good Veteran's Day off…

FLINT BLOOD LEAD LEVEL TESTING PROTOCOL

		A	B	C	D	E	F
PRIORITY LEVEL 1	**Target Population**	**# contacted and offered case management**	**% of total (A/X)**	**# of children receiving CM**	**% of total (C/X1) and (C/A)**	**# of Medicaid claims filed**	**% for whom Medicaid claims filed (E/C)**
	All children with elevated Capillary > 5 since April 2014 (total = X1)						
	All children with newly elevated Venous > 5 since April 2014 (total = X2)						
	All children with new elevated Venous ≥ 5 since October 2015 (total = X3*)						
	TOTALS						

** this number will change weekly*

Metrics included in contract

1. Number and percentage of target children with elevated blood lead levels of **≥ 5 ug/dL** that are successfully contacted and offered case management services. A and B
2. Number and percentage of target children receiving case management services. C and D
3. Number of Medicaid claims filed for children enrolled in Medicaid who receive testing or nursing assessment visits. E and F

From: Peeler, Nancy (DHHS)
Sent: Tuesday, November 10, 2015 2:00 PM
To: Moran, Susan (DHHS)
Subject: RE: Lead data

Sorry, I missed this email amongst the others - the simple answer is that the labs send their data directly to MDHHS/Bob. Bob and Jessica then process the data and upload into the warehouse.

Nancy

-----Original Message-----
From: Moran, Susan (DHHS)
Sent: Thursday, November 05, 2015 9:43 PM
To: Peeler, Nancy (DHHS) <PeelerN@michigan.gov>
Subject: Lead data

Do labs send their BLL data to Bob, and then it gets loaded to warehouse, or are labs uploading files directly into warehouse?

Sent from my iPhone

From: Peeler, Nancy (DHHS)
Sent: Tuesday, November 10, 2015 3:58 PM
To: Lishinski, Karen (DCH) (LishinskiK@michigan.gov)
Subject: FW: Summary of GCHD Lead Program Activities as of 11 (3)
Attachments: Summary of GCHD Lead Program Activities as of 11 (3).docx

FYI – this will tie in to our discussion later this week or next week about tracking activities in Flint… ☺

From: Miller, Mark (DHHS)
Sent: Tuesday, November 10, 2015 3:53 PM
To: Peeler, Nancy (DHHS) <PeelerN@michigan.gov>
Subject: FW: Summary of GCHD Lead Program Activities as of 11 (3)

fyi

From: Brickey, Tamara [mailto:tbrickey@gchd.us]
Sent: Tuesday, November 10, 2015 3:37 PM
To: Miller, Mark (DHHS) <millerm1@michigan.gov>
Subject: FW: Summary of GCHD Lead Program Activities as of 11 (3)

Hi Mark,

Please find attached the summary of Lead activities on behalf of Toni LaRocco.

Thanks,

Tamara Brickey, MS, CHES

Public Health Division Director
Genesee County Health Department
630 S. Saginaw Street
Suite 4
Flint, MI 48502
(810) 257-3202 Fax: (810) 257-3147
tbrickey@gchd.us

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From: LaRocco, Toni
Sent: Tuesday, November 10, 2015 9:00 AM
To: Valacak, Mark; Brickey, Tamara; Wells, Eden (DHHS)
Subject: Summary of GCHD Lead Program Activities as of 11 (3)

Hi,

I wanted to give you a summary of the lead screening and case management activities. I will not be on the call this afternoon. Getting things set for Thursday. Overall, things went very well last week with a much smaller turnout than hoped. But not necessarily surprising.

Toni

Toni L LaRocco MS, RN
Director of Nursing Services
Genesee County Health Department
810.237.4544
tlarocco@gchd.us

"Gratitude unlocks the fullness of life. It turns what we have into enough, and more. It turns denial into acceptance, chaos to order, confusion to clarity. It can turn a meal into a feast, a house into a home, a stranger into a friend. Gratitude makes sense of our past, brings peace for today, and creates a vision for tomorrow." - Melody Beattie

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For a copy of the Health Department's Notice of Information Practices, contact the Health Department or visit the Health Department's website at http://www.gchd.us/

Summary of GCHD Lead Program Activities as of 11/09/2015

1. Lead testing clinic for outreach was held at Burton clinic on 11/5/15. This was a special event resulting in 39 children being screened or tested for lead poisoning.

    - 17 children were screened via capillary sample with results less than 3
    - 1 child's screening level was a 3
    - 1 child's screening level was a 4
    - 2 were tested using venous sample, these were sent to the state lab for analysis, results not yet known
    - The rest (18) were done as capillary samples by McLaren Health Plan staff and results are not yet know by GCHD

2. Children in Flint with Elevated Blood Lead Levels list from MDHHS (160 children plus 6 who have been retested and had new level less than 5)

    - 81 Children with Capillary test results greater than 5 needed contact for confirmation testing:
        - 75: 5-9 levels
            - 38 attempts to contact were made
            - 14 families were reached
                - 6 did not have water filters
            - 9 letters were mailed
        - 6: 10-14 levels
            - 2 attempts to contact were made
            - 2 children's family were reached
        - 0: Greater than/equal to 15

    - 79 Children with Venous test results greater than 5 need case management contact:
        - 68: 5-14 levels
        - 7: Greater than/equal to 15
            - 2 were recently opened to case management 9/25/15
            - 8 children from this list were already open to case management prior to list creation
        - 4 were not due for retesting yet

3. 3 children were found to have levels between 10-20 via capillary screening completed at GCHD Lead clinic (not the clinic noted above). The results for these children have not yet made it to the list from MDHHS, but should be added soon.

4. 1 home visit was made 11/2/15 to a home for case management regarding an elevated blood lead level over 20. Family does have a water filter in place.

From: Peeler, Nancy (DHHS)
Sent: Friday, November 13, 2015 8:46 AM
To: Peeler, Nancy (DHHS)
Subject: file
Attachments: Prelim rec for CLPPP services for MHP 7.2.15.doc

Preliminary recommendations for CLPPP related services through MHP*

Testing status	Lead level (Venous)	which Providers/protocols	Actions
Before test	Unknown	Primary Care Provider [1]	Medicaid requires BL testing at 12 & 24 months
After test	0-4	Primary Care Provider	Provides anticipatory guidance about lead hazards
	5-14	Primary Care Provider	Orders retesting w/in 1-3 months, monitors BLL Refers to MHP for in home CM services and education by CHW
		Community Health Worker [2]	Provides in home education about lead hazards, cleaning techniques and nutrition
		MHP Care Manager	Assures testing and referrals are completed
	15-44	Primary Care Provider	Actions above Retest/confirm within 1-3 weeks
		CHW	Provides in home education about lead hazards, cleaning techniques and nutrition
		Registered Nurse [3]	In home Nursing Assessment
		MHP Care Manager [4]	Coordinates Care and EH services with local HD (?) or outside entity
	45+	Primary Care Provider	Refers to CHM for possible chelation Above actions
		Registered Nurse	Provides in home follow up
		MHP Care Manager	Coordinates care, EH services and i.d. of safe housing with local HD (?), HHS or outside entity and CHM staff (after chelation)
		CHW	Above actions

[1] PCP protocol is defined in EPSDT chapter of Medicaid manual

[2] Working on defining CHW protocol; anticipate this would be prevention-focused to address lower lead levels (5-14), and would include in-home education about nutrition, lead hazards, how to appropriately clean the home, temporary 'fixes' (e.g. put plastic sheeting over peeling paint – not repairs)

[3] Nursing assessment protocol can be based on existing CLPPP Case Management protocol (with modifications) Includes developmental screening, and appropriate referrals i.e. Early On, Hearing screening, HHS Leadsafe Home Program ect.

[4] Working on understanding this role as it is defined now; need to differentiate role of MHP Care Manager from the in-home nursing/Nursing Assessment service. Guessing that the MHP Care Manager would coordinate services paid by the MHP, support getting info back to the PCP, follow up testing ordered, etc. Whereas Nursing Assessment might focus more on coordination of services in the community (e.g. not paid by MHP).

**Note: this does not currently include anything about home inspections/elevated blood lead level investigations. Wes and his staff would need to be involved in that discussion.*

From: Travis, Rashmi (DHHS)
Sent: Friday, November 13, 2015 2:54 PM
To: Peeler, Nancy (DHHS)
Subject: update on lead

Nancy,
I was on a call with Genesee County Health Dept this afternoon and wanted you to check in that you were working on getting data from the GCHD and reporting out how many were tested, how many followed up, etc. They (GCHD) will need to report out on these weekly when we do our call.

Also, I am on a call with CDC and GCHD – I was told about this 2Pm call at 1:30Pm. It appears that others have commented that the parent letter and attachments are too high a readability. CDC has comments on this too. They will provide a lead dictionary to explain the terms. I explained we have reviewed and created these document on the standard of a 6th grade reading level. They still thought that was too high. We also asked them to send info on water specifically. So, more to come on this or we may be asked to revise some of our materials.
Rashmi

From: MDHHS-FCH-DivisionContracts
Sent: Monday, November 16, 2015 4:30 PM
To: MDHHS-FCH-DivisionContracts;MDHHS-MIEGRANTS-AGREEMENT-DOC
Cc: Thelen, Beverly (DHHS);Peeler, Nancy (DHHS)
Subject: CO-2016 Multiple Agencies--Nurse Family Partnership Services--Amend. 2

CO-2016 Multiple Agencies--Nurse Family Partnership Services--Amend. 2

Project Code: CO-2016
Current Agreement Amount: varied
Additional Amount: $0
Match Amount: $0
TOTAL Agreement Amount: varied
Funding Source: N/A

Purpose: The purpose of this amendment is to update the Attachment III language for the agencies below. The state agreements do not change.

Berrien County HD
Calhoun County PHD
Ingham County HD
Kalamazoo County Health & Community Services Dept.
Kent County HD
Oakland County Dept. of Health and Human Serv.
Saginaw County HD

Update Budget?: No
Update Work Plan?: N/A
Attachments?: Yes, Attachment III language to follow by 11.16.15

Penny Eisfelder
Michigan Department of Community Health
Michigan Home Visiting Program
109 W. Michigan Ave., 4th floor
Lansing, MI 48933
Phone: (517) 373-2039
Fax: (517) 373-4294
eisfelderp@michigan.gov

Mailing address:
P.O. Box 30195
Lansing, MI 48909

New project, for Genesee County Health Department. Can you please copy the following people on the email:

Jeanette Hensler, me, Rashmi Travis, Mark Miller

Let me know if you have questions/need information – thank you for your help with this!

Nancy

Title: Child Elevated Lead Case Management
Amount: $425,000
Attachment III is attached.
Start date: 10/15/15
End date: 9/30/15
Source: State general funds (appropriated 10/15/15)

From: Hensler, Jeanette (DHHS)
Sent: Thursday, October 22, 2015 9:11 AM
To: Peeler, Nancy (DHHS); Miller, Mark (DHHS)
Cc: Travis, Rashmi (DHHS)
Subject: RE: Emergency Elevated Lead Management in Flint, financial vehicle for Follow-up Nurses

Hi Mark and Nancy,
We need the information for this project in order to add this to the Genesee County Health Department agreement.

Please provide the project title, amount, and Attachment III language for this project. Please send this information to our mailbox as well as the budget liaison.

Please let me know if there will be a delay in forwarding this information.
Thank you,
Jeanette

From: Peeler, Nancy (DHHS)
Sent: Monday, October 19, 2015 5:18 PM
To: Miller, Mark (DHHS)
Cc: Hensler, Jeanette (DHHS); Travis, Rashmi (DHHS)
Subject: Re: Emergency Elevated Lead Management in Flint, financial vehicle for Follow-up Nurses

Hi Mark - we know Sherry Taylor, who we agree is great, will be good to have her involved. If they can do the nursing via the health department, we concur with that approach.

Nancy

Sent from my iPad

On Oct 19, 2015, at 3:56 PM, Miller, Mark (DHHS) <millerm1@michigan.gov> wrote:

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> I just had a call with Sue, Rashmi and Genesee on possible vehicles to get nurses to do the follow-up on children in Flint with elevated lead levels.

Mark Valacak, the health officer already has a nurse, Sherry XXXX, who is experienced in lead management, but currently working in immunization. He also has another nurse ID'ed who can do the task. Depending on how much $ we send, he could get a couple more nurses for the follow-up, from his seasonal nurse bank (retired public health nurses).

At any rate, looks like the vehicle would be through the GCHD, rather than us trying to contract from up here.

Nancy what do you think of this scheme?

Jeanette, how should we work this in Egrams. Set up a separate new project?

Augment an existing project, like MCH Block Grant?

Some other procedure?

What would be fastest?

Thanks

Mark Miller
Director, Local Health Services
Michigan Department of Health & Human Services
201 Townsend, 6th Floor
Lansing MI 48913
(517) 335-8032
millerm1@michigan.gov

From: Scott, Robert L. (DHHS)
Sent: Tuesday, November 17, 2015 10:10 AM
To: Kostelec, Tiffany (DHHS)
Cc: Peeler, Nancy (DHHS)
Subject: early on lead numbers map
Attachments: MI BLL by PR fy2015.emf; MI BLL by PR fy2015.pdf

Tiffany,

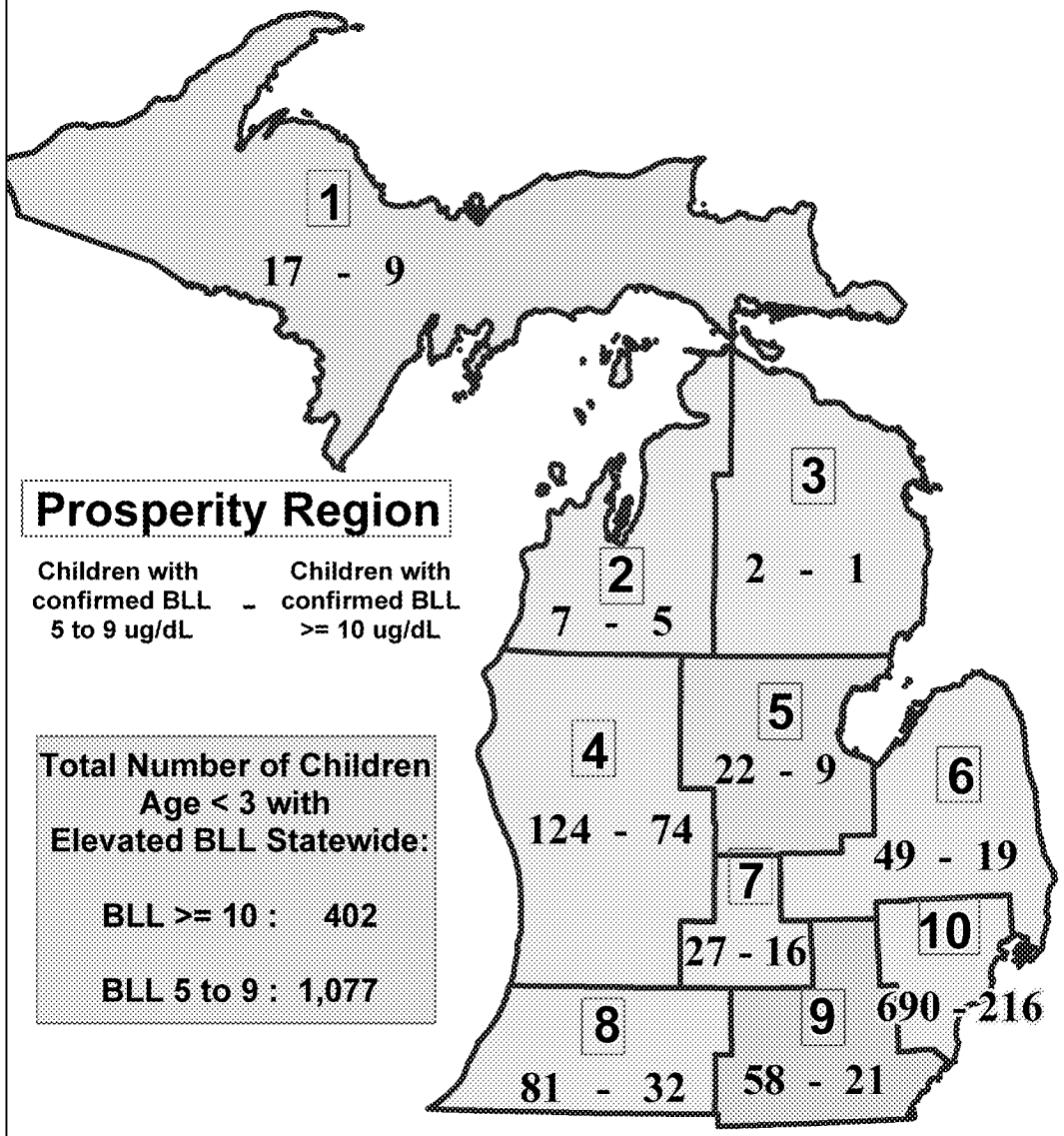
Please see attached. Per our discussion: PDF for stand-alone, EMF for powerpoint.

I can still make changes if you see something you want tweaked.

Bob

Robert L. Scott
Childhood Lead Poisoning Prevention Program
Michigan Department of Health & Human Services
(517) 335-8178
fax (517) 335-8509

Children with Elevated Blood Lead Levels (BLL)
FY2015
by Prosperity Region



Prosperity Region

Children with confirmed BLL 5 to 9 ug/dL	-	Children with confirmed BLL >= 10 ug/dL

Total Number of Children Age < 3 with Elevated BLL Statewide:

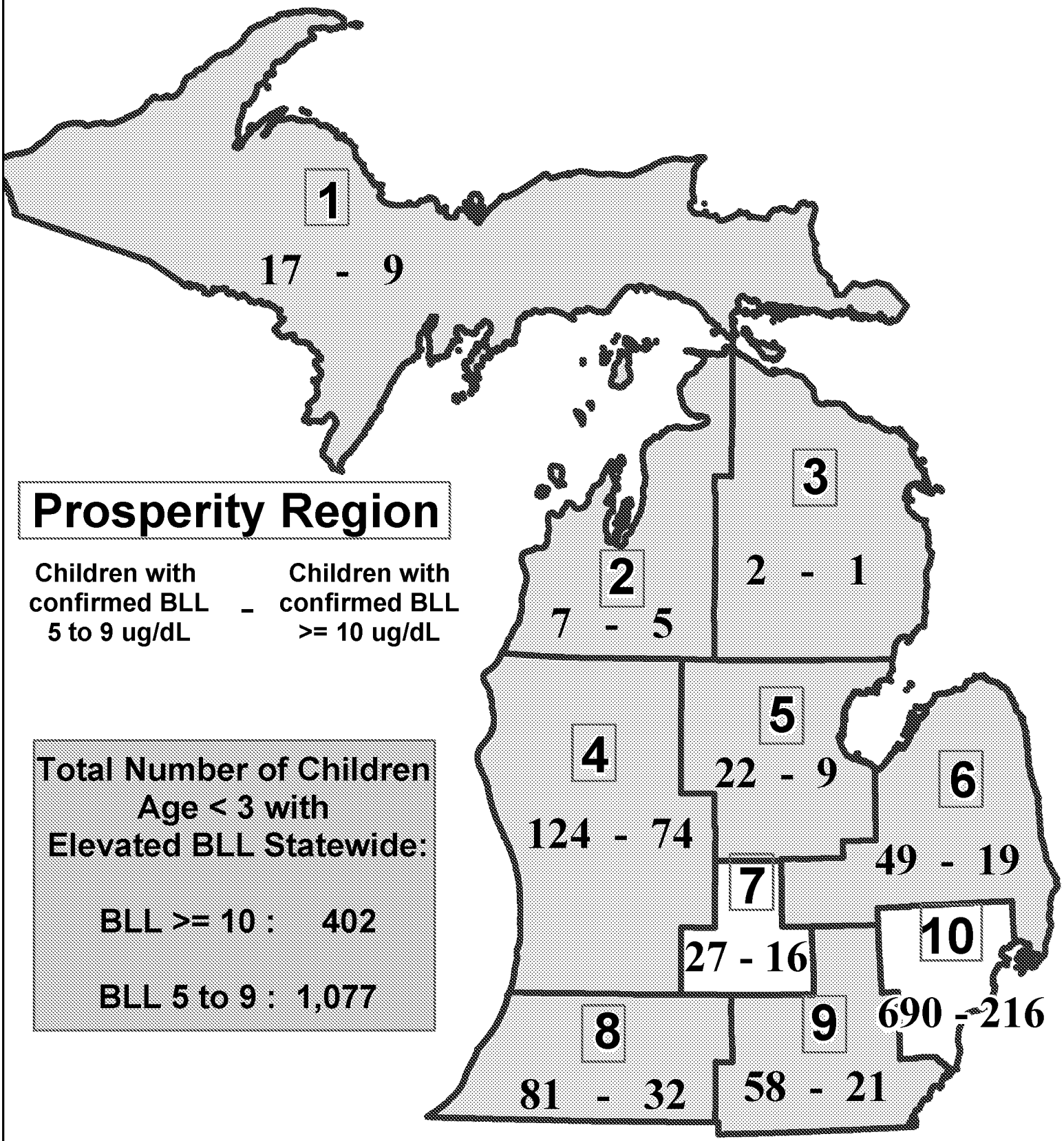
BLL >= 10 : 402

BLL 5 to 9 : 1,077

November 17, 2015

Source: MDCH CLPPP surveillance database

Children with Elevated Blood Lead Levels (BLL)
FY2015
by Prosperity Region



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November 17, 2015

Source: MDCH CLPPP surveillance database

From: MDHHS-FCH-DivisionContracts
Sent: Tuesday, November 17, 2015 11:07 AM
To: MDHHS-FCH-DivisionContracts;MDHHS-MIEGRANTS-AGREEMENT-DOC
Cc: Thelen, Beverly (DHHS);Peeler, Nancy (DHHS)
Subject: RE: CO-2016 Multiple Agencies--MIECHV Healthy Families America Expansion--Amend. 2
Attachments: HFA Special Requirements (Attach III) FY16 (revised 11.16.15).docx

Importance: High

Attached is the revised Attachment III language for the amendment previously submitted (below). Please let me know if you have any questions.

Penny Eisfelder
Administrative Analyst
Michigan Department of Community Health
109 W. Michigan Ave., 4th floor
Lansing, MI 48933
Phone: (517) 373-2039
Fax: (517) 373-4294
eisfelderp@michigan.gov

Mailing address:
P.O. Box 30195
Lansing, MI 48909

From: MDHHS-FCH-DivisionContracts
Sent: Monday, November 16, 2015 4:33 PM
To: MDHHS-FCH-DivisionContracts <MDHHS-FCH-DivisionContracts@michigan.gov>; MDHHS-MIEGRANTS-AGREEMENT-DOC <MDHHS-MIEGRANTS-AGREEMENT-DOC@michigan.gov>
Cc: Thelen, Beverly (DHHS) <Thelen87@michigan.gov>; Peeler, Nancy (DHHS) <PeelerN@michigan.gov>
Subject: RE: CO-2016 Multiple Agencies--MIECHV Healthy Families America Expansion--Amend. 2

CO-2016 Multiple Agencies-- MIECHV Healthy Families America Expansion --Amend. 2

Project Code: CO-2016
Current Agreement Amount: varied
Additional Amount: $0
Match Amount: $0
TOTAL Agreement Amount: varied
Funding Source: N/A

Purpose: The purpose of this amendment is to update the Attachment III language for the agencies below. The state agreements do not change.

Kalamazoo County Health & Community Services Dept.
Wayne County HD

Update Budget?: No
Update Work Plan?: N/A
Attachments?: Yes, Attachment III language to follow by 11.16.15

Penny Eisfelder
Michigan Department of Community Health
Michigan Home Visiting Program
109 W. Michigan Ave., 4th floor
Lansing, MI 48933
Phone: (517) 373-2039
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> Thanks

Mark Miller
Director, Local Health Services
Michigan Department of Health & Human Services
201 Townsend, 6th Floor
Lansing MI 48913
(517) 335-8032
millerm1@michigan.gov

From: Emily Houk <emily@r2pconsultants.com>
Sent: Wednesday, November 18, 2015 2:51 PM
To: Peeler, Nancy (DHHS)
Subject: Fwd: Communication Plan Update and Revisions w/ MDHHS
Attachments: Lead_and_your_Body_-_Flint_-_no_background_504124_7.pdf; 2015-10-21 - Lead - Flint Water FINAL.pdf; 2015-11-13 - Phosphate in Flint 02 DRAFT (2) - Copy.pdf; GCHD_Lead_in_Water_Fact_Sheet__2_ - Copy.pdf

I can go! Save me a seat on the parade route!
---------- Forwarded message ----------
From: **Henry, James** <jhenry@gchd.us>
Date: Wed, Nov 18, 2015 at 11:24 AM
Subject: Communication Plan Update and Revisions w/ MDHHS
To: "Stickler, Lisa" <STICKLER@gchd.us>, "LaRocco, Toni" <tlarocco@gchd.us>, "Brickey, Tamara" <tbrickey@gchd.us>, "Swartout, April" <ASWARTOUT@gchd.us>, scupal@gchd.us, MVALACAK@gchd.us "Henry, James" <jhenry@gchd.us>, "McShane, Hilda" <hmcshane@gchd.us>, BruneauM@michigan.gov, emily@r2pconsultants.com, sselig@umflint.edu

Hello everyone,

The doodle poll indicates that this Friday afternoon is best for attendance. I would have sent this sooner, but I was off work yesterday. Everyone is included in this meeting appointment, although some have indicated that they can't attend. GCHD has our recurring water briefing at 1pm on Friday, so the meeting is scheduled for 1:30pm.

Below are agenda topics and some of the factsheets that we'll be reviewing. Primarily, the intent is to ensure the current and future messages are appropriate for our targets. Michelle Bruneau, MDHHS will bring a laptop and projector to display the written communications. Michelle, feel free to update the agenda and if possible please send electronic copies of the CLPPP and other documents to the group for review prior to Friday's meeting.

<<Lead_and_your_Body_-_Flint_-_no_background_504124_7.pdf>> <<2015-10-21 - Lead - Flint Water FINAL.pdf>> <<2015-11-13 - Phosphate in Flint 02 DRAFT (2) - Copy.pdf>> <<GCHD_Lead_in_Water_Fact_Sheet__2_ - Copy.pdf>>

Agenda Topics:

- **Update the Communications Plan**

  Perhaps we can also revisit the draft communications plan and identify what needs to be updated and community needs, and get that table filled in with action items and point people as well, so at least we have some focus. As part of the communications plan, we can address:

- **Readability of Existing Materials – Which materials are a problem, what would you like to see instead?**

- **Gaps in Outreach – What are we missing?**

- **Focus Group vs Community Survey?**

--
Emily Houk, President and Chief Mischief Maker
Research to Practice Consulting, LLC
216 North Chestnut
Lansing, Michigan 48933
517-896-2712
r2pconsultants.com

Genesee County Health Department

Frequently Asked Questions About Lead & Your Body

MDHHS Michigan Department of Health & Human Services

Pregnant Woman

If you are exposed to lead when pregnant, the lead can be passed on to your fetus, possibly causing:

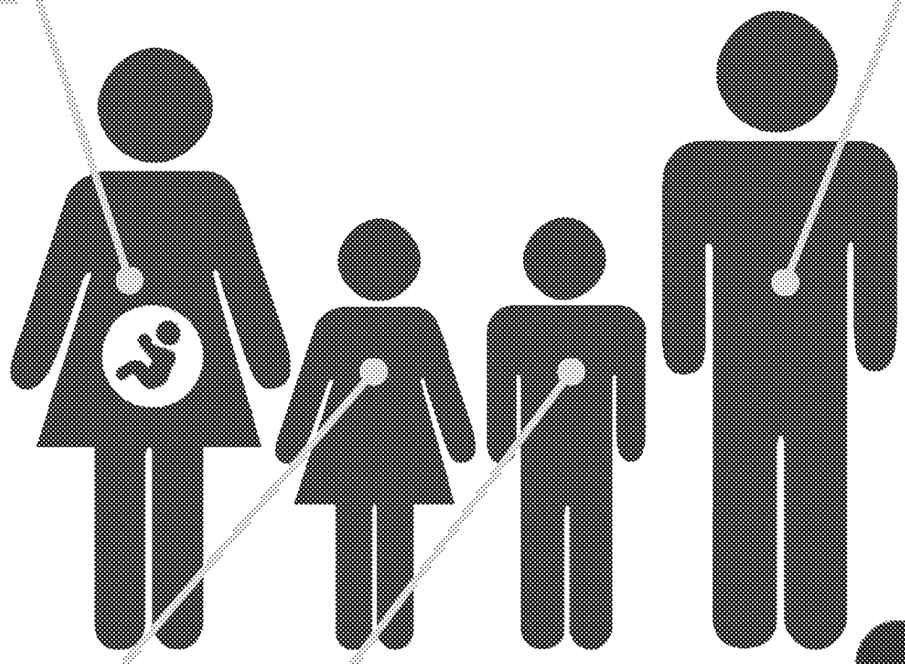
- premature birth
- a smaller baby
- learning difficulties
- slower growth in young kids

Healthy Adult

You are at lower risk of health problems from small amounts of lead.

Most health problems that come from lead in adults are because they are exposed to a lot of it at their job - whether they are in painting or construction or work at a factory where lead is used in a product.

If you work with lead, you should have regular blood tests to make sure you're not getting too much into your body.



Kids

Even small amounts of lead can harm kids' health. Your doctor can do a simple blood test to find out if your child has been exposed to lead. Some possible signs of lead poisoning include:

- a bad stomachache
- muscle weakness
- paleness (caused by anemia)

Over time lead can affect a kids'

- brain development
- growth rate

How Does Lead Get Into Your Body?

Eating and breathing lead dust is the most common way lead gets into your body.

- When kids accidentally eat lead, up to 50% can be absorbed into their bodies, compared to 3 to 10% for adults. This is why protecting kids from even small amounts of lead is important.

Lead does not absorb into your skin quickly or at high levels.

- The CDC reviewed a study where a cream with high levels of lead was put on the skin of adults. The cream was left on their skin for 12 hours. The amount of lead that soaked into their skin was very, very small (less than 0.3 percent).
- Taking a shower or bath in water containing lead at levels found in most tap water in Michigan is unlikely to be a problem for anyone, including kids.

If you think you or your children have been exposed to lead, please talk to your doctor or health department about getting a simple blood test to measure how much lead might be in your body.

For more information on protecting yourself and your family from lead, please visit: www.michigan.gov/lead, or you can call the Michigan Department of Health and Human Services at 1-800-648-6942. We will help direct you to the best department that can answer your questions about lead in your home.

You can also call the Flint Water Department at 810-787-6537 to request a free or low-cost water test.
If you use City of Flint water, you can call 211 to find out where you can pick up a free NSF-approved water filter.

v.10/17/2015

Genesee County Health Department

Frequently Asked Questions About Lead in Flint Water

MDHHS Michigan Department of Health & Human Services

- Lead is hard to avoid completely. It can be found in old paint, water pipes and brass water faucets, in dirt, at some job sites, and in metal used for some hobbies.
- The amount of lead found in some Flint homes' drinking water could affect kids' health.
  - Even small amounts of lead can harm kids' health because they are little and still growing.
  - Adults are less likely to be harmed by the levels found in the water.
- Filter your drinking water using a NSF-approved filter.
  - Find a NSF-approved filter at http://www.gchd.us/docs/lead_filter_information.pdf.
  - If you use City of Flint water, you can call 211 to find out where you can pick up a free water filter.
- Some filters can remove up to 99% of the lead in water when used properly. To be sure your filter is removing as much lead as it can, carefully follow the instructions that came with it.
  - Change the filter cartridge as often as you should.
  - Run only cold water through the filter.
- Even after changes to the water system, it may take a while before lead levels in your home's water drop. Use the tips below to know when it's best to use filtered water:

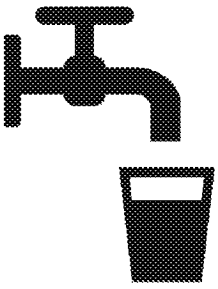
Lead in Water

Although your water may be a different color sometimes, it is not caused by lead. It's important to remember:

- **You can't see, smell, or taste lead in water.**
- **Lead won't change the color of your water.**
- **The only way to know what your home's lead levels are is by having your water tested in a lab.**

Please call the Flint Water Department at 810-787-6537 to request a free or low-cost water test.

In The Kitchen



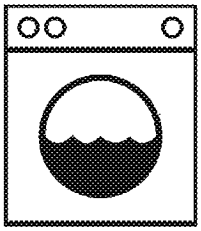
Use filtered tap water for:

- Drinking (including making coffee, drink mixes, juice, baby formula)
- Cooking (even if you boil the water, the lead will stay in the water and food)
- Washing fruits and vegetables

You can use unfiltered tap water for:

- Washing your hands
- Washing dishes
- Wiping down countertops

Cleaning



You can use unfiltered tap water for:

- Mopping floors
- Washing clothes

Your washing machine and dryer won't put lead from the water into the air of your home.

In the Bathroom

Use <u>filtered</u> tap water for:

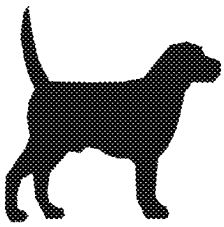
- Brushing kids' teeth

You can use <u>unfiltered</u> tap water for:

- Showers
- Baths (don't let kids drink the water as they play in the tub)
- Brushing your teeth (if you are an adult)

Lead will not cause rashes or other skin problems. However, if chlorine levels or other cleaners are high in the water, it may cause itchy or dry skin (similar to what can happen when you swim in a pool).

Caring for Pets



Use <u>filtered</u> tap water for:

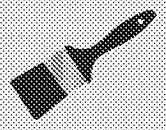
- Pets' water bowls

You can use <u>unfiltered</u> tap water for:

- Baths

If you notice your pet acting differently than normal, please contact your vet.

Other Sources of Lead in Your Home



Lead Paint

- Homes built before 1978 likely have lead paint, both inside and outside.
- Old paint is the most common way that kids are exposed to lead.

Dirt

- If you live in the city, there may be lead in the dirt outside your home.
- Before 1996, gas and the exhaust from cars contained lead. More lead will be found in dirt in busy traffic areas.

Dust

- The dust in your home can contain tiny amounts of both the paint and the dirt that contain lead.

Hobbies & Jobs

- Solder, fishing sinkers, bullets, and stained glass framing materials are some of the items in your home that may contain lead. You could also track home lead dust from your job site.

Have Questions?

For more information about protecting yourself and your family from lead, please visit:

<u>www.michigan.gov/lead</u>

Or you can call the Michigan Department of Health and Human Services at:

1-800-648-6942

The staff at this number will help direct you to the best department that can answer your questions about lead in your home.

To request a free or low-cost water test, please call the Flint Water Department at:

1-810-787-6537

To find out if you can get a free water filter, please call 211.

MDHHS

Michigan Department of Health & Human Services

Genesee County Health Department

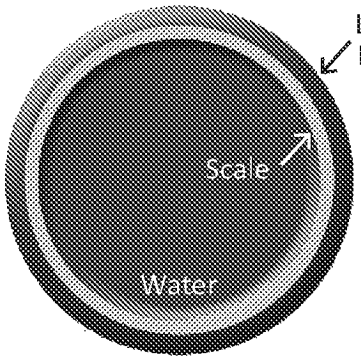
MDHHS Michigan Department of Health & Human Services

Frequently Asked Questions About

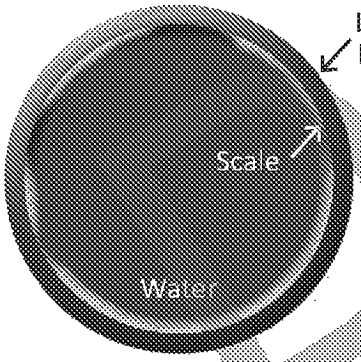
Adding Phosphate to Flint Water

Why is phosphate being added to our water?

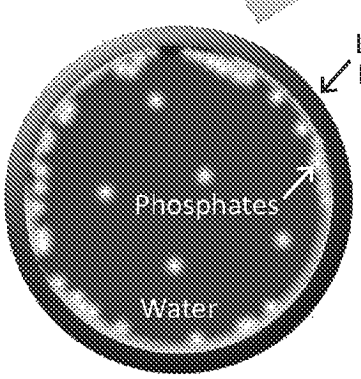
- Water pipes in homes built before 1986 could have lead in them. Brass faucets and certain kinds of solder could also have lead in them.
- The lead found in tap water in the City of Flint is from these older pipes, solder, and faucets.



- Over the years, minerals that are in our water had built up on the inside of pipes, keeping the water from actually touching the lead pipes. This is called scale.
- This scale helped to keep a lot of lead out of our water.



- Because of the cleaning products added to the Flint River water, some of the scale was cleaned from the pipes that bring the water to our homes.
- This has let the water touch the pipes again and pick up the lead that is in them.



- By adding extra phosphate to the water, the scale will be able to build back up faster than just waiting for it to happen again naturally.

Learn About Phosphate

- **Phosphorus is a natural mineral that your body needs. Along with calcium, it works to keep your bones strong and healthy.**
- **Phosphate is a type of salt that has phosphorus in it.**
- **Phosphate is being added to the water in the City of Flint to help put the scale back on the pipes.**
- **The City of Flint has calculated how much phosphate is needed to help coat the pipes without getting too much in your drinking water.**
- **The levels of phosphate in your drinking water will be safe for everyone - but continue to use filtered water until the Genesee County Health Department Advisory is lifted.**
- **Using the filter will protect your family from lead in your water until the scale can be rebuilt.**

DRAFT

If you have questions about the phosphate being added to City of Flint water, please call the Flint Water Department at 810-787-6537.

If you have questions about phosphates and your health, please call MDHHS at 1-800-648-6942.

v. 11/13/2015

Genesee County Health Department

Mark Valacak, M.P.H., Health Officer
Gary K. Johnson, M.D., M.P.H., Medical Director

How does lead get into my tap water?

Under typical circumstances, lead will dissolve into the water. The concentration of lead in drinking water can vary greatly, depending on the corrosiveness of the water, the type and age of the plumbing materials and the length of time that the water stands in the pipes. The highest levels of lead occur when very corrosive water stands motionless in lead or lead soldered pipe for long periods of time.

How do I know if my tap water is contaminated with lead?

The only way to know whether your tap water contains lead is to have it tested. You cannot see, taste, or smell lead in drinking water. There are different sampling methods for sampling lead in drinking water. To determine your household risk, it is recommended to take a first draw sample.

Does lead in my tap water cause health effects?

Lead can cause damage to the brain, red blood cells and kidneys. The greatest risk is to young children and pregnant women. Amounts of lead that won't hurt adults can slow down normal mental and physical development of growing bodies. Lead in water can be a special problem for infants, whose diets may be mostly liquids, such as baby formulas or concentrated juices mixed with water. Smaller bodies can absorb lead more rapidly than bigger ones. A child's mental and physical growth can be permanently harmed by too much lead. Risk will vary, depending on the individual, the circumstances, and the amount of water consumed.

What can I do to reduce or eliminate lead in my tap water?

Flush your cold-water pipes by running the water for approximately 5 minutes. The longer the water has been sitting in the pipes, the more lead it may contain. You can fill containers for later use, after the flushing process. Use only water from the cold-water tap for drinking, cooking, and especially for making baby formula. Hot water is likely to contain higher levels because it dissolves more lead.
You may choose to install a water filter that is NSF-certified for lead removal. If a water filter is installed, replace filters at least as often as recommended by the manufacturer.

Buy a lead-free faucet. The legal definition of "lead-free" still allows brass faucets to contain up to 8 percent lead. However, faucets marked with "NSF 61/9" and/or "California Proposition 65" meet stricter limits. Regularly clean particles from faucet aerators.

Is it safe to take a bath or shower, if my water has high lead levels?

Yes. Bathing and showering should be safe for you and your children, even if the water contains lead over EPA's action level. Human skin does not absorb lead in water. This information applies to most situations and to a large majority of the population, but individual circumstances may vary. Some situations, such as cases involving highly corrosive water, may require additional recommendations or more stringent actions.

Who do I contact for more information?

The local water authority is always your first source for testing and identifying lead contamination in your tap water. You can visit the City of Flint Website at www.cityofflint.com or contact the Flint Water Department at 810-787-6537.

WWW.EPA.GOV

WWW.MDEQ.GOV

From: Peeler, Nancy (DHHS)
Sent: Wednesday, November 18, 2015 4:08 PM
To: Eisfelder, Penny (DHHS)
Subject: REVISED GCHD Contract.Flint water 11.18.15
Attachments: REVISED GCHD Contract.Flint water 11.18.15.docx

Importance: High

Here is the revised contract language for the Genesee County Health Department Flint water contract, $425,000. Thank you!

CHILDHOOD LEAD POISONING PREVENTION PROGRAM
Child Elevated Lead Case Management
SPECIAL REQUIREMENTS - REVISED
(Genesse County Health Department)

Purpose:

Grantee activities funded by the Department are expected to be focused on case management and intervention activities for children < age 6 identified with confirmed elevated blood lead levels (≥ 5 ug/dL) since April 2014 and ongoing through FY2016. These funds are intended to augment, not replace, services billable to Medicaid. This is one time funding.

Funding requirements:

1. Funds may be used only for the following purposes:
   a. Administrative support and data entry documentation/reporting for any services rendered under this contract.
   b. For children insured by Medicaid, testing, nursing visits and case management services beyond those billable to Medicaid.
   c. For children not insured by Medicaid, testing and all nursing visits and other case management services provided.
   d. Funds may be used to provide Case Management services to residents of the City of Flint or Genesee County, for children who live in a home using City of Flint water, or who attend school, childcare or often spend time with a caregiver in the City of Flint.

Grantee Requirements:

1. Regular and ongoing Supervision will be provided by GCHD to all nurses providing services under this contract, with additional support available from the CLPPP Nurse as needed.
2. The CLPPP Case Management protocol will be utilized to assure comprehensive services.
3. All nurses providing services funded through this contract must participate in Lead Poisoning Prevention Case Management training prior to providing such services. Training will be coordinated and delivered jointly by CLPPP and GCHD Lead Nurse.
4. All nurses providing services funded through this contract must participate in training to use the Healthy Homes and Lead Poisoning Surveillance System (HHLPSS) to appropriately document services rendered.
5. Grantee must bill Medicaid for services rendered to Medicaid-insured children, for the maximum amount possible. For specific information on Medicaid covered services, please refer to the Medicaid Provider Manual.
6. In providing case management services related to elevated blood lead levels dating back to April 2014, Grantee will utilize lists provided by CLPPP and contact and offer a full complement of case management services to:
   a. Families of all children with capillary results of ≥ **5 ug/dL** that have not yet been confirmed by venous blood draw.
   b. Families of all children with venous results ≥ **5 ug/dL** that are due for follow-up testing to monitor their lead levels.

7. Each child in the jurisdiction with a new blood lead level ≥ **5 ug/dL** will be offered a full complement of case management services. Refer to Medicaid policy for an explanation of required services.
8. To the maximum extent allowed by law, nurses providing services funded through this contract will coordinate activities with EBL Investigators assigned to the same cases, including joint, coordinated home visits and exchange of information that supports each to carry out their duties in carrying out this public health activity.

Required Reporting:

1. On a weekly basis, Grantee will document all family contacts, case management activities, communications and Medicaid billing in the Healthy Homes and Lead Poisoning Surveillance System (HHLPSS), in a manner prescribed by the Department CLPPP.
2. Grantee must participate in a minimum of weekly review and status conference calls as scheduled by the Department CLPPP.

Metrics for Contract Monitoring

Contract monitoring will be based on data recorded in the Healthy Homes and Lead Poisoning Surveillance System (HHLPSS), Medicaid Claims data from the MDHHS data warehouse, and via weekly review and status calls.

1. Number and percentage of target children with elevated blood lead levels of ≥ **5 ug/dL** for whom contact has been attempted.
2. Number and percentage of target children with elevated blood lead levels of ≥ **5 ug/dL** that are successfully contacted and offered case management services.
3. Number and percentage of target children receiving case management services.
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5. Number of Medicaid claims filed for children enrolled in Medicaid who receive testing or nursing assessment visits.

Prohibited expenditures:

1. Billable services for children insured by Medicaid.
2. Purchase of or distribution of water filters.
3. Childhood Lead Poisoning Prevention funds may not be used to fund other local public health operations.

From: Peeler, Nancy (DHHS)
Sent: Wednesday, November 18, 2015 4:10 PM
To: Lishinski, Karen (DCH) (LishinskiK@michigan.gov);Miller, Christopher (DHHS);Travis, Rashmi (DHHS)
Cc: Fink, Brenda (DHHS)
Subject: REVISED GCHD Contract.Flint water 11.18.15.changes
Attachments: REVISED GCHD Contract.Flint water 11.18.15.changes.docx

Importance: High

Per Sue's request, we have modified the contract language with GCHD related to Flint water, see attached. Changes are highlighted in yellow. We had a phone call with GCHD staff to review the changes before submitting. Karen will email them this copy as an FYI, and we will be revising our reporting form to align with the new metrics, will send them that form to them tomorrow.

Please let us know if you have any questions.

Nancy

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From: Eisfelder, Penny (DHHS)
Sent: Wednesday, November 18, 2015 7:42 PM
To: Peeler, Nancy (DHHS)
Subject: RE: REVISED GCHD Contract.Flint water 11.18.15

Got it...will send it through and copy Jeanette on it.

From: Peeler, Nancy (DHHS)
Sent: Wednesday, November 18, 2015 4:08 PM
To: Eisfelder, Penny (DHHS) <EisfelderP@michigan.gov>
Subject: REVISED GCHD Contract.Flint water 11.18.15
Importance: High

Here is the revised contract language for the Genesee County Health Department Flint water contract, $425,000. Thank you!

From: Peeler, Nancy (DHHS)
Sent: Thursday, November 19, 2015 5:40 PM
To: LaRocco, Toni
Subject: RE: positions

Ok, thanks. I will email her tonight to set something up.

From: LaRocco, Toni [mailto:tlarocco@gchd.us]
Sent: Thursday, November 19, 2015 5:36 PM
To: Peeler, Nancy (DHHS) <PeelerN@michigan.gov>
Subject: Re: positions

Jori Who will probably lupine one or more of the nurses

Toni LaRocco MS, RN
Director of Nursing Services
Genesee County Health Department

On Nov 19, 2015, at 5:30 PM, Peeler, Nancy (DHHS) <PeelerN@michigan.gov> wrote:

> Thanks, Toni.
>
> I have a couple of questions pertaining to the reporting form we gave you -- we need to update it to match the revised contract language, and I can see some other things that could be improved, would like to review those with one or more of you tomorrow, if possible. Who is best to include for that type of discussion?
>
> Nancy
>
> ---
>
> **From:** LaRocco, Toni [mailto:tlarocco@gchd.us]
> **Sent:** Thursday, November 19, 2015 5:18 PM
> **To:** Peeler, Nancy (DHHS) <PeelerN@michigan.gov>
> **Subject:** Re: positions
>
> Yes I did say Sherry is a nursing coordinator but that means something different at Genesee County than it does at MDHHS. She reports to Jori and will not be making any budgetary or programmatic decisions. She will be making sure she and the other nurses stay on focus and early on she was the only nurse we had who knew lead.
>
> Toni LaRocco MS, RN
> Director of Nursing Services
> Genesee County Health Department
>
> On Nov 19, 2015, at 2:31 PM, Peeler, Nancy (DHHS) <PeelerN@michigan.gov> wrote:
>
> > Thanks, Toni – this is helpful information. Early in the process, Sherry was identified for us as the Coordinator for this effort. Is that incorrect? Or if correct, the Coordinator

role doesn't include budget/contracts? Just wanting to make sure we understand her role.

Nancy

From: LaRocco, Toni [mailto:tlarocco@gchd.us]
Sent: Thursday, November 19, 2015 1:41 PM
To: Peeler, Nancy (DHHS) <PeelerN@michigan.gov>; Lishinski, Karen (DHHS) <LishinskiK@michigan.gov>
Cc: July, Jori <jjuly@gchd.us>
Subject: positions

Hi Nancy and Karen,

One of our nurses working in Lead Case Management came to us concerned that you might not know the roles of Genesee County staff in the case management realm. If you have questions regarding budget or contract issues, that should be brought to myself or Jori. If you have questions regarding clients that would go to Sherry, Kim or Jan. If there are concerns about implementation process please discuss with Jori. I hope this is helpful.

Thanks,
Toni

Toni L LaRocco-MS, RN
Director of Nursing Services
Genesee County Health Department
810.237.4544
tlarocco@gchd.us

"Gratitude unlocks the fullness of life. It turns what we have into enough, and more, It turns denial into acceptance, chaos to order, confusion to clarity. It can turn a meal into a feast, a house into a home, a stranger into a friend. Gratitude makes sense of our past, brings peace for today, and creates a vision for tomorrow." - Melody Beattie

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From: Peeler, Nancy (DHHS)
Sent: Friday, November 20, 2015 11:39 AM
To: July, Jori
Subject: FW: 11182015 FLINT BLOOD LEAD CM - weekly status tracking form
Attachments: 11182015 FLINT BLOOD LEAD CM - weekly status tracking form.docx

Document I'm referencing

From: Lishinski, Karen (DHHS)
Sent: Wednesday, November 18, 2015 9:12 AM
To: Peeler, Nancy (DHHS) <PeelerN@michigan.gov>
Subject: FW: 11182015 FLINT BLOOD LEAD CM - weekly status tracking form

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From: July, Jori [mailto:jjuly@gchd.us]
Sent: Wednesday, November 18, 2015 9:09 AM
To: Lishinski, Karen (DHHS)
Subject: FW: 11182015 FLINT BLOOD LEAD CM - weekly status tracking form

Jori July MSN RN ANP-BC
PHN Supervisor
Genesee County Health Department
jjuly@gchd.us
(810) 237-4543

From: Noble, Kim
Sent: Wednesday, November 18, 2015 8:11 AM
To: Taylor, Sherry; July, Jori
Cc: July, Jori
Subject: 11182015 FLINT BLOOD LEAD CM - weekly status tracking form

One more update with newer numbers and addition to notes.
Do you want it sent to Karen before call? She had requested it prior to call.
I think Toni wants a copy too if you think it is alright.

Kim Noble RN, BSN
Public Health Nurse
Genesee County Health Department
G-3373 S. Saginaw Street
Flint, MI 48529
Telephone: 810- 237-4571
Fax: 810- 237-4612

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FLINT BLOOD LEAD LEVEL TESTING REPORT for week ending 11/13/2015

		A	B	C	D	E	F
PRIORITY LEVEL 1	**Target Population**	**# contacted and offered case management**	**% of total (A/X)**	**# of children receiving CM**	**% of total (C/X1) and (C/A)**	**# of Medicaid claims filed**	**% for whom Medicaid claims filed (E/C)**
	All children with elevated Capillary > 5 since April 2014 (total = **84**)	3	4%	NA	NA	NA	NA
	All children with newly elevated Venous > 5 since April 2014 (total = **79**)	0	0%	1	1.3%	1	100%
	All children with new elevated Venous ≥ 5 since October 2015 (total =**3**)	2	67%	0	0%	0	0%
	All children with elevated Capillary > 5 since Oct 2015 (total = **5**)	0	0%	NA	NA	NA	NA
	TOTALS						

** this number will change weekly*

NOTES: GCHD CM staff were in training all day 11/10, closed for holiday 11/11, and were at an outreach clinic on 11/12 for the afternoon away from the office. Note that children with capillary are not offered case management until result confirmed by venous sample, the 4% in column B represents number reached via phone. FYI-families may be contacted in one week, first home visit to open to CM may not occur in same week due to scheduling, etc. This information reflects activities for this week only.

Metrics included in contract

1. Number and percentage of target children with elevated blood lead levels of ≥ **5 ug/dL** that are successfully contacted and offered case management services. A and B
2. Number and percentage of target children receiving case management services. C and D
3. Number of Medicaid claims filed for children enrolled in Medicaid who receive testing or nursing assessment visits. E and F

11182015 FLINT BLOOD LEAD CM - weekly status tracking form

From: Peeler, Nancy (DHHS)
Sent: Friday, November 20, 2015 11:46 AM
To: Lishinski, Karen (DCH) (LishinskiK@michigan.gov)
Subject: FW: hoping to touch base about our reporting form
Attachments: FLINT BLOOD LEAD CM - weekly status tracking form.v2 11.20.15.docx; REVISED GCHD Contract.Flint water 11.18.15.changes.docx

Importance: High

FYI – follow up on my call today with Jori. Let's talk about this on Monday –

- I reviewed the updated contract language with Jori, as well as the revised reporting spreadsheet She is going to review the reporting spreadsheet with the nurses, they are supposed to give feedback on the Tuesday call that you already have set up.
- I asked her about the numbers on the first report they sent you – we don't know where they got the 163 number they listed. I can see that the totals they listed for rows 1 and 2 are not accurate (as measured by the list of families that Bob sends them) – she is hopefully going to get back to me today regarding that number. Rashmi has asked about it, and my detective work so far with Bob hasn't helped us to figure it out. I do wonder if the text on the reporting form was part of the problem, so I tried to fix what I saw might be the problem. We'll see!

See you on Monday, hope it was a good (warm) weekend – you left just in time for our first snow!

From: Peeler, Nancy (DHHS)
Sent: Friday, November 20, 2015 11:29 AM
To: 'July, Jori' <jjuly@gchd.us>
Cc: Lishinski, Karen (DHHS) <LishinskiK@michigan.gov>
Subject: RE: hoping to touch base about our reporting form
Importance: High

Jori, the files I wanted to walk through are attached. I'll call you shortly.

Nancy

From: July, Jori [mailto:jjuly@gchd.us]
Sent: Friday, November 20, 2015 8:10 AM
To: Peeler, Nancy (DHHS) <PeelerN@michigan.gov>
Cc: Lishinski, Karen (DHHS) <LishinskiK@michigan.gov>; LaRocco, Toni <tlarocco@gchd.us>
Subject: RE: hoping to touch base about our reporting form

Hi Nancy-

Closer to noon would be best for me.

Jori

Jori July MSN RN ANP-BC

PHN Supervisor
Genesee County Health Department
jjuly@gchd.us
(810) 237-4543

From: Peeler, Nancy (DHHS) [mailto:PeelerN@michigan.gov]
Sent: Thursday, November 19, 2015 5:43 PM
To: July, Jori
Cc: Lishinski, Karen (DHHS); LaRocco, Toni
Subject: hoping to touch base about our reporting form

Hi Jori, I have a couple of questions pertaining to the reporting form we gave you – we need to update it to match the revised contract language, and I can see some other things that could be improved, would like to review those with one or more of you tomorrow, if possible. Karen is off for a family event, so it would be just me on our end. I could talk sometime tomorrow between about 9 and noon, or around 4pm. Would one of those times work for you?

If you could let me know, and send me your phone number, I would appreciate it!

Nancy

FLINT BLOOD LEAD LEVEL CASE MANAGEMENT, ORGANIZED BY TESTING PROTOCOL PRIORITY GROUPS

		A	B	C	D	E	F	G	H	I	J
	Target Population	**# for whom contact has been attempted**	**% for whom contact has been attempted** (Col. A / total for row)	**# successfully contacted and offered CM**	**% of total % of attempted** (Col. C / total for row AND Col. C / Col. A)	**# of children receiving CM**	**% of total % of contacted** (Col. E / total for row AND Col. E / Col. C)	**# of children receiving CM who live in Flint**	**% of CM in Flint** (Col. G / Col. E)	**# of CM Medicaid claims filed**	**% for whom Medicaid claims filed** (Col. I / Col. E)
PRIORITY LEVEL 1	All children with elevated Capillary > 5 from April 2014 – September 2015 (row total =75)										
	All children with newly elevated Venous > 5 from April 2014 – September 2015 (row total = 76)										
	All children with new elevated Capillary ≥ 5 since October 2015 (row total = X*)										
	All children with new elevated Venous ≥ 5 since October 2015 (row total = X*)										
	TOTALS										

* *X will reflect the new, weekly numbers*

Metrics included in contract (as amended 11.18.15):

1. Number and percentage of target children with elevated blood lead levels of ≥ **5 ug/dL** for whom contact has been attempted.
2. Number and percentage of target children with elevated blood lead levels of ≥ **5 ug/dL** that are successfully contacted and offered case management services.
3. Number and percentage of target children receiving case management services.
4. Number and percentage of target children receiving case management services residing in the City of Flint.

5. Number of Medicaid claims filed for children enrolled in Medicaid who receive testing or nursing assessment visits.

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From: Peeler, Nancy (DHHS)
Sent: Friday, November 20, 2015 12:29 PM
To: Robert L. Scott (ScottR9@michigan.gov)
Subject: new documents for GCHD
Attachments: FLINT BLOOD LEAD CM - weekly status tracking form v2 11 20 15.docx; REVISED GCHD Contract.Flint water 11.18.15.changes.docx

Revised contract language, and revised reporting form. If you see any errors or improvements, we appreciate the feedback!

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6. In providing case management services related to elevated blood lead levels dating back to April 2014, Grantee will utilize lists provided by CLPPP and contact and offer a full complement of case management services to:
   a. Families of all children with capillary results of ≥ **5 ug/dL** that have not yet been confirmed by venous blood draw.
   b. Families of all children with venous results ≥ **5 ug/dL** that are due for follow-up testing to monitor their lead levels.

7. Each child in the jurisdiction with a new blood lead level ≥ **5 ug/dL** will be offered a full complement of case management services. Refer to Medicaid policy for an explanation of required services.
8. To the maximum extent allowed by law, nurses providing services funded through this contract will coordinate activities with EBL Investigators assigned to the same cases, including joint, coordinated home visits and exchange of information that supports each to carry out their duties in carrying out this public health activity.

Required Reporting:

1. On a weekly basis, Grantee will document all family contacts, case management activities, communications and Medicaid billing in the Healthy Homes and Lead Poisoning Surveillance System (HHLPSS), in a manner prescribed by the Department CLPPP.
2. Grantee must participate in a minimum of weekly review and status conference calls as scheduled by the Department CLPPP.

Metrics for Contract Monitoring

Contract monitoring will be based on data recorded in the Healthy Homes and Lead Poisoning Surveillance System (HHLPSS), Medicaid Claims data from the MDHHS data warehouse, and via weekly review and status calls.

1. Number and percentage of target children with elevated blood lead levels of ≥ **5 ug/dL** for whom contact has been attempted.
2. Number and percentage of target children with elevated blood lead levels of ≥ **5 ug/dL** that are successfully contacted and offered case management services.
3. Number and percentage of target children receiving case management services.
4. Number and percentage of target children receiving case management services residing in the City of Flint.
5. Number of Medicaid claims filed for children enrolled in Medicaid who receive testing or nursing assessment visits.

Prohibited expenditures:

1. Billable services for children insured by Medicaid.
2. Purchase of or distribution of water filters.
3. Childhood Lead Poisoning Prevention funds may not be used to fund other local public health operations.

From: Peeler, Nancy (DHHS)
Sent: Friday, November 20, 2015 2:58 PM
To: Travis, Rashmi (DHHS)
Subject: RE: talking points on case management & environmental investigations/composite with a couple bullets from Wes

Hi Rashmi -- regarding the 163 number you asked me about -- I've been on the phone with GCHD several times today.

If we take their report they sent to Karen on 11/18, it captures information about 171 families. That matches the total number on the list that Bob sent them for that time period. So that is good!

I can see now where the 163 number came from. It is the total of 2 rows from our reporting form, but didn't include the other two rows listed on the table, that's the difference.

In reviewing the report GCHD sent us, and in looking at the numbers on it, Karen and I realized that we needed to clarify some of the instructions, as they caused confusion on the GCHD end. We have subsequently added more detail, and have shared it back to GCHD to review, give us feedback next Tuesday.

Nancy

From: Travis, Rashmi (DHHS)
Sent: Friday, November 20, 2015 9:55 AM
To: Peeler, Nancy (DHHS) <PeelerN@michigan.gov>; Dykema, Linda D. (DHHS) <DykemaL@michigan.gov>
Subject: RE: talking points on case management & environmental investigations/composite with a couple bullets from Wes

Ok thanks. I'm sending to Linda Dykema to verify with the figure she may have because it was a higher figure at one time.

Linda,
See Nancy's notes below on the 163 EBL investigations. At one time, you had a different figure based on your analysis. Can you verify what figure you have.

Thanks,
Rashmi

From: Peeler, Nancy (DHHS)
Sent: Thursday, November 19, 2015 5:26 PM
To: Travis, Rashmi (DHHS) <TravisR@michigan.gov>
Cc: Fink, Brenda (DHHS) <FinkB@michigan.gov>
Subject: RE: talking points on case management & environmental investigations/composite with a couple bullets from Wes

The 163 number came off of the GCHD Case Management reporting sheet they sent to us this week.

I'm not sure where they got that number. I have to call and clarify with them tomorrow (Karen is away for a family event).

Bob has 151 for the April 2014 – September 2015 dates.

Updates to his list are as follows (not sure about prior to 10/26):

Total of 162 as of 10/26/15
Total of 166 as of 11/2/15
Total of 171 as of 11/9/15
Total of 180 as of 11/16/15

I can see some improvements we need to make to our CM reporting sheet, perhaps the form contributed to confusion on numbers? Will find out tomorrow.

Sorry I don't have a resolution for you tonight. All I can suggest is to go with the 163 for now, and we'll have it cleared up for next week – I'm OK with that because if anything, the 163 number is too low, not too high (e.g. it will go up next week, not down).

Nancy

From: Travis, Rashmi (DHHS)
Sent: Thursday, November 19, 2015 4:45 PM
To: Peeler, Nancy (DHHS) <PeelerN@michigan.gov>
Subject: Re: talking points on case management & environmental investigations/composite with a couple bullets from Wes

Kay thanks.

Sent from my iPhone

On Nov 19, 2015, at 4:44 PM, Peeler, Nancy (DHHS) <PeelerN@michigan.gov> wrote:

> I'll check in with Bob, let you know. Not sure if something changed about the original lists? He may know.
>
> ---
>
> **From:** Travis, Rashmi (DHHS)
> **Sent:** Thursday, November 19, 2015 4:42 PM
> **To:** Peeler, Nancy (DHHS) <PeelerN@michigan.gov>
> **Subject:** Re: talking points on case management & environmental investigations/composite with a couple bullets from Wes
>
> The 163 figure
>
> Sent from my iPhone
>
> On Nov 19, 2015, at 4:39 PM, Peeler, Nancy (DHHS) <PeelerN@michigan.gov> wrote:
>
> > Not sure which figure you are referencing...
> >
> > ---
> >
> > **From:** Travis, Rashmi (DHHS)
> > **Sent:** Thursday, November 19, 2015 4:30 PM

To: Peeler, Nancy (DHHS) <PeelerN@michigan.gov>
Subject: FW: talking points on case management & environmental investigations/composite with a couple bullets from Wes

Nancy,
Do you know if the figure on children with EBL got sorted out?
Rashmi

From: Robinson, Mikelle (DHHS)
Sent: Thursday, November 19, 2015 4:29 PM
To: Miller, Mark (DHHS) <millerm1@michigan.gov>
Cc: Travis, Rashmi (DHHS) <TravisR@michigan.gov>
Subject: RE: talking points on case management & environmental investigations/composite with a couple bullets from Wes

Regarding the number of children with EBL. There has been some question about what the true figure is. Did that get sorted out?

From: Miller, Mark (DHHS)
Sent: Thursday, November 19, 2015 4:27 PM
To: Robinson, Mikelle (DHHS) <RobinsonM18@michigan.gov>; Travis, Rashmi (DHHS) <TravisR@michigan.gov>
Subject: RE: talking points on case management & environmental investigations/composite with a couple bullets from Wes

I say this is good to send to Eden and Geralyn. The two experts, Wes and Nancy, provided the material that we summarized. Thoughts?

I think these would be some brief talking points for Eden and/or Geralyn:

The governor signed the legislation for funding on Oct. 15th.

Contracts for Case Management were negotiated and in place by Oct. 23rd; a contact for environmental investigations was executed on 10/29/15.

GCHD hired 2.5 staff and trained them by Nov. 10th; staff have begun to contact families and offer/conduct case management services.

The Nurse Case Managers have met with, and developed plans to coordinate efforts with, the Environmental Investigators, and will be making joint home visits whenever possible.

There are 163 children with elevated blood lead levels reported since April 2014. Staff just started, but have reached 5 families to offer case management, and have conducted case management on one of those cases (as of 11/13/15). Outreach to additional families is already underway. 2 EBL

investigations have been conducted as of 11/19/15; environmental investigators also do water sampling.

We expect these numbers to grow in the coming weeks.

From: Peeler, Nancy (DHHS)
Sent: Tuesday, November 24, 2015 10:17 AM
To: July, Jori
Cc: Lishinski, Karen (DCH) (LishinskiK@michigan.gov)
Subject: RE: hoping to touch base about our reporting form
Attachments: FLINT BLOOD LEAD CM - weekly status tracking form v3 11.23.15.xls.xlsx

HI Jori -- see attached file -- in an Excel spreadsheet as you requested. The red numbers are only there to test the formulas I entered for the first two rows -- not based on reality at all. Just replace those as you use the form. I didn't program the last two rows, as I don't have the data needed to do that (e.g. the running weekly total).

I think we only want column totals for the # columns; I blocked the cells where we don't need column totals. We don't need row totals.

Let's try using the test date, see how that works.

Nancy

From: July, Jori [mailto:jjuly@gchd.us]
Sent: Tuesday, November 24, 2015 9:13 AM
To: Peeler, Nancy (DHHS) <PeelerN@michigan.gov>
Subject: RE: hoping to touch base about our reporting form

Nancy-

Do you want running totals? That wasn't clear in your reply.

I suppose that it depends on what you want for numbers; to me it makes sense to have the test date. Aren't you wanting to know the lead test results of those that were drinking the water before the switch back to Detroit???

Jori

Jori July MSN RN ANP-BC
PHN Supervisor
Genesee County Health Department
jjuly@gchd.us
(810) 237-4543

From: Peeler, Nancy (DHHS) [mailto:PeelerN@michigan.gov]
Sent: Monday, November 23, 2015 11:09 PM
To: July, Jori
Subject: Re: hoping to touch base about our reporting form

Hi Jori - thanks for sending feedback. We'll have the Excel spreadsheet for you tomorrow (Tuesday).

Regarding your questions -

- I think the Word document had totals for each column. I agree, that the 'X' in rows 3 and 4 will change each week as any new results come in, and as Bob adds to the list.
- Thanks for catching the > 5 - you are correct, it should be ≥ 5.
- We were thinking data would be based on when data was added to Bob's lists; what would work best for you?

Nancy

From: July, Jori <jjuly@gchd.us>
Sent: Monday, November 23, 2015 4:47 PM
To: Peeler, Nancy (DHHS)
Subject: RE: hoping to touch base about our reporting form

Nancy-

Regarding the updated reporting form:

- Do you want running totals for all rows and columns? This means that the "X" will change each week dependent on the list received from Bob and any results we receive ahead of being put on his list.
- The top 2 rows, should the results show as ≥ 5? Currently, they are just > 5.
- Do you want data entered into the columns dependent on the date the test was done or the date the result was added to Bob's list?

Please clarify.

Thank you,
Jori

Jori July MSN RN ANP-BC
PHN Supervisor
Genesee County Health Department
jjuly@gchd.us
(810) 237-4543

From: Peeler, Nancy (DHHS) [mailto:PeelerN@michigan.gov]
Sent: Friday, November 20, 2015 11:29 AM
To: July, Jori
Cc: Lishinski, Karen (DHHS)
Subject: RE: hoping to touch base about our reporting form
Importance: High

Jori, the files I wanted to walk through are attached. I'll call you shortly.

Nancy

From: July, Jori [mailto:jjuly@gchd.us]
Sent: Friday, November 20, 2015 8:10 AM
To: Peeler, Nancy (DHHS) <PeelerN@michigan.gov>
Cc: Lishinski, Karen (DHHS) <LishinskiK@michigan.gov>; LaRocco, Toni <tlarocco@gchd.us>
Subject: RE: hoping to touch base about our reporting form

Hi Nancy-

Closer to noon would be best for me.

Jori

Jori July MSN RN ANP-BC
PHN Supervisor
Genesee County Health Department
jjuly@gchd.us
(810) 237-4543

From: Peeler, Nancy (DHHS) [mailto:PeelerN@michigan.gov]
Sent: Thursday, November 19, 2015 5:43 PM
To: July, Jori
Cc: Lishinski, Karen (DHHS); LaRocco, Toni
Subject: hoping to touch base about our reporting form

Hi Jori, I have a couple of questions pertaining to the reporting form we gave you -- we need to update it to match the revised contract language, and I can see some other things that could be improved, would like to review those with one or more of you tomorrow, if possible. Karen is off for a family event, so it would be just me on our end. I could talk sometime tomorrow between about 9 and noon, or around 4pm. Would one of those times work for you?

If you could let me know, and send me your phone number, I would appreciate it!

Nancy

	A	B
1	**Target Population**	**# for whom contact has been attempted**
2		
3		
4		
5		
6	All children with elevated Capillary ≥ 5 from April 2014 – September 2015 (row total = 75)	5
7		
8	All children with newly elevated Venous ≥ 5 from April 2014 – September 2015 (row total = 76)	7
9		
10	All children with new elevated Capillary ≥ 5 since October 2015 (row total = X*)	
11		
12	All children with new elevated Venous ≥ 5 since October 2015 (row total = X*)	
13		
14	**TOTALS**	
15		
16	** X will reflect the new, weekly numbers*	
17	Metrics included in contract (as amended 11.18.15):	
18	1. Number and percentage of target children with elevated blood lead levels of ≥ **5 ug/dL** for whom contact has been attempted.	
19	2. Number and percentage of target children with elevated blood lead levels of ≥ **5 ug/dL** that are successfully contacted and offered case management services.	
20	3. Number and percentage of target children receiving case management services.	
21	4. Number and percentage of target children receiving case management services residing in the City of Flint.	
22	5. Number of Medicaid claims filed for children enrolled in Medicaid who receive testing or nursing assessment visits.	
23		
24		
25		
26	*v3 11.23.15*	

	C	D	E	F	G
1	**% for whom contact has been attempted** (Col. B / total for row)	**# successfully contacted and offered CM**	**% of total**	**# of children receiving CM**	**% of total**
2			**% of attempted**		**% of contacted**
3			(Col. D / total for row		(Col. F / total for row
4			AND		AND
5			Col. D / Col. B)		Col. F / Col. D)
6	7%	3	4%	1	1%
7			60%		33%
8	9%	5	7%	4	5%
9			71%		0.8
10	0%				
11					
12	0%				
13					
14					
15					
16					
17					
18					
19					
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21					
22					
23					
24					
25					
26					

	H	I	J	K
1	**# of children receiving CM who live in Flint**	**% of CM in Flint**	**# of CM Medicaid claims filed**	**% for whom Medicaid claims filed** (Col. J / Col. F)
2		(Col. H / Col. F)		
3				
4				
5				
6	1	100%	1	100%
7				
8	3	75%	3	75%
9				
10				
11				
12				
13				
14				
15				
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18				
19				
20				
21				
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24				
25				
26				

From: Peeler, Nancy (DHHS)
Sent: Tuesday, November 24, 2015 12:30 PM
To: Robert L. Scott (ScottR9@michigan.gov);Stanbury, Martha (DHHS)
Cc: Lishinski, Karen (DCH) (LishinskiK@michigan.gov)
Subject: 1pm call with GCHD about Flint - lists of children and contract reporting
Attachments: FLINT BLOOD LEAD CM - weekly status tracking form v3 11.23.15.xls.xlsx

Hi Bob and Martha, we have a 'status' call with Genesee Health Department staff at 1pm, and I believe that the lists of children Bob is sending them will come up related to our reporting sheet. I think it could be helpful to have Bob participate. Bob, is there any chance you could join the call with us? If yes, Karen and I can dial your phone to conference you in.

Nancy

	A	B
1	**Target Population**	**# for whom contact has been attempted**
2		
3		
4		
5		
6	All children with elevated Capillary ≥ 5 from April 2014 – September 2015 (row total = 75)	5
7		
8	All children with newly elevated Venous ≥ 5 from April 2014 – September 2015 (row total = 76)	7
9		
10	All children with new elevated Capillary ≥ 5 since October 2015 (row total = X*)	
11		
12	All children with new elevated Venous ≥ 5 since October 2015 (row total = X*)	
13		
14	**TOTALS**	
15		
16	** X will reflect the new, weekly numbers*	
17	Metrics included in contract (as amended 11.18.15):	
18	1. Number and percentage of target children with elevated blood lead levels of ≥ **5 ug/dL** for whom contact has been attempted.	
19	2. Number and percentage of target children with elevated blood lead levels of ≥ **5 ug/dL** that are successfully contacted and offered case management services.	
20	3. Number and percentage of target children receiving case management services.	
21	4. Number and percentage of target children receiving case management services residing in the City of Flint.	
22	5. Number of Medicaid claims filed for children enrolled in Medicaid who receive testing or nursing assessment visits.	
23		
24		
25		
26	*v3 11.23.15*	

	C	D	E	F	G
1	**% for whom contact has been attempted** (Col. B / total for row)	**# successfully contacted and offered CM**	**% of total**	**# of children receiving CM**	**% of total**
2			**% of attempted**		**% of contacted**
3			(Col. D / total for row		(Col. F / total for row
4			AND		AND
5			Col. D / Col. B)		Col. F / Col. D)
6	7%	3	4%	1	1%
7			60%		33%
8	9%	5	7%	4	5%
9			71%		0.8
10	0%				
11					
12	0%				
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					

	H	I	J	K
1	**# of children receiving CM who live in Flint**	**% of CM in Flint**	**# of CM Medicaid claims filed**	**% for whom Medicaid claims filed** (Col. J / Col. F)
2		(Col. H / Col. F)		
3				
4				
5				
6	1	100%	1	100%
7				
8	3	75%	3	75%
9				
10				
11				
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26				

From: Peeler, Nancy (DHHS)
Sent: Tuesday, November 24, 2015 1:40 PM
To: Lishinski, Karen (DCH) (LishinskiK@michigan.gov);July, Jori
Cc: Robert L. Scott (ScottR9@michigan.gov)
Subject: FLINT BLOOD LEAD CM - weekly status tracking form v4 11.24.15.xlsx
Attachments: FLINT BLOOD LEAD CM - weekly status tracking form v4 11.24.15.xlsx

Revised Excel reporting form. Jori, please let us know if you have questions, identify other updates, etc.

Nancy

	A	B
1	**Target Population**	**# for whom contact has been attempted**
2		
3		
4		
5		
6	All children with elevated Capillary ≥ 5 from April 2014 – September 2015 (row total = 75)	5
7		
8	All children with newly elevated Venous ≥ 5 from April 2014 – September 2015 (row total = 76)	7
9		
10	All children with new elevated Capillary ≥ 5 since October 2015 (row total = X*)	
11		
12	All children with new elevated Venous ≥ 5 since October 2015 (row total = X*)	
13		
14	**TOTALS**	
15		
16	** X will reflect the new, weekly numbers*	
17	Metrics included in contract (as amended 11.18.15):	
18	1. Number and percentage of target children with elevated blood lead levels of ≥ **5 ug/dL** for whom contact has been attempted.	
19	2. Number and percentage of target children with elevated blood lead levels of ≥ **5 ug/dL** that are successfully contacted and offered case management services.	
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22	5. Number of Medicaid claims filed for children enrolled in Medicaid who receive testing or nursing assessment visits.	
23		
24		
25		
26	*v3 11.23.15*	

	C	D	E	F	G
1	**% for whom contact has been attempted** (Col. B / total for row)	**# successfully contacted and offered CM**	**% of total**	**# of children receiving CM**	**% of total**
2			**% of attempted**		**% of contacted**
3			(Col. D / total for row		(Col. F / total for row
4			AND		AND
5			Col. D / Col. B)		Col. F / Col. D)
6	7%	3	4%	1	1%
7			60%		33%
8	9%	5	7%	4	5%
9			71%		0.8
10	0%				
11					
12	0%				
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					

	H	I	J	K	L
1	**# of children receiving CM who live in Flint**	**% of CM in Flint**	**# of CM Medicaid claims filed**	**% for whom Medicaid claims filed** (Col. J / Col. F)	
2		(Col. H / Col. F)			**# other**
3					**disposition**
4					(closed, moved)
5					
6	1	100%	1	100%	2
7					
8	3	75%	3	75%	
9					
10					
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24					
25					
26					

	M	N
1		
2	**% with other**	
3	**disposition**	**Disposition notes**
4	(Col. L / total for row)	
5		
6	3%	
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26		

From: Diebolt, Pamela J. (DHHS)
Sent: Tuesday, November 24, 2015 4:42 PM
To: Peeler, Nancy (DHHS)
Subject: RE: Physician resources regarding Flint water

Hi Nancy-Would you also be interested in us sending some messaging to providers who are enrolled in FFS Medicaid about this? We have e-mail addresses for around 90% of our enrolled providers, so we could easily send out an e-mail blast on this, or if you'd rather, send you the file for your own messaging. We don't usually share provider contact information outside MSA, but this is probably a good reason to do so. Let me know what you think. Thanks Nancy. Pam

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From: Peeler, Nancy (DHHS)
Sent: Friday, November 20, 2015 2:25 PM
To: Fink, Brenda (DHHS); Dunbar, Paulette Dobynes (DHHS); Travis, Rashmi (DHHS); Stiffler, Kathleen A. (DHHS); Hamilton, Kimberly (DHHS); Kwasnik, Monica (DHHS); Prokop, Jackie (DHHS); LaPres, Marie (DHHS); Dilernia, Lisa (DHHS); Diebolt, Pamela J. (DHHS); Said, Manal (DHHS); Barnett, Lonnie D. (DHHS); McCandless, Karla K. (DHHS); Barron, Brad (DHHS); Hambleton, Matthew (DHHS); Linn, Cindy (DHHS); Slawinski, Heather (DHHS); Stanbury, Martha (DHHS)
Cc: Hennesey, Diane (DHHS); Lounds, Elizabeth (DHHS); Reinhart, Denise (DHHS); Larner, Trena (DHHS); Colston, Leslie (DHHS); Mayes, Nanette (DHHS)
Subject: Physician resources regarding Flint water

Good afternoon, everyone – as part of the MDHHS Action plan regarding Flint water, we wanted to share with you the attached Provider letter, with several resource documents that accompanied the letter. The letter was distributed by email to local Physicians on October 30th, by the Genesee County Health Department.

For our colleagues in Medicaid, could we please ask your assistance in sharing the Provider letter and resources with your contacts at the Medicaid Health Plans that currently or will be working in Flint and Genesee County, and the surrounding areas? In turn, it would be helpful if the plans could share these with their enrolled providers. We want to assure that the materials reach any providers who may be seeing Flint families and their children. These materials are also available at the following website: www.michigan.gov/flintwater

Many thanks for any assistance you can give with distributing these materials. Please share any questions you have, or you receive, with Rashmi and I.

Nancy

<< File: deq-FlintWater-Provider-Ltr-FINAL_504861_7.pdf >> << File: ProviderQuickReference_Sept2015_501831_7.pdf >> << File: deq-flintwater-breastfeedingandlead_503281_7.pdf >> << File: deq-FlintWater-FightLead-HealthyDiet_504857_7.pdf >>

<< File: Parent_Handout_Sept2015_501830_7.pdf >> << File: 2015-10-21_-_Lead_-_Flint_Water_FINAL_504265_7.pdf >>

From: Travis, Rashmi (DHHS)
Sent: Tuesday, November 24, 2015 5:01 PM
To: Peeler, Nancy (DHHS);Diebolt, Pamela J. (DHHS)
Subject: RE: Physician resources regarding Flint water

The info that just went out to Genesee County Health Dept to share with their WIC providers relates to Ready to Feed Formula.
Attached is what we sent them.

Talking Points_Lead_11-...

RTF NE.pdf

WIC Provider Letter_11-24-15....

From: Peeler, Nancy (DHHS)
Sent: Tuesday, November 24, 2015 4:46 PM
To: Diebolt, Pamela J. (DHHS) <DieboltP@michigan.gov>
Cc: Travis, Rashmi (DHHS) <TravisR@michigan.gov>
Subject: RE: Physician resources regarding Flint water

Hi Pam – thank you, that would be great, we really appreciate any help in getting information out to the Flint area physicians. It's fine if you send the message, it doesn't need to come from us necessarily, but we're happy to help co-author if that would help you. Either way! Also, there is a new letter from WIC going out to Providers, we may want to see if we can get that into your hands as well – I've copied Rashmi Travis on this email as she has access to the newer WIC information.

Nancy

From: Diebolt, Pamela J. (DHHS)
Sent: Tuesday, November 24, 2015 4:42 PM
To: Peeler, Nancy (DHHS) <PeelerN@michigan.gov>
Subject: RE: Physician resources regarding Flint water

Hi Nancy-Would you also be interested in us sending some messaging to providers who are enrolled in FFS Medicaid about this? We have e-mail addresses for around 90% of our enrolled providers, so we could easily send out an e-mail blast on this, or if you'd rather, send you the file for your own messaging. We don't usually share provider contact information outside MSA, but this is probably a good reason to do so. Let me know what you think. Thanks Nancy. Pam

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From: Peeler, Nancy (DHHS)
Sent: Friday, November 20, 2015 2:25 PM
To: Fink, Brenda (DHHS); Dunbar, Paulette Dobynes (DHHS); Travis, Rashmi (DHHS); Stiffler, Kathleen A. (DHHS); Hamilton, Kimberly (DHHS); Kwasnik, Monica (DHHS); Prokop, Jackie (DHHS); LaPres, Marie (DHHS); Dilernia, Lisa (DHHS); Diebolt, Pamela J. (DHHS); Said, Manal (DHHS); Barnett, Lonnie D. (DHHS); McCandless, Karla K. (DHHS); Barron, Brad (DHHS); Hambleton, Matthew (DHHS); Linn, Cindy (DHHS); Slawinski, Heather (DHHS); Stanbury, Martha (DHHS)

Cc: Hennesey, Diane (DHHS); Lounds, Elizabeth (DHHS); Reinhart, Denise (DHHS); Larner, Trena (DHHS); Colston, Leslie (DHHS); Mayes, Nanette (DHHS)
Subject: Physician resources regarding Flint water

Good afternoon, everyone – as part of the MDHHS Action plan regarding Flint water, we wanted to share with you the attached Provider letter, with several resource documents that accompanied the letter. The letter was distributed by email to local Physicians on October 30th, by the Genesee County Health Department.

For our colleagues in Medicaid, could we please ask your assistance in sharing the Provider letter and resources with your contacts at the Medicaid Health Plans that currently or will be working in Flint and Genesee County, and the surrounding areas? In turn, it would be helpful if the plans could share these with their enrolled providers. We want to assure that the materials reach any providers who may be seeing Flint families and their children. These materials are also available at the following website: www.michigan.gov/flintwater

Many thanks for any assistance you can give with distributing these materials. Please share any questions you have, or you receive, with Rashmi and I.

Nancy

<< File: deq-FlintWater-Provider-Ltr-FINAL_504861_7.pdf >> << File: ProviderQuickReference_Sept2015_501831_7.pdf >> << File: deq-flintwater-breastfeedingandlead_503281_7.pdf >> << File: deq-FlintWater-FightLead-HealthyDiet_504857_7.pdf >>

<< File: Parent_Handout_Sept2015_501830_7.pdf >> << File: 2015-10-21_-_Lead_-_Flint_Water_FINAL_504265_7.pdf >>

Talking Points for WIC Staff regarding Lead in Flint Water

The following examples address some common client concerns related to lead in the drinking water supply. These examples are meant to provide some consistent language to support a client-centered approach, and foster further client-staff dialogue.

This discussion can be tailored around the '*Explore, Offer, Explore*' process.

> ***Explore*** *...Explore what the client knows, or would like to know*
> ***Offer*** *...Offer information in a neutral, nonjudgmental manner*
> ***Explore*** *...Explore about the client's thoughts, feelings, and reactions*

Focus: Infants and Ready to Feed Formulas

Concern: What formula would be best for my infant if I'm unsure of the safety of my water?
[*Staff Note:* Determine if client has access to safe water, and take lifestyle factors into consideration.]

Answer: *It sounds like you're worried about providing your child with safe water. May I offer some suggestions around formulas that might help you decide what is best for your family?*

- Tell me about your water and how you use formula now.
- Tell me more about your lifestyle.
  - Are you constantly on the move with limited access to refrigeration throughout the day?
  - Do you stay home most of the time and have a reliable refrigerator available?
  - Do you have a car to get to the store, or do you walk when carrying your groceries?
  - Do you buy your formula all at once, or do you make several trips to the store for formula throughout the month?

Using RTF Formulas:

- RTF Formulas require no mixing or dilution.
- Unopened cans/bottles can be stored at room temperature.
- Once the bottle/can is opened, unused portions must be refrigerated immediately, and used within 48 hours.
- These bottles can be heavy because the water is already mixed in.
- Depending on demand, many smaller stores may have difficulty keeping RTF formula on the shelves. You may want to call your store to check their supply before you go.

Using Powdered Formulas:

- Powdered formulas require simple, standard mixing and measuring.
- Mixing directions for powdered formulas are designed to be easy to remember and do: Add 1 (unpacked/level) scoop of formula to every 2 fl oz of water.
- You MUST have safe water to do the mixing.

- After mixing the formula, you can either feed your child immediately, or store in the refrigerator for up to 24 hours.
- With powdered formula though, you MUST use safe water to do the mixing.

Additional Client Considerations:

- Another thing to keep in mind is that WIC is a supplemental food program, and will likely not provide all the formula your baby will need for the month.
- You may need to purchase some formula to complete the month.
- Powdered formula is the least expensive option, while RTF formulas are most expensive.

What can you tell me about your family's lifestyle that might help make this decision?

Concern: Is Ready to Feed formula more nutritious than powdered formula?

Answer: *It's great you are concerned about your child's nutrition. I'm happy to share some information regarding the health benefits of both.*

All Formula Provides the Same Nutrients:

- All formula types (both RTF and powder) contain the same amount of nutrients.
- Your baby will receive the same nutrition regardless of which formula type you receive.
- RTF already has the water mixed in with the formula; with powder, you need to add the water.

After hearing this, please tell me more about any other of your nutrition concerns.

Concern: Will I still get the same amount if I choose one formula over another?

Answer: *It's wonderful you want to get the most benefit from WIC. May I share some information about the different formulas?*

- USDA provides guidelines on the amount of formula an infant receives from the WIC program.
- RTF is most commonly available in 32 ounce bottles or cans. This is approximately the same size as a quart of milk. Because the water is already mixed in, the number of cans or bottles of RTF would be higher than the number of cans of powder (i.e., IFF on Enfamil Infant will initially receive 9 cans of powder v. 26 cans of RTF per month).
- No matter what type of formula you choose, your infant will receive a comparable amount of nutrition regardless of the option you choose.

What are your other concerns about the amount of formula you will receive?

Concern: Where can I get RTF formulas?

- Check with your WIC clinic staff – or the store directly – to ask about availability in your local stores.
- Please know that there may be fluctuations in store availability due to constant changes in supply and demand.

Focus: General Lead Concerns

Concern: My family may have been exposed to lead. What should I do?

Answer: *Many families have similar concerns. Please tell me more about the potential lead exposure.*

WIC clients who may have been exposed to lead.

- Symptoms of lead poisoning can be hard to recognize.
- Families (especially infants and children, and pregnant women, women planning to become pregnant, and breastfeeding mothers) who live in the City of Flint, live in a home using City of Flint water, or who attend school, childcare or often spend time with a caregiver in the City of Flint, should be tested *as soon as possible.*
- The best place to get a blood lead level test is your doctor's office. Tests are covered by most health plans.
- Your doctor will follow up with you on lab tests and provide you with information on what to do next.
- Your family can also get a free lead test here at the Health Department. Call 211 for any transportation help needed.

I have a handout specific to the water situation in Flint that other families have found helpful; would you like to take one?

Publication: http://www.michigan.gov/documents/lead/2015-10-21_-_Lead_-_Flint_Water_FINAL_1_504859_7.pdf

Concern: My family doesn't live in the affected Flint zip codes, yet I'm still worried. What can we do to prevent lead poisoning?

Many families have come in with the same concern. It's great you are being proactive in regards to your family's health. There are things you can do to decrease the risk of lead poisoning.

- Good nutrition can help.
- Keep your child's belly full by having him/her eat healthy foods containing iron and calcium. This may help to keep lead out of your child's blood.
- Eat iron-rich foods with vitamin C-rich foods for better absorption.
- Iron-rich foods: lean red meats, beans, peanut butter, whole grains, enriched breads and cereals
- Vitamin C-rich foods: Oranges, strawberries, broccoli, bell pepper, juice
- Calcium-rich foods: milk, yogurt, cheese, green leafy vegetables like spinach

- Eating three meals, and 2-3 snacks each day is also important, as an empty stomach absorbs more lead than a full stomach.
- Use filtered water for washing fruits and vegetables, cooking and drinking.
- If you are concerned about your family's diet, talk with your doctor who may also recommend a daily multivitamin.
- Eating healthy foods, in addition to using some safety practices in your home, can help to decrease your family's exposure to lead.

I have a handout that lists these safety measures. Other families have found it helpful; would you like one as well?

MDHHS Parent Handout 'Is my child safe from Lead?':
http://www.michigan.gov/documents/lead/Parent_Handout_Sept2015_501802_7.pdf

Moving Forward

Any contact with participants is an opportunity to educate them on lead exposure and/or prevention, including informing them of all infant formula options available to them, as well as providing referrals for all family members who may also be affected. This can all be done while reinforcing the additional services provided by WIC.

It might be important to assess the family's water filter use and understanding. It might help to inform them that the water filter will not last forever and replacements are available for free.

General Lead Prevention Resources:

- California WIC: http://www.cdph.ca.gov/programs/wicworks/Documents/NE/WIC-NE-EdMaterials-LeadIsAPoison.pdf
- Texas WIC: http://www.onlineordersff.com/ffcontent/placeorder/placeorder.asp?mainpage=itemselection&treepage=dummyprojtree&ProjID=27&ActionSearch=globalview&Expandedmenus=
- MDHHS Childhood Lead Prevention Program: http://www.michigan.gov/lead
- MDHHS Fight Lead with a Healthy Diet: http://www.michigan.gov/documents/lead/FightLead_HealthyDiet_1_504871_7.pdf
- MDHHS Parent Handout 'Is my child safe from Lead?': http://www.michigan.gov/documents/lead/Parent_Handout_Sept2015_501802_7.pdf
- Pregnant and Breastfeeding Women: http://www.michigan.gov/documents/lead/breastfeedingandlead3_2_501839_7.pdf

Flint-specific Resources:

- MDHHS FAQ about Lead in Flint Water: http://www.michigan.gov/documents/lead/2015-10-21_-_Lead_-_Flint_Water_FINAL_1_504859_7.pdf

Ready-to-Feed Formula

is 'ready-to-feed' your baby!

Do Not Add Water!

Adding water to ready-to-feed formulas may cause problems for your baby's health.

Once a bottle/can is opened, unused portions must be refrigerated immediately, and used within 48 hours.

Enfamil Infant

Enfamil Gentlease

Enfamil AR

Enfamil ProSobee

This institution is an equal opportunity provider.

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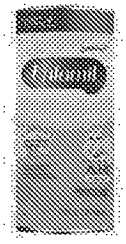
Enfamil Gentlease



Enfamil AR

Enfamil ProSobee

This institution is an equal opportunity provider.

November [redacted], 2015

Dear Provider,

As noted in the provider letter dated October 30, 2015, elevated levels of lead have been found in lead pipes within the City of Flint's water system.

To help further protect the children of Flint from the current lead in water exposure, the Genesee County Health Department and the Michigan Department of Health and Human Services are providing answers to the following questions about infant formula:

- What can be done for formula fed infants who do not have safe water?
- Does WIC provide Ready-To-Feed (RTF) infant formula?
- How can WIC clients obtain RTF formula?
- What else do I need to know about WIC or RTF formula?

What can be done for formula fed infants who do not have safe water?

Flint residents whose water safety is questionable may safely reconstitute infant formula with properly filtered or bottled water, or use Ready to Feed (RTF) formula. A few facts about RTF formula are noted below.

- RTF Formulas require no mixing or dilution.
- Unopened cans/bottles can be stored at room temperature.
- Once the bottle/can is opened, unused portions must be refrigerated immediately, and used within manufacturer-specified time frame (usually 24-48 hours).
- These bottles can be heavy because the water is already mixed in.

Does WIC provide Ready-To-Feed (RTF) infant formula?

Yes, RTF infant formula can be provided by the WIC Program to clients who do not have a safe or sufficient water source to reconstitute powder or concentrate infant formula. The WIC nutritionist is prepared to work with clients on an individual basis to assist in assessing the most appropriate formula type. This assessment will take into consideration important lifestyle factors to ensure the infant has access to not only safe formula, but adequate nutrition. For example, a mother accustomed to feeding her infant 'on-the-go' (without access to refrigeration) may prefer the convenience of powder formula reconstituted with bottled water. Attached are sample talking points used by WIC nutritionists in helping determine the best formula choice. These topic areas may be helpful for providers to explore with clients as well, if similarly assessing for best formula choice.

For WIC clients (including children) receiving non-standard formulas, RTF availability may vary by product/manufacturer. The WIC clinic can assist clients and providers with assessing options in these cases too.

How can WIC clients obtain RTF formula?

WIC clients can obtain RTF formula by contacting the Genesee County WIC Program. In addition to working with WIC clients to determine the most appropriate formula type, WIC staff are able to void and issue new food benefits. Once benefits are issued, clients use their WIC EBT card to redeem formula at authorized WIC retailers. Because there may be fluctuations in store availability of RTF formula due to constant changes in supply and demand, it is suggested that clients work with the WIC clinic staff to ensure access to this less commonly used/stocked product.

What else do I need to know about WIC or RTF formula?

It is important for clients transitioning to RTF formula to understand appropriate usage. The WIC nutritionist is prepared to educate clients that they should NOT add any water to RTF formulas, and that RTF formula, unlike powdered formula, must be refrigerated once the bottle/can has been opened. The attached nutrition education flyer was developed for use with WIC clients to help reinforce these messages. It may also be used by your office or staff as needed (note: it is WIC product-specific, and may not be appropriate for use with non-WIC clients).

Additional information to keep in mind:

- All formula types (RTF, powder, concentrate), once prepared according to manufacturer directions, contain the same amount of nutrition.
- Formula packaging differs by product type. Shopping location, frequency and transportation are important considerations. WIC nutritionists can assist in educating clients regarding what to expect, and reassuring mothers that regardless of the option selected and difference in number of cans, their infant will receive a comparable amount of nutrition from their WIC benefits.
- Recall that WIC is a supplemental food program, and may not provide all the formula needed by the infant in a given month. WIC clients may need to purchase additional formula with their own funds. RTF formula is the most costly formula type, and is significantly more expensive than purchasing powder formula with bottled water for reconstitution.

Additional information regarding lead may be obtained from:

- Genesee County Health Department Lead Program
  (810) 257-3833
  www.gchd.us

- Michigan Department of Health and Human Services Childhood Lead Poisoning Prevention Program
  (888) 322-4453
  www.michigan.gov/lead

- Michigan Department of Health and Human Services Lead Poisoning Prevention Video for Primary Care Providers
  http://www.youtube.com/watch?v=AnkjCW_vGaU&feature=youtu.be

- United States Environmental Protection Agency
  www.epa.gov/lead

- U.S. Centers for Disease Control and Prevention (CDC)
  Web site www.cdc.gov/nceh/lead

Additional information regarding WIC and/or RTF formula may be obtained from:

- Genesee County Health Department WIC Program
  (810) 237-4537
  www.gchd.us

- Michigan Department of Health and Human Services WIC Program
  (517) 335-8951
  www.michigan.gov/wic

Sincerely,

From: Diebolt, Pamela J. (DHHS)
Sent: Tuesday, November 24, 2015 5:12 PM
To: Travis, Rashmi (DHHS);Peeler, Nancy (DHHS)
Subject: RE: Physician resources regarding Flint water

OK. Great. Thanks Rashmi.

From: Travis, Rashmi (DHHS)
Sent: Tuesday, November 24, 2015 5:11 PM
To: Diebolt, Pamela J. (DHHS); Peeler, Nancy (DHHS)
Subject: RE: Physician resources regarding Flint water

No. We are just trying to get it in the hands of Flint providers. It is not being widely advertised about Ready to Feed. Other WIC agencies are proceeding as usual, without anyone asking about Ready to Feed, so we don't want to put it out on the website and confuse others.

From: Diebolt, Pamela J. (DHHS)
Sent: Tuesday, November 24, 2015 5:03 PM
To: Travis, Rashmi (DHHS) <TravisR@michigan.gov>; Peeler, Nancy (DHHS) <PeelerN@michigan.gov>
Subject: RE: Physician resources regarding Flint water

Thank you ladies. Will this information also be posted to the flintwater webpage?

From: Travis, Rashmi (DHHS)
Sent: Tuesday, November 24, 2015 5:01 PM
To: Peeler, Nancy (DHHS); Diebolt, Pamela J. (DHHS)
Subject: RE: Physician resources regarding Flint water

The info that just went out to Genesee County Health Dept to share with their WIC providers relates to Ready to Feed Formula.
Attached is what we sent them.
<< File: Talking Points_Lead_11-10-15.pdf >> << File: RTF NE.pdf >> << File: WIC Provider Letter_11-24-15.docx >>

From: Peeler, Nancy (DHHS)
Sent: Tuesday, November 24, 2015 4:46 PM
To: Diebolt, Pamela J. (DHHS) <DieboltP@michigan.gov>
Cc: Travis, Rashmi (DHHS) <TravisR@michigan.gov>
Subject: RE: Physician resources regarding Flint water

Hi Pam – thank you, that would be great, we really appreciate any help in getting information out to the Flint area physicians. It's fine if you send the message, it doesn't need to come from us necessarily, but we're happy to help co-author if that would help you. Either way! Also, there is a new letter from WIC going out to Providers, we may want to see if we can get that into your hands as well – I've copied Rashmi Travis on this email as she has access to the newer WIC information.

Nancy

From: Diebolt, Pamela J. (DHHS)
Sent: Tuesday, November 24, 2015 4:42 PM
To: Peeler, Nancy (DHHS) <PeelerN@michigan.gov>
Subject: RE: Physician resources regarding Flint water

Hi Nancy-Would you also be interested in us sending some messaging to providers who are enrolled in FFS Medicaid about this? We have e-mail addresses for around 90% of our enrolled providers, so we could easily send out an e-mail blast on this, or if you'd rather, send you the file for your own messaging. We don't usually share provider contact information outside MSA, but this is probably a good reason to do so. Let me know what you think. Thanks Nancy. Pam

---

From: Peeler, Nancy (DHHS)
Sent: Friday, November 20, 2015 2:25 PM
To: Fink, Brenda (DHHS); Dunbar, Paulette Dobynes (DHHS); Travis, Rashmi (DHHS); Stiffler, Kathleen A. (DHHS); Hamilton, Kimberly (DHHS); Kwasnik, Monica (DHHS); Prokop, Jackie (DHHS); LaPres, Marie (DHHS); Dilernia, Lisa (DHHS); Diebolt, Pamela J. (DHHS); Said, Manal (DHHS); Barnett, Lonnie D. (DHHS); McCandless, Karla K. (DHHS); Barron, Brad (DHHS); Hambleton, Matthew (DHHS); Linn, Cindy (DHHS); Slawinski, Heather (DHHS); Stanbury, Martha (DHHS)
Cc: Hennesey, Diane (DHHS); Lounds, Elizabeth (DHHS); Reinhart, Denise (DHHS); Larner, Trena (DHHS); Colston, Leslie (DHHS); Mayes, Nanette (DHHS)
Subject: Physician resources regarding Flint water

Good afternoon, everyone – as part of the MDHHS Action plan regarding Flint water, we wanted to share with you the attached Provider letter, with several resource documents that accompanied the letter. The letter was distributed by email to local Physicians on October 30th, by the Genesee County Health Department.

For our colleagues in Medicaid, could we please ask your assistance in sharing the Provider letter and resources with your contacts at the Medicaid Health Plans that currently or will be working in Flint and Genesee County, and the surrounding areas? In turn, it would be helpful if the plans could share these with their enrolled providers. We want to assure that the materials reach any providers who may be seeing Flint families and their children. These materials are also available at the following website: www.michigan.gov/flintwater

Many thanks for any assistance you can give with distributing these materials. Please share any questions you have, or you receive, with Rashmi and I.

Nancy

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<< File: Parent_Handout_Sept2015_501830_7.pdf >> << File: 2015-10-21_-_Lead_-_Flint_Water_FINAL_504265_7.pdf >>

From: Travis, Rashmi (DHHS)
Sent: Wednesday, November 25, 2015 7:23 AM
To: Peeler, Nancy (DHHS)
Subject: Re: update on child in Flint

Thanks for the update.

Sent from my iPhone

On Nov 24, 2015, at 4:43 PM, Peeler, Nancy (DHHS) <PeelerN@michigan.gov> wrote:

> Yes, older child has been tested, was slightly elevated on the last test. Looks like the PCP is tracking that.
>
> **From:** Moran, Susan (DHHS)
> **Sent:** Tuesday, November 24, 2015 4:41 PM
> **To:** Peeler, Nancy (DHHS) <PeelerN@michigan.gov>
> **Cc:** Wells, Eden (DHHS) <WellsE3@michigan.gov>; Miller, Corinne (DHHS) <MillerC39@michigan.gov>; Dykema, Linda D. (DHHS) <DykemaL@michigan.gov>; Travis, Rashmi (DHHS) <TravisR@michigan.gov>; Miller, Mark (DHHS) <millerm1@michigan.gov>; Fink, Brenda (DHHS) <FinkB@michigan.gov>; Stanbury, Martha (DHHS) <stanburym@michigan.gov>
> **Subject:** Re: update on child in Flint
>
> Nancy- great update, thanks for this info. Assume the other child in home has been tested- lead level OK?
>
> Sent from my iPhone
>
> On Nov 24, 2015, at 4:37 PM, Peeler, Nancy (DHHS) <PeelerN@michigan.gov> wrote:
>
> > Per your request, a quick update on the child in Flint with the EBL.
> >
> > GCHD Nurse visited the family this afternoon; it is an older home with wood windows and doors. The nurse reported clear evidence that this child is chewing on surfaces such as windows and furniture, lots of mouthing behaviors. They have lived there for 6 years. The nurse worked with the Mom to identify potential sources of lead exposure, gave her a cleaning kit, and took steps to put in place protections/barriers to accessing the various surfaces. ETC will be conducting their EBL investigation (and water sampling) on 11/4/15, and can take out more supplies as needed. The home has had a water filter in place for the past month.
> >
> > The child is already connected with WIC, Infant Mental Health, and Early On. He is reportedly being evaluated for autism, a diagnosis shared with his brother(s).
> >
> > Medically, he is anemic, and Mom reports he has a poor diet. He will be seen for follow-up at the Children's Hospital (Detroit) lead clinic on 11/30/15 (Dr. Bhambhani). His PCP is Dr. Mustafa Akpinar.
> > Dr. Akpinar had ordered the blood test, and had sent the family to Children's on 11/18/15 based on the level of 51.7 V. Children's admitted the child late Wednesday

night, retested and had a level of 36 V, abdominal x-rays were negative, so they did not chelate and sent him home on Friday.

We'll share more as we learn more, likely later next week.

Nancy

From: Peeler, Nancy (DHHS)
Sent: Thursday, December 03, 2015 11:52 AM
To: Fink, Brenda (DHHS);Lishinski, Karen (DCH) (LishinskiK@michigan.gov)
Subject: FW: Flint Briefing 2Dec15
Attachments: Flint Lead MDHHS Sitrep 12 2_15.docx

Forwarding, FYI.

From: Bouters, Janese (DHHS)
Sent: Thursday, December 03, 2015 11:43 AM
To: Anderson, Paula (DHHS) <AndersonP3@michigan.gov>; Barr, Jacqui (DHHS) <BarrJ3@michigan.gov>; Becker, Timothy (DHHS) <beckert1@michigan.gov>; Bruneau, Michelle (DHHS) <BruneauM@michigan.gov>; Colston, Leslie (DHHS) <ColstonL@michigan.gov>; DeMyers, Deborah (DHHS) <DeMyersD@michigan.gov>; Dykema, Linda D. (DHHS) <DykemaL@michigan.gov>; Eisner, Jennifer (DHHS) <EisnerJ@michigan.gov>; Granger, Patricia (DHHS) <GrangerP@michigan.gov>; Grijalva, Nancy (DHHS) <GrijalvaN@michigan.gov>; Groetsch, Kory J. (DHHS) <GroetschK@michigan.gov>; Harvey, Janice (DHHS) <HarveyJ1@michigan.gov>; Hertel, Elizabeth (DHHS) <HertelE@michigan.gov>; Kaiser Van Dam, Paula (DHHS) <KaiserP@michigan.gov>; Lasher, Geralyn (DHHS) <lasherg@michigan.gov>; Lyon, Nick (DHHS) <LyonN2@michigan.gov>; McKane, Patricia (DHHS) <McKaneP@michigan.gov>; Miller, Corinne (DHHS) <MillerC39@michigan.gov>; Minicuci, Angela (DHHS) <MinicuciA@michigan.gov>; Moran, Susan (DHHS) <MoranS@michigan.gov>; Peeler, Nancy (DHHS) <PeelerN@michigan.gov>; Priem, Wesley F. (DHHS) <priemw@michigan.gov>; Ridley, Nancy (DHHS) <RidleyN@michigan.gov>; Robinson, Mikelle (DHHS) <RobinsonM18@michigan.gov>; Rockefeller, Cheryl (DHHS) <RockefellerC@michigan.gov>; Scott, Jackie (DHHS) <ScottJ34@michigan.gov>; Shah, Sandip (DHHS) <shahs@michigan.gov>; Sims, Teri (DHHS) <SimsT2@michigan.gov>; Stanbury, Martha (DHHS) <stanburym@michigan.gov>; Thompson, Sheryl D. (DHHS) <ThompsonS2@michigan.gov>; Travis, Rashmi (DHHS) <TravisR@michigan.gov>; Wells, Eden (DHHS) <WellsE3@michigan.gov>
Subject: Flint Briefing 2Dec15

Sending on behalf of the PHCSA:

Attached is the MDHHS daily situation report for the Flint water lead project.

Thanks,

Janese Bouters
Executive Secretary to Corinne Miller
Bureau of Disease Control, Prevention and Epidemiology
Michigan Department of Health & Human Services
201 Townsend Street
Lansing, Michigan 48913
Phone: (517) 335-8731
Fax: (517) 335-8263

Flint Water Lead Project

Michigan Department of Health and Human Services
Situation Report for December 2, 2015

****NOTE: Contains potentially Identifiable Information- REDACT AS INDICATED****
New items for the day listed first and in bold print.

Daily Briefing and Situation Report prepared by Linda Dykema

Surveillance Indicators: People Tested since 10/1/2015: 1,361;
Children less than 6 years old ≥ 5 µg/dl since 10/1/2015: 15
Children 6 to 17 years old ≥ 5 µg/dl since 10/1/2015: 6
Adults 18 years and older ≥ 5 µg/dl since 10/1/2015: 9
Severity Indicators: Hospitalized/Discharged-1/1; Deaths- 0

DAILY ACTIVITY SUMMARY

Elevated Blood Level (EBL) Environmental Investigations – ETC Contractors, Wes Priem, Courtney Wisinski

- **3 EBL investigations completed.**
- 8 investigations scheduled.
- The high EBLL home is scheduled for Friday 12/4/15.

MDHHS/Genesee County Health Department (GCHD) Case Management (CM) Services – Nancy Peeler

- **CLPPP Nurse has maintained contact with GCHD nurses regarding hospitalized child with EBLL of 52 µg/dl. GCHD Nurse reports that the child's lead level has decreased to 20 µg/dl.**
- **Received calls from Rep. Neely's office regarding an upcoming Health Fair, asking about CLPPP participation or provision of materials (may be on December 15th at a Methodist church?). Suggested that GCHD staff as their best contact: shared with GCHD as they may receive a call.**
- CM report through 11/25/15:
  - # of contacts attempted: 136
  - # offered CM: 46
  - # CM started: 5
  - # of children receiving CM who live in Flint: 5
  - # billed to Medicaid: 5
  - # Other disposition: 2 (2 children moved to Oakland County)

Epidemiology/Surveillance – Patti McKane, Martha Stanbury, Bob Scott, Jessica Cooper, Karen Lishinski

- **Established protocol for notifying HHS staff and GCHD about Flint EBL children. Master list will be compiled on Monday and HHS staff and GCHD who will track their CM activities re these children and report back to HHS on Friday.**

Filter Distribution Sheryl Thompson

- **November Distribution**
  - **778 Filters**
  - **63 Pitchers**
  - **924 Replacement Filters**
- **Total Distribution since October 1, 2015**
  - **10,951 Filters**
  - **184 Pitchers**
  - **924 Replacement Filters**

Communications/Information Sharing – Linda Dykema, Eden Wells

- **Linda Dykema received call from Dr. Mark Johnson, ATSDR R5 Senior Regional Representative and CDC main point of contact. Provided an update on HHS activities.**
- **Wes Priem attended a Michigan Community Development Directors' conference on housing where he talked with Susan Wilcox, Manager for Flint Community and Economic Development Program. She will schedule a meeting with HHS staff to discuss application of the Landlord Penalty Law in city of Flint.**
- Weekly (Tues. 8:00 am) coordination call with DEQ/LARA/HHS. Discussed need for informational materials for schools/residents regarding lead free plumbing replacements.
- Technical Advisory Committee meeting originally scheduled for December 9th- , then postponed by City of Flint, may actually take place: awaiting word from City.

Health Education Resources Updates - Michelle Bruneau, Emily Houk

- **Met with Liane Shekter-Smith (MDEQ), Steve Busch (MDEQ), Kory Groetsch (MDHHS), and Jennifer Gray (MDHHS) to discuss Phosphate Fact Sheet; changes forthcoming**
- **Coordinating meeting with GCHD and MDHHS to discuss phosphate dosing and potential health implications**
- **Sent out draft of "Bath Time" fact sheet to MDHHS and GCHD for review reiterating that it's safe for adults and children to bathe in Flint tap water; requested quote via Eden from Dr. Mona Hanna-Attisha**
- **Continuing to write and coordinate additions to the EBL Case Manager Binder, now known as the MDHHS Lead Safe Family Guide Book.**
- **Pending: Aerator/Filter Maintenance Fact Sheet; Flint Parent Letter re-do in partnership with Emily Houk.**

Toxicology - Kory Groetsch, Jennifer Gray, Lisa Quiggle

- Working with GCHD and DEQ to address questions concerning impact of phosphate treatment on drinking water filters.
- Working with Healthy Homes Section staff to revise EBL report for Flint Residents.

WIC

- Letter sent 11/24 to GCHD about Ready-to-feed formula availability from WIC program
- Talking points for WIC staff and for providers shared

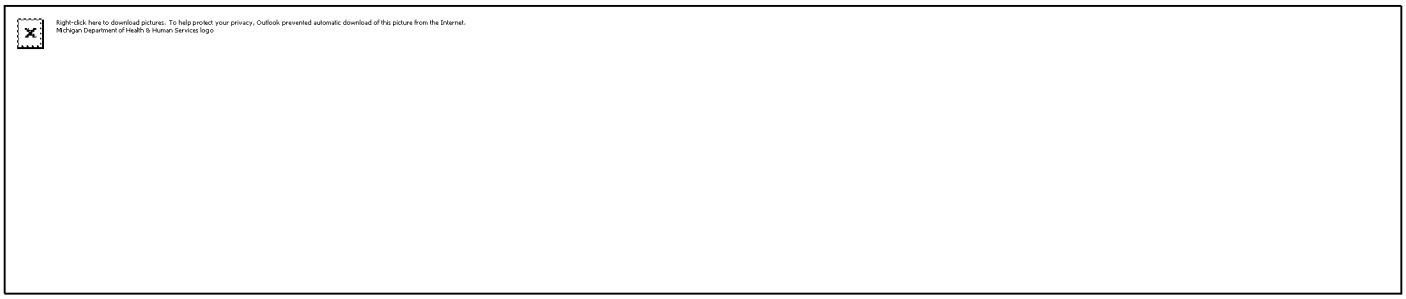
Healthcare/Providers

- **Moran, Wells and Miller met with Medicaid health plan staff 2 to discuss increased promotion by health plans of EBL testing of Flint children < 6 years of age. Status update on Flint provided. Medicaid put this issue on its agenda for discussion at its December 3 meeting with Medicaid health plan CEOs and suggested inviting Dr. Wells to speak to Medicaid health plan medical directors.**
- **Medicaid identified three individuals to partner with epidemiology staff to develop methodology to measure/report progress on the percentage of Flint children enrolled in Medicaid who receive EBL testing.**
- Forum for primary care providers in Flint POSTPONED pending coordination with local providers
- WIC information to be shared by GCHD to providers

DEQ Information - Linda Dykema as Liaison

- MDEQ would like to issue school drinking water testing results in coordination with MDHHS release of the blood lead test reporting.

From: Michigan Department of Health and Human Services <MDHHS@govsubscriptions.michigan.gov>
Sent: Thursday, December 03, 2015 2:32 PM
To: Peeler, Nancy (DHHS)
Subject: FOR IMMEDIATE RELEASE: MDHHS releases latest data outlining blood lead levels in Flint; Follow-up care, case management resources continue for families



Press Release

FOR IMMEDIATE RELEASE: December 3, 2015

CONTACT: Jennifer Eisner, (517) 241-2112

MDHHS releases latest data outlining blood lead levels in Flint

Follow-up care, case management resources continue for families

LANSING, Mich. – Preliminary data indicates that 30 of 1,361 adults and children tested in Flint since October 1 had elevated blood lead levels, according to a report issued today by the Michigan Department of Health and Human Services.

This marks the first summary report on lead testing called for in the state's action plan related to health concerns about Flint's water infrastructure.

"Our goal is to help families reduce their exposure to lead sources," said Dr. Eden Wells, MDHHS chief medical executive. "We have made progress in testing and identifying those with elevated blood lead levels, and the department will continue to work closely with the Genesee County Health Department to reach these families. We will remain diligent in our ongoing outreach and education efforts."

Information comes from tests administered citywide to 1,361 children and adults since October 1. Tests showed that 21 of 969 children age 17 or younger and 9 of 392 adults over the age 18 were identified with elevated blood lead levels.

The report covers test results reported to MDHHS since the state action plan was put in place Oct.

2. It includes the number of tests and number of elevated blood lead levels greater than 5 micrograms per deciliter, and captures both capillary and venous blood tests that have been reported to MDHHS since the beginning of October. People who have had multiple tests are counted only once. Five micrograms per deciliter is the level that the Centers for Disease Control and Prevention considers elevated and triggers health care professional follow up with families.

The full report is posted online at www.michigan.gov/flintwater and will be updated as more data becomes available.

When reviewing historical trend data, the risk of lead exposure is highest during the third quarter of each year – July through September. Seasonal variation is the result of a number of factors including increased exposure to lead in dust and soil in the summer months.

In the third quarter of 2010, 8.3 percent of Flint children 6 and under showed elevated blood lead levels. The figure gradually decreased to 4.1 percent in the third quarter of 2013. During the same months in 2014, the figure increased to 7.5 percent and decreased to 6.4 percent in the third quarter of 2015.

Last month, MDHHS collaborated with the county health department and local partners to distribute educational resources and informational letters to Flint parents regarding lead testing. The state is providing funding for GCHD nurses to work with families when an elevated blood lead level has been detected. During these follow-up visits, nurses coordinate with environmental health investigators to meet with families in their homes to identify lead exposures, address questions and provide water filters. People can be exposed to lead from paint, soil, plumbing and other sources.

MDHHS continues to provide free water filters and replacement cartridges to Flint residents at four locations, including the MDHHS Flint offices and the Genesee County Community Action Resource Department. For a full list of locations and hours of distribution, visit www.michigan.gov/flintwater.

To help residents properly install water filters, and to demonstrate how to replace the original when it expires, MDHHS has created an instructional video on its YouTube channel. For updates, visit www.michigan.gov/flintwater.

###

- Flint Blood Lead Level Summary Report December.pdf
- Flint EBL Data Press Release.pdf

Right-click here to download pictures. To help protect your privacy, Outlook prevented automatic download of this picture from the Internet.
DHHS Poster

Become a foster parent through Michigan Department of Health & Human Services foster care program.

Questions? Contact Us

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This email was sent to peslern@michigan.gov using GovDelivery, on behalf of: Michigan Dept of Health & Human Services · 235 S. Grand Ave W. · Lansing, MI 48909 · 1-855-275-6424

From: Emily Houk <emily@r2pconsultants.com>
Sent: Friday, December 04, 2015 8:45 AM
To: Peeler, Nancy (DHHS)
Subject: Fwd: Re: cm protocol
Attachments: CMprotocol12315_Flint.docx

---------- Forwarded message ----------
From: "Emily Houk" <emily@r2pconsultants.com>
Date: Dec 3, 2015 12:32 PM
Subject: Re: cm protocol
To: "Lishinski, Karen (DHHS)" <LishinskiK@michigan.gov>
Cc:

Here you go! Updated as needed.

Also--I added "in Flint, Michigan" to the title so as to differentiate it from the statewide CM.

Call me if you need anything!
Em

On Thu, Dec 3, 2015 at 12:17 PM, Lishinski, Karen (DHHS) <LishinskiK@michigan.gov> wrote:

I think this is it!!!!

Please just change the page numbers and the date in the header.

Also the fix tabbing starting at the "social history" don't know why it would let me do that one! If you can send it back by 100- that would be fabulous!

Karen Lishinski RN MA AE-C

Nurse Consultant

Michigan Department of Health and Human Services

Childhood Lead Poisoning Prevention Program

517 241 3599

109 Michigan Ave

4th Floor

Lansing, Mi 48913

Fax 517 335 8509

--
Emily Houk, President and Chief Mischief Maker
Research to Practice Consulting, LLC
216 North Chestnut
Lansing, Michigan 48933
517-896-2712
r2pconsultants.com

Michigan's Case Management Protocol for Children with Elevated Blood Lead Levels in Flint, Michigan

Section 1: Application of this Protocol

The State of Michigan's childhood lead poisoning elimination goal is to identify and provide appropriate follow-up services to all children with Elevated Blood Lead Levels (EBLLs) in order to support their continued health and safety.

To meet this goal, case management services should be performed for children with BLLs≥5ug/dL as determined by a venipuncture test.

Origin

This document represents a standard of care as prescribed by the United States Centers for Disease Control and Prevention (CDC), the American Academy of Pediatrics (AAP), Michigan state law and Medicaid. This document contains case management guidelines developed by the Nursing and Health Support component of the Michigan Department of Health and Human Services Childhood Lead Poisoning Prevention Program (CLPPP).

Section 2: Expectations

Desired outcomes of EBLL case management include:

- Reducing an elevated blood lead level below the current CDC reference value of ≥5 ug/dL;
- Evidence that communication has occurred between caregivers and other service providers to ensure the child's continued health and safety;
- Evidence and assurance that appropriate action has been taken by case managers as required by this protocol.

Section 3: Required Activities

Activities defined by Medicaid, the CDC and AAP as encompassing case management include:

- Client identification and outreach
- Individual assessment and diagnosis
- Service planning and resource identification
- Linking clients to needed services
- Service implementation and coordination
- Monitoring of service delivery
- Advocacy
- Evaluation

1. Client Identification and Outreach

Case managers must continually review the list of EBLLs ≥5ug/dL provided on a weekly basis by the MDHHS Surveillance Manger. Case managers must contact and offer case management services to these families based on the schedule below. Outreach efforts must be deliberate, ongoing and varied in order to ensure that contact with families is made.

All outreach activities must be documented in activity logs and the HHLPP system.

a. Schedule

The following schedule must be used when initiating initial in-home nursing visits:

- BLL 5-14 within 2 weeks of referral;
- BLL 15-44 within one week of referral;
- BLL 45+ within 48 hours of referral;

b. Fees for Services

Medicaid provides reimbursement for the following in-home visits related to a venipuncture EBLL ≥ 5ug/dL:

- Two Environmental Investigations (One initial and one alternative location as needed)
- Two Blood Lead Nursing Assessment Visits (two in-home visits)

2. In Home Visits

Nursing Assessments Overview

Nursing Assessment visits must be provided in the child's home. The objectives of the first home visit are:

- **Individual assessment and diagnosis** through a health, development, social and

dietary history for the affected child and identification of the possible sources of lead in the child's environment.

- **Development of a Plan of Care** that identifies resources specific to the individual child and family so that exposure is reduced, appropriate referrals and recommendations can be implemented, and the impact of lead exposure minimized.
- **To provide education and anticipatory guidance for caregivers** so that the effects of exposure are minimized
- T**o advocate for families** to ensure they receive the appropriate support for managing their child's exposure through community referrals and resources; and
- **To ensure that the Individualized Plan of Care is continually reevaluated** until the child's lead level is below the current CDC reference value of 5ug/dL.

The initial visit will focus on:

- Assessment of the growth and development of the child, including any symptomology that may be present in the child (refer to Initial Home Visit assessment form for a list of common symptoms)
- Behavioral assessment of the child including any aggressive and/or hyperactivity
- Nutritional assessment of the child
- Assessment of typical family practices that may produce lead risk (e.g., hobbies, occupation, cultural practices)
- Limited physical identification of lead hazards within the dwelling
- Identification and planning for testing of any other family member at risk for lead hazard exposure
- Education and information regarding lead hazards and ways to minimize those risks in the future
- Development of a family plan of care to increase the safety of the child from lead hazards
- Facilitating blood lead follow-up testing and treatment recommended by the PCP.

a. First visit activities

The purpose of the initial nursing assessment home visit is to gather sufficient information to develop an Individualized Plan of Care for the child with an EBLL and to ensure that all siblings and pregnant women in the household are identified for further screening. The child with EBLL must be present at the initial visit for a physical assessment and observation of his/her behavior. During the initial visit, the following must be accomplished:

- Obtaining Caregiver authorization to release protected health information to the case management team and to referral sources as needed using the MOCH HIPAA Authorization to Disclose Protected Health Information Form or any other

agency-developed disclosure form.

- Discuss possible sources of lead exposure:
  - Lead Paint (walls, doors, windows, furniture)
  - Child's toys or common household items
  - Cultural foods, cookware or other items
  - Parent occupation
  - Lead in water or pipes
  - Other
- Interview of the child's caregiver(s) to collect the child's health, social and nutritional history. (Refer to the Initial Nursing Visit form).
  - Obtaining a health history that addresses the current health status of the child, including:
    - Past history of lead testing and, if necessary, chelation for the child;
    - Past history of lead testing for other family members;
    - Child's history of anemia (if any); ask caregiver to relate information re: the child's hemoglobin status;
    - Caregiver's observations about the child's developmental progress;
    - Caregiver's assessment of the child's behavior;
    - Caregiver's assessment of the child's cognitive development;
    - A visual/physical assessment of the child's body systems including eyes, heart and lungs, abdomen/digestive, elimination, muscular and skeletal;
    - Performing a standardized developmental screening to provide a baseline for the future (ASQ).
    - If the child is already enrolled in Early On or Special Education, you may instead obtain parent consent and request the evaluation assessment results from Early On or Special Education.
  - A complete nutrition history for the child including the following:
    - Caregiver's description of the child's usual diet pattern. This should begin with a twenty-four hour recall of his/her intake and ask if this is typical of the child's intake.
    - Ask about child's intake of breast milk, formula and/or cow's milk;
    - Ask about child's intake of other dairy/calcium sources;
    - Ask caregiver about child's intake of iron-containing foods and dietary fat;
    - Inquire about ethnic food products imported or carried from another country;
    - Ask about dietary supplements;
    - Ask caregiver the number of meals and number of snacks the child consumes each day; and
    - Ask where the child sits to eat.
  - A social history for the child including:

- Caregiver's description of play and sleep habits;
  - A child's usual play area;
  - Environments other than the child's primary residence where the child spends 20 hours per week or more (address and caregiver name(s));
  - Family occupational and hobby history: include occupations and hobbies of adults in the home and other adults with whom the child spends time;
  - Cultural practices or foods in use by the immediate family as well as other adults with whom the child spends time;
  - Behavior: ask the caregiver about mouthing/hand-to-mouth behaviors (to be expected in young children), including fingers in mouth; chewing on toys, crayons, newspaper/other print material, matches; consumes non-food items, such as dirt, grass, cigarettes/ashes; chews on furniture? crib/playpen? window sills/frames/doors?; plays at or near chipping or flaking paint, or has been seen eating paint chips.

- Documentation of other information including:
  - Family income source
  - Whether the family receives: WIC, food stamps, Medicaid/Medicare, other support, such as a food pantry.
  - If the residence is a rental property: name, address, phone number and/or other contact information for the rental property owner.
  - Barriers to obtaining medical care: time, both amount of time needed and time of day, child care, transportation, literacy, language barrier, etc.

After the child's history is completed, ask the caregiver for permission to look around the child's common areas for visual evidence of exposure sources, exposure behaviors and family practices.

The Individualized Plan of Care and Referral forms should be completed after reviewing the information obtained in the course of the initial nursing visit.

Appropriate referrals will be made in a timely manner. Early On referrals should include ASQ results as well as documentation of diagnosis. A report to the child's healthcare provider should also be completed and submitted at this time. (Use the Report to Healthcare Provider form).

b. Second and subsequent home visit activities

The purpose of the second and/or subsequent nursing home visits is to assess caregiver implementation of the plan of care, including compliance with medical follow up, housekeeping practices, and reductions in exposure. Objectives of the second home

visit are to:

- **Reinforce the educational information** presented to the family during the first visit
- **Validate** the family's ability to carry out activities to minimize risks of continued lead exposure
- **Modify** the plan of care to minimize lead risks, as needed
- **Facilitate blood lead follow-up testing** and treatment recommended by the PCP
- **Follow up on any referrals made**

The second visit must include:

- A review of contact information and primary care provider information with child's caregiver(s);
- Review of initial forms and documenting changes in EBLL, child's health history, nutritional history, social history, and conditions in the home;
- Review of the Individualized Plan of Care to identify additional messages to communicate at this visit;
- Assessment of the family's understanding of their responsibilities under the Plan of Care and a determination as to whether additional education or resources are needed to implement the plan;
- Revising the Individualized Plan of Care as needed and obtaining consent or signatures; and
- Notifying the health care provider and other members of the team, including the Environmental Investigators, of significant changes.
- Complete any activities not finished during the first visit.
- Timing of the second subsequent visits may be influenced by observations/ information from the first visit, and at the case manager's discretion, may take place relatively quickly.

Results of the second and/or subsequent follow-up visits must be recorded on the Follow Up Visit form.

c. Nursing assessment case closure activities

Nursing services may not be discontinued until all of the following are completed

- At least 2 home visits in which lead education was provided are done
- Nutritional, medical and developmental assessments are done
- There is one blood lead level below 5 ug/dL
- Recommended abatements and/or lead hazard reduction is completed

Use of administrative case closure should be infrequent and reserved for the following extenuating circumstances:

- Parent refuses services

- Family has moved out of jurisdiction (a new referral MUST be made)
- At least 3 documented attempts to locate or gain access to the child and caregiver have failed (2 visits/ 1 certified mail) **and** attempts to reach the family using PCP or MIWIC, MICAR, CLPPP staff and other resources have been made

Section 4: Environmental Investigations

The Michigan Department of Health and Human Services Healthy Homes Section is available to assist case managers with environmental investigations.

The case manager must work collaboratively with the environmental investigator to maximize the opportunity for scheduling joint visits and to ensure that inspection and remediation take place in a timely fashion.

If the child's BLL is > 44mcg/dl, the case manager will contact the primary care provider and the hospital immediately to understand the plan of care. Coordination with the EBL investigators, and hospital must be done to ensure that the child will discharged to a safe environment (e.g. the designated property has been certified free of lead hazards before the child returns to that location.)

Contact the Health Homes Section at (866) 691-5323 or 517 335 8252 or refer to the case management guidelines for environmental visits at http://www.michigan.gov/documents/mdch/EBL_EI_Protocol_February_2015_484429_7.pdf.

From: Emily Houk <emily@r2pconsultants.com>
Sent: Friday, December 04, 2015 8:46 AM
To: Peeler, Nancy (DHHS)
Subject: Fwd: CM Forms
Attachments: CLPPP_Case_ClosureForm120315.pdf; CLPPP_Report_to_Health_Care_Provider_120315.pdf; CLPPP_Initial Home Visit Form_120315.pdf; CLPPP_Individualized Plan of Care_120315.pdf; CLPPP_Referral Form_102915.pdf; CLPPP_Followup_Visit_ form_103015.pdf; CLPPP_Activity_Log Form102915.pdf

---------- Forwarded message ----------
From: "Emily Houk" <emily@r2pconsultants.com>
Date: Dec 3, 2015 11:30 AM
Subject: CM Forms
To: "Lishinski, Karen (DCH)" <LishinskiK@michigan.gov>, "Nancy Peeler" <PeelerN@michigan.gov>
Cc:

Forms:

- **Activity Log:** No changes required
- **Follow-up Visit:** No changes required
- **Individualized Plan of Care:** Fixed typos, updated revision date, under long-term development changed form to read "Date of ASQ screening"
- **Initial Home Visit**: Revised name of form, added in ASQ under developmental screening, w/comment section and date, fixed form errors, updated form date
- **Referral Form**: No changes ([redacted]----the referral for Early On is described as being for BLL>10. Do we want to add "or other noted developmental delay"?)
- **Report to Health Care Provider:** Fixed BLL repeat test protocol on second page. Updated date of form.
- **Case Closure**: Updated date of form. Updated closure reason in section 2 of form to 1 BLL<5 ug/dL to be consistent with section 1.

All form names are revised for naming convention consistency.

--
Emily Houk, President and Chief Mischief Maker
Research to Practice Consulting, LLC
216 North Chestnut
Lansing, Michigan 48933
517-896-2712
r2pconsultants.com

Childhood LEAD POISONING prevention program

Revised 12/03/15

Name of Child:_____
Date of Birth: _____
MRN: _____

Michigan Lead Poisoning Prevention Program
Child Case Closure Form

Child's Full Legal Name (Last Name, First, Middle Initial): DOB:

_____ _____

Name of PCP/ notified of case closure:_____

Last Blood Lead Level: _____µg/dL

Recommendations for Case Closure		
Cases can be closed when all 3 of the following criteria are met: • Environmental lead hazards have been controlled or eliminated. • 1 BLLs <5µg/dL • Other objectives of the plan are achieved (e.g., including provision of long-term developmental follow-up).	**OR**	Use administrative case closure ONLY if: • Parent refuses services • Family has moved out of jurisdiction (new referral MUST be made) • At least 3 documented attempts to locate or gain access to the child and caregiver have failed (2 visits/1 certified mail) **and** attempts to reach the family using PCP or MIWIC, MICR, CLPPP or other resources have been made.

Check all that apply	**Closure Reasons**	**Additional Notes:**
	1 BLLs below 5µg/dL	
	Environmental lead hazards have been eliminated	
	Other objectives of the plan have been met	
	Administrative Closure: Lost to follow-up/Unable to locate	Date of first home visit attempt: _____ Date of second home visit attempt: _____ Other strategies used (include dates): _____ _____
	Services refused	
	Moved out of Jurisdiction/State	Date of referral to different jurisdiction/jurisdiction name & contact person: _____
	Other (Specify):	

SIGNATURE _____ DATE CLOSED TO SERVICE _____

Childhood LEAD POISONING prevention program

Revised 12/03/15

Report to Health Care Provider
Re: Lead Poisoned Child Case Management

This report is to inform you of recent lead poisoning prevention case management activities undertaken for the child listed below. It highlights issues, referrals, and educational messages that you may wish to reinforce at the child's next office visit.

Child's Name: _____

Date of Birth: _____

Address: _____

_____

Parent/Guardian's Name:

_____

Initial Blood Lead Test Result: _____ µg/dL Date of test: _____

Confirmatory Blood Lead Test Result: _____µg/dL Date of test: _____

Date of Last Health Department Home Visit_____

PLEASE NOTE: The CDC recommends that the child's permanent medical problem list includes his/her history of a confirmed elevated blood lead level.

Suggested date of next blood lead test: _____

(See next page for testing schedule.)

Reason for Referral to Health Department (Check all that apply):

- ☐ Blood lead level
- ☐ Follow-up to a prior EBLL
- ☐ Parent/guardian request
- ☐ Foster child
- ☐ Refugee/Immigrant child (country of origin: _____)

Recent Services Provided by the Health Department (Check all that apply):

- ☐ Telephone Interview
- ☐ Home visit
- ☐ Health education
- ☐ Nutritional assessment
- ☐ Unable to contact family

Possible Lead Exposure Source(s)/ High Risk Factor(s) (Circle all that apply):

Paint Soil Water Dust Frequent hand to mouth behavior

Worker take home exposure Cosmetics/Home Remedy

Ceramics or pottery Hobbies or home businesses

- ☐ Other locations where child spends time:_____
- ☐ Other: _____

Follow-up Home Visits (Check all that apply):

- ☐ Environmental Health Visit/Home Assessment scheduled for: _____(Date)
- ☐ Environmental Health Visit/Home Assessment complete
- ☐ Follow-up PHN visit planned
- ☐ Follow-up PHN visit scheduled for: _____ (Date)

Referrals Made (Check all that apply):

- ☐ Early On ☐ WIC ☐ Medicaid/Medicare ☐ Social Services
- ☐ Referred for developmental follow-up ☐ Housing remediation
- ☐ Relocation to lead safe housing
- ☐ Other:_____

Child/Family Teaching (Check all that were covered)

- ☐ Need for retesting
- ☐ Encouraged testing of siblings
- ☐ Encouraged handwashing
- ☐ Avoidance of chipping or peeling paint
- ☐ Temporary control of sources of exposure
- ☐ Wet mopping/cleaning techniques
- ☐ Reduction of occupational/hobby take home exposure (e.g., changing work clothes)
- ☐ Discontinue use of ceramics for cooking/storing/serving food
- ☐ Discontinue use of lead based home remedy
- ☐ Nutritional education
- ☐ Resources for housing remediation
- ☐ Other: _____

***Nursing recommendations to the provider:** _____

_____

_____

Follow Up Testing Recommendations

- BLL 5-14 retest 1-3 months;
- BLL 15-44 retest within 1 month until levels <15;
- BLL 45+ retest monthly as directed by expert at Children's Hospital of Michigan in Detroit.

If you have any questions, please do not hesitate to contact me at the number listed below. Thank you,

Signature: _____Date:_____

Agency: _____

Phone: _____ Email:_____

CHILDHOOD LEAD POISONING

Blood Lead Level (BLL) Quick Reference for Primary Care Providers

Not Yet Tested

Consider screening ALL children between ages 1-6

Need for testing can be based on risk factors

REMINDER: Medicaid requires all children to be tested at ages 1 & 2. Children who were not tested between 1 & 2 must be tested at least once between 3 & 6.

BLL <5

Review lead levels with family

Provide anticipatory guidance

REMINDER: Medicaid requires all children to be tested at ages 1 & 2. Children who were not tested between 1 & 2 must be tested at least once between 3 & 6.

BLL 5-14

Review lead levels with family

Confirm results with venous blood sample

Review venous sample with family

Perform environmental history. Consider other children who may be exposed

Consider iron sufficiency, provide nutritional counseling r/t calcium and iron

Provide anticipatory guidance

Refer to case management

FOLLOW UP: Retest venous sample within 1-3 months to ensure BLL is not rising

REMINDER: Medicaid requires all children to be tested at ages 1 & 2. Children who were not tested between 1 & 2 must be tested at least once between 3 & 6.

BLL 15-44

Review lead levels with family

Confirm results with venous blood sample

Perform environmental history. Consider other children who may be exposed

Consider if a specific evaluation of the child is necessary such as an abdominal x-ray. Gut decontamination may be needed if leaded foreign bodies are visualized in x-ray

Consider iron sufficiency, provide nutritional counseling r/t calcium and iron

Refer to case management

FOLLOW UP: Retest venous sample monthly until levels are <15, repeat every 1-3 months until levels are <5

REMINDER: Medicaid requires all children to be tested at ages 1 & 2. Children who were not tested between 1 & 2 must be tested at least once between 3 & 6.

BLL >44

Review lead levels with family

Confirm results with venous blood sample

Review venous sample with family

Any treatment at this level should be performed in consultation with an expert at Children's Hospital of Michigan in Detroit.

FOLLOW UP: As directed by expert. Monthly venous samples will be required.

REMINDER: Medicaid requires all children to be tested at ages 1 & 2. Children who were not tested between 1 & 2 must be tested at least once between 3 & 6.

Questions? Contact us at (888) 322-4453 or (517) 335-8885

MDHHS
Michigan Department of Health & Human Services
RICK SNYDER, GOVERNOR | NICK LYON, DIRECTOR

Childhood LEAD POISONING prevention program

Childhood LEAD POISONING prevention program

Revised 12/03/15

CLPPP
Lead Poisoning
Nursing Initial Home Visit

MRN _____

Client Information:

Case Child's Name (Last, First Mi): _____ DOB: _____ Race: _____ Sex: _____ Ethnicity: _____

Childs Primary Address: _____ City: _____ County _____ Zip code _____

MA# _____ Other ID: _____ Construction date: _____

PCP Name: _____ Address: _____ Phone #: _____

Alt . Medical Provider: _____ Address: _____ Phone #: _____

Relationship:	Age:	Phone #:	Occupation:
Mother		Home	
		Business	
Father		Home	
		Business	
Other		Home	
		Business	
Other		Home	

Alternate Contact person

Name:	Address:	Phone #:	Relationship:

Child's Lead Test History:

Date of Blood Draw:	Type (Capillary or Venous):	Lead Level:	Date of Blood Draw:	Type (Capillary or Venous):	Lead Level:

Caregiver Information:

Primary Caregiver is: ☐ Mother ☐ Father ☐ Foster Parent/Guardian

☐ Other Specify: _____

Person Interviewed: _____

Primary language of the household: _____

What is the primary source of income for the family? _____

Does family receive:

☐ WIC ☐ Food assistance ☐ Medicaid/Medicare/SSI/SSDI

☐ MI Child ☐ Maternal Infant Health

☐ Public housing

☐ Other: Social service agency support, food pantry etc._____

Does the family own or rent the property? ☐ Own ☐ Rent If rented:

Owners Name: **Address:** **Phone #:**

_____

_____

Property Management Firm: _____

Other living arrangement (explain): _____

_____

_____

_____

Child's Health History:

When was the last time your child was seen by the doctor? _____

Do you have any concerns about your child's health? ☐ Yes ☐ No

If yes, explain: _____

Does the child have a history of (Check all that apply):

☐ Asthma ☐ Birth defects ☐ Diabetes ☐ Heart conditions ☐ Sickle cell ☐ Seizures

Other:_____

_____

Is the child currently taking prescribed medications? ☐ Yes ☐ No

If yes, list medications: _____

Does the child have a history of iron deficiency Anemia? ☐ Yes ☐ No

Do you know the child's hemoglobin status? ☐ Yes ☐ No

If no, explain:_____

Does your child have allergies? ☐ No ☐ Yes, To: Medications (list)_____

Food (list)_____

Other:_____

Is the child current with immunizations? ☐ Yes ☐ No

If no, explain: _____

Is the doctor aware of your child's blood lead history? ☐ Yes ☐ No

Has the child ever been hospitalized for lead poisoning?

☐ No ☐ Yes If yes, specify dates: _____

Has the child ever received chelation therapy?

☐ No ☐ Yes If yes, specify dates: _____

Is the child receiving or has the child been referred to Children Special Health Care Services?

☐ Receiving services ☐ Referred to services ☐ Neither

Barriers to obtaining medical care: ☐ lack of medical insurance ☐ transportation

☐ language barrier ☐ not convenient for work schedule ☐ cannot find child care for other children

☐ literacy ☐ Other _____.

Comments: _____

Sibling Lead History

Comments:_____

_____

_____

Developmental Assessment:

Does the caregiver feel the child's development is normal for his/her age? ☐ Yes ☐ No

If no, specific concerns_____

_____

Date of ASQ or other assessment:_____

_____

Deficits noted? If yes, explain:_____

_____

Nutritional Assessment:

Do you have food available for the family all days of the month? ❑ Yes ❑ No

Does your child have a good appetite? ❑ Yes ❑ No

How many meals does your child eat each day? ___ How many snacks? ___

Do your child's eating habits fluctuate frequently? ❑ Yes ❑ No

Does your child eat at the same times each day? ❑ Yes ❑ No

Where does your child usually sit to eat? _____

Does your child eat at school/daycare? ❑ Yes ❑ No Describe:_____

Type of food:_____

Does your child eat fruits and vegetables daily? ❑ Yes ❑ No If no, explain:_____

Does your child take vitamins or dietary supplements (i.e., calcium, iron etc)? ❑ Yes No ❑

If yes, list them:_____

Does your child take any other nutritional supplements/herbal preparations or remedies from another country? ❑ Yes ❑ No If yes, describe: _____

Does the family eat food grown in a garden? ❑ Yes ❑ No

Does your family thoroughly wash all fresh fruits and vegetables? ❑ Yes ❑ No

Does your child ever eat ethnic foods from another country? ❑ Yes ❑ No

Are food items stored in open cans or ceramic containers? ❑ Yes ❑ No

Are handmade or imported ceramic dishes used in the home? ❑ Yes ❑ No

What containers are used to prepare, serve, and store the child's food? _____

Does your child have a favorite cup or eating utensil? ❑ Yes ❑ No

Is it handmade or ceramic? ❑ Yes ❑ No

Do you have a water filter? ❑ Yes ❑ No

Additional Comments:_____

_____

_____

List foods and amounts eaten by the child in the last 24 hours:

Breakfast	Lunch	Dinner	Snacks
Grains			
Vegetables			
Fruits			
Milk			
Meat and Beans			
Liquids (Water, juice, soda)			

Is this typical of your child's diet? ❑ Yes ❑ No

If no, complete the next section.

Record the frequency with which the child eats the following foods:

	Daily	Weekly	Never
Cheese, yogurt			
Chicken, Beef, Pork, Poultry			
Fish and shellfish			
Eggs			
Dried Beans, Peas, Peanut Butter			
Bread, Crackers, Cereal, Macaroni, Spaghetti, Tortillas, Pasta			
Whole Milk			
Skim or Low-fat Milk			
Breast Milk			
Formula			
Fruit, Fruit Juice			
Vegetables			
Potatoes			
Soft Drinks			
Pastry Desserts, Ice Cream, Desserts			
Candy			
Chips, Snacks or other high fat foods			

Compare these lists to the food guidelines appropriate for the child's age.

Comments: _____

_____

Social History:

How long has the child lived at this address? _____

List all locations where the child <u>currently</u> spends or <u>within the past two years</u> has spent more than 20 hours a week.

Address:	Facility:	How Long at Address	Contact Name:	Phone #:

Where does your child spend most of his/her time when at home? _____

Where is your child's most frequent play area? _____

Check the answer that applies.

Does family remove shoes when entering the house?	❑ Yes ❑ No
Does family have a pet that could track contaminated soil/dust from outside? If yes, where does the pet sleep? _____	❑ Yes ❑ No
Does child play in, live in, or have access to areas where shellacs, dyes, etc are kept?	❑ Yes ❑ No
Does your child ever play in the yard or the dirt near the house?	❑ Yes ❑ No
Does your child ever play on the porch or painted steps?	❑ Yes ❑ No
Does your child play in areas of chipping or deteriorated paint?	❑ Yes ❑ No
Does your child play at a park or playground? If yes, specify location: _____	❑ Yes ❑ No

Does your child wash his/her hand before meals, after playing outside, at bedtime and naptime?
❑ Yes ❑ No

Mouthing activity is normal in young children; does your child do any of the following?

☐ sucks fingers	☐ eats/chews paint chips
☐ picks at painted surfaces	☐ eats soil
☐ puts painted objects in mouth	☐ puts matches in mouth
☐ puts soft metal objects in mouth	☐ puts old or foreign printed materials in mouth
☐ sucks on or eats other non-food items (i.e., miniblinds)	☐ plays with cosmetics/hair preparations metal objects or talc or puts them in mouth

Has anyone in the household recently traveled outside the U.S.? ❑ Yes ❑ No

If yes, Who and to what countries? _____

Does anyone in the household use paints, pigments, facial cosmetics, or hair coloring containing lead? ❑ Yes ❑ No If yes, explain: _____

Does anyone in the household use or have access to imported cosmetics, folk medicines, or non prescription medication or ethnic foods? ❑ Yes ❑ No

Check the answer that applies:

Are there imported non-glossy vinyl mini blinds in the house?	❑ Yes ❑ No
Is there an industrial area within one mile of the house? If yes, type of industry:_____	❑ Yes ❑ No
Has any renovation work been done in the past six months?	❑ Yes ❑ No
Have you or anyone in the household had lead-safe work practices training?	❑ Yes ❑ No
Has painted wood ever been burned in a wood-stove or fireplace?	❑ Yes ❑ No
Have ashes ever been emptied onto soil?	❑ Yes ❑ No
Were gasoline or other solvents ever used to clean parts or disposed of at the property?	❑ Yes ❑ No
Has soil ever been tested for lead?	❑ Yes ❑ No
Has the water ever been tested for lead?	❑ Yes ❑ No

Comments: _____

_____

_____

Check all that apply:

Latino:	**Cosmetics**	
	Foods	☐ Tamarind Candy ☐ Chile flavored candies ☐ Chocolate-Covered grasshoppers
	Remedies	☐ Azarcon ☐ Liga ☐ Maria Luisa ☐ Alarcon ☐ Coral ☐ Rueda ☐ Greta ☐ Albayalde ☐ Litargirio
Middle Eastern, Indian, Pakistani, African:	**Cosmetics**	☐ Alkohl ☐ Kohl ☐ Saoott ☐ Surma ☐ Henna
	Foods	☐ Lozeena
	Remedies	☐ Bali Goli ☐ Ghasard ☐ Kandu ☐ Ayurvedic ☐ Kushta ☐ Deshi Dawa ☐ Bint Dahab ☐ Santrinj ☐ Bokhoor ☐ Cebagin ☐ Al Murrah
Southeast Asian, Chinese	**Cosmetics**	
	Foods	
	Remedies	☐ Chuifong Tokuwan ☐ Jin Bu Huan ☐ Po Ying Tan ☐ Ba-Baw-San ☐ Pay-Loo-Ah ☐ Hai Ge Fen ☐ Ju Hua ☐ Litharge ☐ Cordyceps

Other:

Does anyone living in the household or regularly visiting do any of the following as a hobby or occupation? ❑ Yes ❑ No

(Check all that apply.)

- ❑ Home renovation (HVAC, plumbing, painting)
- ❑ Furniture refinishing
- ❑ Glass or metal soldering
- ❑ Glazed-pottery making/Ceramics
- ❑ Stained-glass making
- ❑ Artistic painting
- ❑ Landscaping/Gardening
- ❑ Auto repair(radiator or body work)
- ❑ Electronics soldering
- ❑ Jewelry making/crafts
- ❑ Target shooting
- ❑ Fishing or hunting
- ❑ Making bullets, slugs, or fishing sinkers
- ❑ Construction Type:

Do any adults, involved with the hobbies or occupations listed above, change out of their work clothes as soon as they get home? ❑ Yes ❑ No

Child's Physical Assessment Results

Height: _____ (in/cm) **Weight:** _____ (lbs/kg) ❑ Per parent report

Initial Birth Weight: _____ (lbs/kg)

Level of attention:	❑ Appropriate ❑ Somewhat distractible ❑ Very distractible ❑ Other: _____
Interest in Surroundings:	❑ Alert ❑ Somewhat disinterested ❑ Seriously disinterested ❑ Other: _____
Behavior:	❑ WNL for age ❑ Other: DESCRIBE any instances of impulsivity, difficulty following instructions, aggressiveness toward others observed during visit _____ _____
General Appearance:	❑ Well-nourished ❑ Obese ❑ Thin Other: _____
Skin:	❑ WNL ❑ Laceration ❑ Bruises ❑ Rashes ❑ Other:_____
Stool:	❑Toilet trained? ❑Toilet training begun? Last BM: _____ Usual Pattern: _____ Other:_____
Bladder:	❑Toilet trained? ❑Toilet training begun ❑ Other:_____
Muscles:	❑ WNL ❑ Movement impaired ❑ Other _____
Adaptive Devices	❑ Eye glasses ❑ Hearing Aide ❑ Wheelchair ❑ Other: _____

PROPERTY ASSESSMENT:
Based on direct visual observation by interviewer. Must be completed by PHN if Environmental Investigation is not done at time of IHV or if local protocol does not require Environmental Investigation

Is dwelling located within 2 blocks of a major roadway, freeway, elevated highway, other transportation structure or industrial area?	❑ Yes ❑ No
Is any part of the home currently being renovated or repaired?	❑ Yes ❑ No
Are nearby buildings or structures being renovated, repaired or demolished?	❑ Yes ❑ No
Is there **chewed** paint on: Woodwork, toys, or furniture? (Circle all that apply)	❑ Yes ❑ No
Is there **peeling** paint on: woodwork, toys or furniture? (Circle all that apply)	❑ Yes ❑ No
Is there deteriorated paint on outside of fences, garages, play structures, railings, building siding, windows, trims, or mailboxes?	❑ Yes ❑ No
Are there visible paint chips at the perimeter of the house, fences, garage, or play structures?	❑ Yes ❑ No
Is there any evidence of hobbies or businesses that could cause contamination?	❑ Yes ❑ No
Is food prepared or stored in ceramic or pewter pots or stored in any glazed or earthenware containers?	❑ Yes ❑ No
Are Liquids stored in metal, pewter, or crystal containers? If yes: _____	❑ Yes ❑ No

Comments: _____

_____

_____

_____

_____

_____

_____

PROPERTY ASSESSMENT: Based on direct visual observation by interviewer.

Room	Paint Condition	Observations and Temporary Measures Needed
Primary Play Area	❑ Intact ❑ Not intact	
Living Room	❑ Intact ❑ Not intact	
Dining Room	❑ Intact ❑ Not intact	
Kitchen	❑ Intact ❑ Not intact	
Family Room	❑ Intact ❑ Not intact	
Child's Bedroom	❑ Intact ❑ Not intact	
Parent's Bedroom	❑ Intact ❑ Not intact	
Other Bedroom	❑ Intact ❑ Not intact	
Bathroom	❑ Intact ❑ Not intact	
Porch Entry	❑ Intact ❑ Not intact	
Yard	❑ Intact ❑ Not intact	

Nurse's Signature_____ **Date**_____

Additional notes

Childhood LEAD POISONING prevention program

Revised 12/03/15

Individualized Plan of Care

To be initiated during the first home visit (in addition to the Initial Home Visit Form) and revised on subsequent home visits.

Case Child's Name: _____ Date initiated: _____

MRN, Medical Record Number _____

Problem	Outcomes	Actions	Additional Information (specific for family)	Date Covered	PHN Initials
Elevated Blood Lead Level.	Child will have 1 blood lead tests <5ug/dL	PHN will discuss with the child's caretaker and communicate with the medical provider the need for repeat BLL testing within recommended timeframes.	Date of next blood lead test should be:		
		PHN will monitor changes in BLL for a steady decline in lead levels. If a decline does not occur, the PHN will reassess exposures and need for additional referrals.			

Problem	Outcomes	Actions	Additional Information (specific for family)	Date Covered	PHN Initials
Elevated Blood Lead Level (continued)	Child will have 1 consecutive blood lead tests <5ug/ dL.	PHN will provide information on good hygiene and housekeeping measures to reduce lead exposure.	Key housekeeping and health messages specific to family (check all that were discussed): ___ Encouraged frequent adult-supervised handwashing, especially prior to meals, snacks, after playing outside, and at and bedtime . ___ Discussed wet mopping and cleaning techniques. ___ Observe child for pica/mouthing behavior. _____Discourage child from eating or sleeping on the floors until lead hazards are corrected. ___ Encourage caregiver to wash toys, pacifiers, and bottles frequently. ___ Educational pamphlets were provided. ___ Other (Specify):		

Problem	Outcomes	Actions	Additional Information (specific for family)	Date Covered	PHN Initials
Lead hazard present.	Lead hazards in the child's environment will be identified.	PHN will conduct an assessment to identify potential lead hazards in the home at the time of the first home visit.	Age of home _____ Check off main lead sources found during initial visit: ___ Deteriorated Paint ___ Bare Soil ___ Water ___ Imported painted toys, lead jewelry ___ Food storage & preparation ___ Ethnic foods/medications ___ Occupation/hobby sources ___ Neighborhood exposures ___ Other (Specify):		
		PHN will follow-up with the environmental investigator to ensure that an investigation is completed within recommended timeframes.	Date of environmental investigation should be no later than:_____(Date)		
		Once complete, PHN will ensure that results of the lead investigation were reviewed with the family.			

Problem	Outcomes	Actions	Additional Information (specific for family)	Date Covered	PHN Initials
Lead hazard present. (continued)	Lead hazards are addressed.	PHN will ensure that ways to decrease the identified lead exposure risks (both short and long-term strategies) are discussed with the family.	Specific SHORT-TERM recommendations for family (check all that were discussed): ___ Advised on ways to create barriers between the child and lead sources (contact paper, duct tape, relocation of furniture, etc.). ___ Relocation to lead safe housing. ___ Reviewed ways to eliminate work and hobby related exposures. ___ Discussed ways to avoid exposure through food containers, folk remedies, or cosmetics. ___ Encouraged the use of door mats. ___ Other (Specify): Specific LONG-TERM recommendations for family (check all that were discussed): ___ Discussed ways to cover bare soil. ___ Discussed remediation of lead hazards and follow-up dust testing. ___ Discussed ways to reduce exposure to lead in drinking water. ___ Reviewed use of lead-safe work practices in renovation. ___ Other (Specify):		

Problem	Outcomes	Actions	Additional Information (specific for family)	Date Covered	PHN Initials
Lead hazard present. (continued)	Lead hazards are addressed. (continued)	PHN will work with the environmental investigator to identify resources for addressing lead hazards.	Referrals made:		
		PHN will check with the environmental investigator to see if the rental property owner/homeowner is aware of need to address lead hazards.			
		PHN will check with the Environmental investigator to ensure that property owner is referred to prosecutor's office or district court if lead hazards are not addressed within specified period of time.			
Need for medical follow-up.	Child will have a physical exam and be screened for anemia.	PHN will communicate all necessary information to the primary care provider.			
		PHN will encourage the family and provider to make sure the child has a complete physical exam.			
		PHN will encourage the family and provider to test the child for anemia.	Results of anemia test: Date for next anemia test:		

Problem	Outcomes	Actions	Additional Information (specific for family)	Date Covered	PHN Initials
Need for medical follow-up. (continued)	All children in the home will be tested for an EBLL.	PHN will encourage the family to test all children in the home, especially those under the age of six.	Gender and ages of other children in the home that should be tested:		
	An EBLL will be recorded in the child's permanent medical problem list.	PHN will encourage family and medical provider to include an EBLL in the problem list of the child's medical record.			

Problem	Outcomes	Actions	Additional Information (specific for family)	Date Covered	PHN Initials
Potential for poor nutrition.	Child will be provided a diet following the food pyramid recommendations.	PHN will assess child's current diet, especially iron, vitamin C, calcium, and total fat intake.	Specific dietary recommendations based on dietary assessment (check all that were recommended): ___ Incorporate more iron rich foods by providing iron-fortified cereals to young children or one serving of lean red meat per day to older children. ___ Provide adequate intake of Vitamin C by providing 2 servings of citrus fruit juices or fruits per day. ___ Increase calcium intake to ensure 2 servings of dairy products or other calcium-rich foods a day. ___ Other (Specify):		
		PHN will provide information on the food pyramid recommendations to the family.	___ Nutrition information pamphlet provided to family.		

Problem	Outcomes	Actions	Additional Information (specific for family)	Date Covered	PHN Initials
Potential for poor nutrition. (continued)	Child will be provided a diet following the food pyramid recommendations (continued).	PHN will encourage families not to give children supplements unless under the direct supervision of a physician.			
	Child will be enrolled in WIC if eligible.	PHN will determine WIC Eligibility.	Check one: ____ Family receiving WIC services ____ Family referred to WIC ____ Not eligible for WIC services		
	Caregiver will get assistance in providing good nutrition for the child.	PHN will provide families with additional nutritional referrals as needed.	Other nutritional referrals recommended for the family:		
Need for long-term developmental follow-up.	Family will verbalize an understanding of the need for long-term development follow-up.	PHN will discuss with the family the need to look for behaviors that may interfere with learning (e.g., inattention, distractibility, impulsivity).	Date of ASQ screening:		

Problem	Outcomes	Actions	Additional Information (specific for family)	Date Covered	PHN Initials
Need for long-term developmental follow-up (continued)	Family will verbalize an understanding of the need for long-term developmental follow-up. (continued)	PHN will discuss with the family and primary care provider periods when development delays may be apparent (1st, 4th, 6th or 7th grade). PHN will encourage parental sharing of child's diagnosis w/ classroom teacher(s)	Specific recommendations for the family based on development screen (check all that apply): ___ Recommend HeadStart/ Early HeadStart. ___ Refer to Early On. ___ Consider YMCA program/ other enrichment programs. ___ Encourage play groups. ___ Recommended games for parents to play on-one-one with child. ___Provide contact information for the appropriate MSU Extension program (geographically accessible) ___ Other (Specify):		
		PHN will provide family with recommendations for informal/ formal intervention programs and refer the child for additional testing if necessary.			
Potential for family lost to follow-up services.	PHN and medical provider will be notified within one month if family changes addresses.	PHN will discuss with family the importance of maintaining contact with the PHN and medical provider. PHN will reinforce parent responsibility for ongoing health & developmental monitoring.			

Problem	Outcomes	Actions	Additional Information (specific for family)	Date Covered	PHN Initials
Need for additional services.					

PHN Signature: _____ Date _____

I have discussed my child's care plan with the Health Department representative and agree to follow the recommendations to protect my child from further exposure to lead.

Parent/Guardian Signature: _____ Date: _____

Childhood LEAD POISONING prevention program

Updated 10/30/15

Michigan Lead Poisoning Prevention Program Referral Tracking Form

Name of Child: _____
Date of Birth: _____
MRN: _____

Nutrition	Health	Child Development	Housing
WIC Received Referred: Date_____	INSURANCE: Healthy Kids MIChild Received Referred: Date_____	HeadStart/ Early Head Start Received Referred: Date_____	Environmental Investigator Received Referred: Date_____
	Chelation Services/ Lead Poisoning Pediatric Consultants Received Referred: Date_____	Early On (EBLL>10) Received Referred: Date_____	MDHHS Healthy Homes Section Received Referred: Date_____
	Hospitalization Received Referred: Date_____		
	Children's Special Health Care Services (all children who have been chelated are eligible) Received Referred: Date_____		

COMMON REFERRAL OPTIONS

Date of Referral	Name of Agency	Contact at Agency	Type of Referral/ Reason for Referral	Date Services Began	Notes

Childhood LEAD POISONING prevention program

Revised 10/30/15

Michigan Lead Poisoning Prevention Program
Follow Up Home Visit Report

Child's Name _____ Date of Visit: _____

Date of Birth: _____

MRN_____ Environmental investigator_____

Has there been a change in any of the following:

- ❑ Child's Primary Address _____
- ❑ Parents' contact information _____
  _____
- ❑ Child Care contact information _____
  _____
- ❑ Medical Provider _____
  _____
- ❑ Medical Insurance _____

Reason(s) for Visit: (check all that apply)

Medical:

- ❑ BLL remains > 5µg/dL ❑ Persistent EBLL ❑ Chelation ❑ Post-chelation
- ❑ Pregnancy in the household ❑ Failure to comply with follow up testing schedule
- ❑ Other (specify):
  _____

Environmental:

- ❑ Discuss EBL Investigation report ❑ Plan for relocation to lead safe housing
- ❑ Discuss lead hazard remediation options ❑ Investigate site other than primary address
- ❑ Housing unit is associated with more than one case of lead poisoning over time
- ❑ Persistent use of home remedies/products with high lead content
- ❑ Other (specify): _____

Nutritional and Developmental:

- ❑ Follow up on anemia status ❑ Child exhibits new developmental/nutritional problems
- ❑ Follow up on WIC or other social service referrals
- ❑ Follow up on informal developmental services ❑ Follow up on formal developmental services referrals
- ❑ Other_____

Review Care Plan/ Reinforce Caregiver Education:

- ❑ Evaluate implementation of care plan ❑ Assess need for additional referrals
- ❑ Assess reasons for caregiver noncompliance
- ❑ Other (specify): _____

Notes and Observations:

Child Name: _____

Revisions to Care Plan:

PHN Signature: _____ Date: _____

I have discussed my child's care plan with the Health Department representative and agree to follow the recommendations to protect my child from further exposure to lead.

Parent/Guardian Signature: _____Date: _____

Childhood LEAD POISONING prevention program

Revised 10/30/15

Michigan Lead Poisoning Prevention Program
Case Activity Log

Child's Name: _____

Additional information:_____

MRN: _____

Record all activities in this log, including unsuccessful contacts, transfer of files to other offices, contacts with medical providers, etc. Record YOUR name for each activity.

Date	**Action** (phone, visit, etc.) **Name** of staff member making contact	**Contact Name and Phone**	**Purpose**

From: Peeler, Nancy (DHHS)
Sent: Monday, December 07, 2015 4:03 PM
To: Lounds, Elizabeth (DHHS)
Cc: Lishinski, Karen (DCH) (LishinskiK@michigan.gov)
Subject: files to merge
Attachments: CMprotocol12315_Flint.pdf; Guidelines for Contacting Families.Flint.pdf; CLPPP_Activity_Log Form102915.pdf; CLPPP_Case_ClosureForm120315.pdf; CLPPP_Followup_Visit_ form_103015.pdf; CLPPP_Individualized Plan of Care_ 120315.pdf; CLPPP_Initial Home Visit Form_120315.pdf; CLPPP_Referral Form_ 102915.pdf; CLPPP_Report_to_Health_Care_Provider_120315.pdf

Thanks for your offer to come in to help with this Beth, we really appreciate it!

There are 9 files to merge; Karen will send you the order she wants them in. I appreciate if you can name it FLINT CM Protocol, and send both Karen and I the merged copy. Thanks!

Nancy

Michigan's Case Management Protocol for Children with Elevated Blood Lead Levels in Flint, Michigan

Section 1: Application of this Protocol

The State of Michigan's childhood lead poisoning elimination goal is to identify and provide appropriate follow-up services to all children with Elevated Blood Lead Levels (EBLLs) in order to support their continued health and safety.

To meet this goal, case management services should be performed for children with BLLs≥5ug/dL as determined by a venipuncture test.

Origin

This document represents a standard of care as prescribed by the United States Centers for Disease Control and Prevention (CDC), the American Academy of Pediatrics (AAP), Michigan state law and Medicaid. This document contains case management guidelines developed by the Nursing and Health Support component of the Michigan Department of Health and Human Services Childhood Lead Poisoning Prevention Program (CLPPP).

Section 2: Expectations

Desired outcomes of EBLL case management include:

- Reducing an elevated blood lead level below the current CDC reference value of ≥5 ug/dL;
- Evidence that communication has occurred between caregivers and other service providers to ensure the child's continued health and safety;
- Evidence and assurance that appropriate action has been taken by case managers as required by this protocol.

Section 3: Required Activities

Activities defined by Medicaid, the CDC and AAP as encompassing case management include:

- Client identification and outreach
- Individual assessment and diagnosis
- Service planning and resource identification
- Linking clients to needed services
- Service implementation and coordination
- Monitoring of service delivery
- Advocacy
- Evaluation

1. Client Identification and Outreach

Case managers must continually review the list of EBLLs ≥5ug/dL provided on a weekly basis by the MDHHS Surveillance Manger. Case managers must contact and offer case management services to these families based on the schedule below. Outreach efforts must be deliberate, ongoing and varied in order to ensure that contact with families is made.

All outreach activities must be documented in activity logs and the HHLPP system.

a. Schedule

The following schedule must be used when initiating initial in-home nursing visits:

- BLL 5-14 within 2 weeks of referral;
- BLL 15-44 within one week of referral;
- BLL 45+ within 48 hours of referral;

b. Fees for Services

Medicaid provides reimbursement for the following in-home visits related to a venipuncture EBLL ≥ 5ug/dL:

- Two Environmental Investigations (One initial and one alternative location as needed)
- Two Blood Lead Nursing Assessment Visits (two in-home visits)

2. In Home Visits

Nursing Assessments Overview

Nursing Assessment visits must be provided in the child's home. The objectives of the first home visit are:

- **Individual assessment and diagnosis** through a health, development, social and

dietary history for the affected child and identification of the possible sources of lead in the child's environment.

- **Development of a Plan of Care** that identifies resources specific to the individual child and family so that exposure is reduced, appropriate referrals and recommendations can be implemented, and the impact of lead exposure minimized.
- **To provide education and anticipatory guidance for caregivers** so that the effects of exposure are minimized
- T**o advocate for families** to ensure they receive the appropriate support for managing their child's exposure through community referrals and resources; and
- **To ensure that the Individualized Plan of Care is continually reevaluated** until the child's lead level is below the current CDC reference value of 5ug/dL.

The initial visit will focus on:

- Assessment of the growth and development of the child, including any symptomology that may be present in the child (refer to Initial Home Visit assessment form for a list of common symptoms)
- Behavioral assessment of the child including any aggressive and/or hyperactivity
- Nutritional assessment of the child
- Assessment of typical family practices that may produce lead risk (e.g., hobbies, occupation, cultural practices)
- Limited physical identification of lead hazards within the dwelling
- Identification and planning for testing of any other family member at risk for lead hazard exposure
- Education and information regarding lead hazards and ways to minimize those risks in the future
- Development of a family plan of care to increase the safety of the child from lead hazards
- Facilitating blood lead follow-up testing and treatment recommended by the PCP.

a. First visit activities

The purpose of the initial nursing assessment home visit is to gather sufficient information to develop an Individualized Plan of Care for the child with an EBLL and to ensure that all siblings and pregnant women in the household are identified for further screening. The child with EBLL must be present at the initial visit for a physical assessment and observation of his/her behavior. During the initial visit, the following must be accomplished:

- Obtaining Caregiver authorization to release protected health information to the case management team and to referral sources as needed using the MOCH HIPAA Authorization to Disclose Protected Health Information Form or any other

agency-developed disclosure form.

- Discuss possible sources of lead exposure:
  - Lead Paint (walls, doors, windows, furniture)
  - Child's toys or common household items
  - Cultural foods, cookware or other items
  - Parent occupation
  - Lead in water or pipes
  - Other
- Interview of the child's caregiver(s) to collect the child's health, social and nutritional history. (Refer to the Initial Nursing Visit form).
  - Obtaining a health history that addresses the current health status of the child, including:
    - Past history of lead testing and, if necessary, chelation for the child;
    - Past history of lead testing for other family members;
    - Child's history of anemia (if any); ask caregiver to relate information re: the child's hemoglobin status;
    - Caregiver's observations about the child's developmental progress;
    - Caregiver's assessment of the child's behavior;
    - Caregiver's assessment of the child's cognitive development;
    - A visual/physical assessment of the child's body systems including eyes, heart and lungs, abdomen/digestive, elimination, muscular and skeletal;
    - Performing a standardized developmental screening to provide a baseline for the future (ASQ).
    - If the child is already enrolled in Early On or Special Education, you may instead obtain parent consent and request the evaluation assessment results from Early On or Special Education.
  - A complete nutrition history for the child including the following:
    - Caregiver's description of the child's usual diet pattern. This should begin with a twenty-four hour recall of his/her intake and ask if this is typical of the child's intake.
    - Ask about child's intake of breast milk, formula and/or cow's milk;
    - Ask about child's intake of other dairy/calcium sources;
    - Ask caregiver about child's intake of iron-containing foods and dietary fat;
    - Inquire about ethnic food products imported or carried from another country;
    - Ask about dietary supplements;
    - Ask caregiver the number of meals and number of snacks the child consumes each day; and
    - Ask where the child sits to eat.
  - A social history for the child including:

- Caregiver's description of play and sleep habits;
  - A child's usual play area;
  - Environments other than the child's primary residence where the child spends 20 hours per week or more (address and caregiver name(s));
  - Family occupational and hobby history: include occupations and hobbies of adults in the home and other adults with whom the child spends time;
  - Cultural practices or foods in use by the immediate family as well as other adults with whom the child spends time;
  - Behavior: ask the caregiver about mouthing/hand-to-mouth behaviors (to be expected in young children), including fingers in mouth; chewing on toys, crayons, newspaper/other print material, matches; consumes non-food items, such as dirt, grass, cigarettes/ashes; chews on furniture? crib/playpen? window sills/frames/doors?; plays at or near chipping or flaking paint, or has been seen eating paint chips.

- Documentation of other information including:
  - Family income source
  - Whether the family receives: WIC, food stamps, Medicaid/Medicare, other support, such as a food pantry.
  - If the residence is a rental property: name, address, phone number and/or other contact information for the rental property owner.
  - Barriers to obtaining medical care: time, both amount of time needed and time of day, child care, transportation, literacy, language barrier, etc.

After the child's history is completed, ask the caregiver for permission to look around the child's common areas for visual evidence of exposure sources, exposure behaviors and family practices.

The Individualized Plan of Care and Referral forms should be completed after reviewing the information obtained in the course of the initial nursing visit.

Appropriate referrals will be made in a timely manner. Early On referrals should include ASQ results as well as documentation of diagnosis. A report to the child's healthcare provider should also be completed and submitted at this time. (Use the Report to Healthcare Provider form).

b. Second and subsequent home visit activities

The purpose of the second and/or subsequent nursing home visits is to assess caregiver implementation of the plan of care, including compliance with medical follow up, housekeeping practices, and reductions in exposure. Objectives of the second home

visit are to:

- **Reinforce the educational information** presented to the family during the first visit
- **Validate** the family's ability to carry out activities to minimize risks of continued lead exposure
- **Modify** the plan of care to minimize lead risks, as needed
- **Facilitate blood lead follow-up testing** and treatment recommended by the PCP
- **Follow up on any referrals made**

The second visit must include:

- A review of contact information and primary care provider information with child's caregiver(s);
- Review of initial forms and documenting changes in EBLL, child's health history, nutritional history, social history, and conditions in the home;
- Review of the Individualized Plan of Care to identify additional messages to communicate at this visit;
- Assessment of the family's understanding of their responsibilities under the Plan of Care and a determination as to whether additional education or resources are needed to implement the plan;
- Revising the Individualized Plan of Care as needed and obtaining consent or signatures; and
- Notifying the health care provider and other members of the team, including the Environmental Investigators, of significant changes.
- Complete any activities not finished during the first visit.
- Timing of the second subsequent visits may be influenced by observations/ information from the first visit, and at the case manager's discretion, may take place relatively quickly.

Results of the second and/or subsequent follow-up visits must be recorded on the Follow Up Visit form.

c. Nursing assessment case closure activities

Nursing services may not be discontinued until all of the following are completed

- At least 2 home visits in which lead education was provided are done
- Nutritional, medical and developmental assessments are done
- There is one blood lead level below 5 ug/dL
- Recommended abatements and/or lead hazard reduction is completed

Use of administrative case closure should be infrequent and reserved for the following extenuating circumstances:

- Parent refuses services

- Family has moved out of jurisdiction (a new referral MUST be made)
- At least 3 documented attempts to locate or gain access to the child and caregiver have failed (2 visits/ 1 certified mail) **and** attempts to reach the family using PCP or MIWIC, MICAR, CLPPP staff and other resources have been made

Section 4: Environmental Investigations

The Michigan Department of Health and Human Services Healthy Homes Section is available to assist case managers with environmental investigations.

The case manager must work collaboratively with the environmental investigator to maximize the opportunity for scheduling joint visits and to ensure that inspection and remediation take place in a timely fashion.

If the child's BLL is > 44mcg/dl, the case manager will contact the primary care provider and the hospital immediately to understand the plan of care. Coordination with the EBL investigators, and hospital must be done to ensure that the child will discharged to a safe environment (e.g. the designated property has been certified free of lead hazards before the child returns to that location.)

Contact the Health Homes Section at (866) 691-5323 or 517 335 8252 or refer to the case management guidelines for environmental visits at http://www.michigan.gov/documents/mdch/EBL_EI_Protocol_February_2015_484429_7.pdf.

Contacting Families

Child Elevated Lead Case Management

Genesee County Health Department

It is imperative that the Case Managers make every reasonable and possible attempt to contact the families of the EBLL children in order to offer Case Management and Environmental Investigation Services.

After three documented initial attempts (two home visits and one certified letter) to locate the family, further attempts should be made to find and contact the family via other resources, including, but not limited to:

- Primary Care Physician
- MI WIC data base
- MCIR data base
- Other local resources
- State of Michigan CLPPP staff (to access other state data bases)

Childhood LEAD POISONING prevention program

Revised 10/30/15

Michigan Lead Poisoning Prevention Program
Case Activity Log

Child's Name: _____

Additional information:_____

MRN: _____

Record all activities in this log, including unsuccessful contacts, transfer of files to other offices, contacts with medical providers, etc. Record YOUR name for each activity.

Date	**Action** (phone, visit, etc.) **Name** of staff member making contact	**Contact Name and Phone**	**Purpose**

Childhood LEAD POISONING prevention program

Revised 12/03/15

Name of Child:_____
Date of Birth: _____
MRN: _____

Michigan Lead Poisoning Prevention Program
Child Case Closure Form

Child's Full Legal Name (Last Name, First, Middle Initial): DOB:

_____ _____

Name of PCP/ notified of case closure:_____

Last Blood Lead Level: _____µg/dL

Recommendations for Case Closure		
Cases can be closed when all 3 of the following criteria are met: • Environmental lead hazards have been controlled or eliminated. • 1 BLLs <5µg/dL • Other objectives of the plan are achieved (e.g., including provision of long-term developmental follow-up).	**OR**	Use administrative case closure ONLY if: • Parent refuses services • Family has moved out of jurisdiction (new referral MUST be made) • At least 3 documented attempts to locate or gain access to the child and caregiver have failed (2 visits/1 certified mail) **and** attempts to reach the family using PCP or MIWIC, MICR, CLPPP or other resources have been made.

Check all that apply	**Closure Reasons**	**Additional Notes:**
	1 BLLs below 5µg/dL	
	Environmental lead hazards have been eliminated	
	Other objectives of the plan have been met	
	Administrative Closure: Lost to follow-up/Unable to locate	Date of first home visit attempt: _____ Date of second home visit attempt: _____ Other strategies used (include dates): _____ _____
	Services refused	
	Moved out of Jurisdiction/State	Date of referral to different jurisdiction/jurisdiction name & contact person: _____
	Other (Specify):	

SIGNATURE _____ DATE CLOSED TO SERVICE _____

Childhood LEAD POISONING prevention program

Revised 10/30/15

Michigan Lead Poisoning Prevention Program
Follow Up Home Visit Report

Child's Name _____ Date of Visit: _____

Date of Birth: _____

MRN_____ Environmental investigator_____

Has there been a change in any of the following:

- ❑ Child's Primary Address _____
- ❑ Parents' contact information _____
  _____
- ❑ Child Care contact information _____
  _____
- ❑ Medical Provider _____
  _____
- ❑ Medical Insurance _____

Reason(s) for Visit: (check all that apply)

Medical:

- ❑ BLL remains > 5µg/dL ❑ Persistent EBLL ❑ Chelation ❑ Post-chelation
- ❑ Pregnancy in the household ❑ Failure to comply with follow up testing schedule
- ❑ Other (specify):
  _____

Environmental:

- ❑ Discuss EBL Investigation report ❑ Plan for relocation to lead safe housing
- ❑ Discuss lead hazard remediation options ❑ Investigate site other than primary address
- ❑ Housing unit is associated with more than one case of lead poisoning over time
- ❑ Persistent use of home remedies/products with high lead content
- ❑ Other (specify): _____

Nutritional and Developmental:

- ❑ Follow up on anemia status ❑ Child exhibits new developmental/nutritional problems
- ❑ Follow up on WIC or other social service referrals
- ❑ Follow up on informal developmental services ❑ Follow up on formal developmental services referrals
- ❑ Other_____

Review Care Plan/ Reinforce Caregiver Education:

- ❑ Evaluate implementation of care plan ❑ Assess need for additional referrals
- ❑ Assess reasons for caregiver noncompliance
- ❑ Other (specify): _____

Notes and Observations:

Child Name: _____

Revisions to Care Plan:

PHN Signature: _____ Date: _____

I have discussed my child's care plan with the Health Department representative and agree to follow the recommendations to protect my child from further exposure to lead.

Parent/Guardian Signature: _____Date: _____

Childhood LEAD POISONING prevention program

Revised 12/03/15

Individualized Plan of Care

To be initiated during the first home visit (in addition to the Initial Home Visit Form) and revised on subsequent home visits.

Case Child's Name: _____ Date initiated: _____

MRN, Medical Record Number _____

Problem	Outcomes	Actions	Additional Information (specific for family)	Date Covered	PHN Initials
Elevated Blood Lead Level.	Child will have 1 blood lead tests <5ug/dL	PHN will discuss with the child's caretaker and communicate with the medical provider the need for repeat BLL testing within recommended timeframes.	Date of next blood lead test should be:		
		PHN will monitor changes in BLL for a steady decline in lead levels. If a decline does not occur, the PHN will reassess exposures and need for additional referrals.			

Problem	Outcomes	Actions	Additional Information (specific for family)	Date Covered	PHN Initials
Elevated Blood Lead Level (continued)	Child will have 1 consecutive blood lead tests <5ug/ dL.	PHN will provide information on good hygiene and housekeeping measures to reduce lead exposure.	Key housekeeping and health messages specific to family (check all that were discussed): ___ Encouraged frequent adult-supervised handwashing, especially prior to meals, snacks, after playing outside, and at and bedtime . ___ Discussed wet mopping and cleaning techniques. ___ Observe child for pica/mouthing behavior. ____Discourage child from eating or sleeping on the floors until lead hazards are corrected. ___ Encourage caregiver to wash toys, pacifiers, and bottles frequently. ___ Educational pamphlets were provided. ___ Other (Specify):		

Problem	Outcomes	Actions	Additional Information (specific for family)	Date Covered	PHN Initials
Lead hazard present.	Lead hazards in the child's environment will be identified.	PHN will conduct an assessment to identify potential lead hazards in the home at the time of the first home visit.	Age of home _____ Check off main lead sources found during initial visit: ___ Deteriorated Paint ___ Bare Soil ___ Water ___ Imported painted toys, lead jewelry ___ Food storage & preparation ___ Ethnic foods/medications ___ Occupation/hobby sources ___ Neighborhood exposures ___ Other (Specify):		
		PHN will follow-up with the environmental investigator to ensure that an investigation is completed within recommended timeframes.	Date of environmental investigation should be no later than:_____(Date)		
		Once complete, PHN will ensure that results of the lead investigation were reviewed with the family.			

Problem	Outcomes	Actions	Additional Information (specific for family)	Date Covered	PHN Initials
Lead hazard present. (continued)	Lead hazards are addressed.	PHN will ensure that ways to decrease the identified lead exposure risks (both short and long-term strategies) are discussed with the family.	Specific SHORT-TERM recommendations for family (check all that were discussed): ___ Advised on ways to create barriers between the child and lead sources (contact paper, duct tape, relocation of furniture, etc.). ___ Relocation to lead safe housing. ___ Reviewed ways to eliminate work and hobby related exposures. ___ Discussed ways to avoid exposure through food containers, folk remedies, or cosmetics. ___ Encouraged the use of door mats. ___ Other (Specify): Specific LONG-TERM recommendations for family (check all that were discussed): ___ Discussed ways to cover bare soil. ___ Discussed remediation of lead hazards and follow-up dust testing. ___ Discussed ways to reduce exposure to lead in drinking water. ___ Reviewed use of lead-safe work practices in renovation. ___ Other (Specify):		

Problem	Outcomes	Actions	Additional Information (specific for family)	Date Covered	PHN Initials
Lead hazard present. (continued)	Lead hazards are addressed. (continued)	PHN will work with the environmental investigator to identify resources for addressing lead hazards.	Referrals made:		
		PHN will check with the environmental investigator to see if the rental property owner/homeowner is aware of need to address lead hazards.			
		PHN will check with the Environmental investigator to ensure that property owner is referred to prosecutor's office or district court if lead hazards are not addressed within specified period of time.			
Need for medical follow-up.	Child will have a physical exam and be screened for anemia.	PHN will communicate all necessary information to the primary care provider.			
		PHN will encourage the family and provider to make sure the child has a complete physical exam.			
		PHN will encourage the family and provider to test the child for anemia.	Results of anemia test: Date for next anemia test:		

Problem	Outcomes	Actions	Additional Information (specific for family)	Date Covered	PHN Initials
Need for medical follow-up. (continued)	All children in the home will be tested for an EBLL.	PHN will encourage the family to test all children in the home, especially those under the age of six.	Gender and ages of other children in the home that should be tested:		
	An EBLL will be recorded in the child's permanent medical problem list.	PHN will encourage family and medical provider to include an EBLL in the problem list of the child's medical record.			

Problem	Outcomes	Actions	Additional Information (specific for family)	Date Covered	PHN Initials
Potential for poor nutrition.	Child will be provided a diet following the food pyramid recommendations.	PHN will assess child's current diet, especially iron, vitamin C, calcium, and total fat intake.	Specific dietary recommendations based on dietary assessment (check all that were recommended): ___ Incorporate more iron rich foods by providing iron-fortified cereals to young children or one serving of lean red meat per day to older children. ___ Provide adequate intake of Vitamin C by providing 2 servings of citrus fruit juices or fruits per day. ___ Increase calcium intake to ensure 2 servings of dairy products or other calcium-rich foods a day. ___ Other (Specify):		
		PHN will provide information on the food pyramid recommendations to the family.	___ Nutrition information pamphlet provided to family.		

Problem	Outcomes	Actions	Additional Information (specific for family)	Date Covered	PHN Initials
Potential for poor nutrition. (continued)	Child will be provided a diet following the food pyramid recommendations (continued).	PHN will encourage families not to give children supplements unless under the direct supervision of a physician.			
	Child will be enrolled in WIC if eligible.	PHN will determine WIC Eligibility.	Check one: ____ Family receiving WIC services ____ Family referred to WIC ____ Not eligible for WIC services		
	Caregiver will get assistance in providing good nutrition for the child.	PHN will provide families with additional nutritional referrals as needed.	Other nutritional referrals recommended for the family:		
Need for long-term developmental follow-up.	Family will verbalize an understanding of the need for long-term development follow-up.	PHN will discuss with the family the need to look for behaviors that may interfere with learning (e.g., inattention, distractibility, impulsivity).	Date of ASQ screening:		

Problem	Outcomes	Actions	Additional Information (specific for family)	Date Covered	PHN Initials
Need for long-term developmental follow-up (continued)	Family will verbalize an understanding of the need for long-term developmental follow-up. (continued)	PHN will discuss with the family and primary care provider periods when development delays may be apparent (1st, 4th, 6th or 7th grade). PHN will encourage parental sharing of child's diagnosis w/ classroom teacher(s)	Specific recommendations for the family based on development screen (check all that apply): ___ Recommend HeadStart/ Early HeadStart. ___ Refer to Early On. ___ Consider YMCA program/ other enrichment programs. ___ Encourage play groups. ___ Recommended games for parents to play on-one-one with child. ___Provide contact information for the appropriate MSU Extension program (geographically accessible) ___ Other (Specify):		
		PHN will provide family with recommendations for informal/ formal intervention programs and refer the child for additional testing if necessary.			
Potential for family lost to follow-up services.	PHN and medical provider will be notified within one month if family changes addresses.	PHN will discuss with family the importance of maintaining contact with the PHN and medical provider. PHN will reinforce parent responsibility for ongoing health & developmental monitoring.			

Problem	Outcomes	Actions	Additional Information (specific for family)	Date Covered	PHN Initials
Need for additional services.					

PHN Signature: _____ Date _____

I have discussed my child's care plan with the Health Department representative and agree to follow the recommendations to protect my child from further exposure to lead.

Parent/Guardian Signature: _____ Date: _____

Childhood LEAD POISONING prevention program

Revised 12/03/15

CLPPP
Lead Poisoning
Nursing Initial Home Visit

MRN _____

Client Information:

Case Child's Name (Last, First Mi): _____ DOB: _____ Race: _____ Sex: _____ Ethnicity: _____

Childs Primary Address: _____ City: _____ County _____ Zip code _____

MA# _____ Other ID: _____ Construction date: _____

PCP Name: _____ Address: _____ Phone #: _____

Alt . Medical Provider: _____ Address: _____ Phone #: _____

Relationship:	Age:	Phone #:	Occupation:
Mother		Home	
		Business	
Father		Home	
		Business	
Other		Home	
		Business	
Other		Home	

Alternate Contact person

Name:	Address:	Phone #:	Relationship:

Child's Lead Test History:

Date of Blood Draw:	Type (Capillary or Venous):	Lead Level:	Date of Blood Draw:	Type (Capillary or Venous):	Lead Level:

Caregiver Information:

Primary Caregiver is: ☐ Mother ☐ Father ☐ Foster Parent/Guardian

☐ Other Specify: _____

Person Interviewed: _____

Primary language of the household: _____

What is the primary source of income for the family? _____

Does family receive:

☐ WIC ☐ Food assistance ☐ Medicaid/Medicare/SSI/SSDI

☐ MI Child ☐ Maternal Infant Health

☐ Public housing

☐ Other: Social service agency support, food pantry etc._____

Does the family own or rent the property? ☐ Own ☐ Rent If rented:

Owners Name: **Address:** **Phone #:**

_____

_____

Property Management Firm: _____

Other living arrangement (explain): _____

_____

_____

_____

Child's Health History:

When was the last time your child was seen by the doctor? _____

Do you have any concerns about your child's health? ☐ Yes ☐ No

If yes, explain: _____

Does the child have a history of (Check all that apply):

☐ Asthma ☐ Birth defects ☐ Diabetes ☐ Heart conditions ☐ Sickle cell ☐ Seizures

Other:_____

_____

Is the child currently taking prescribed medications? ☐ Yes ☐ No

If yes, list medications: _____

Does the child have a history of iron deficiency Anemia? ☐ Yes ☐ No

Do you know the child's hemoglobin status? ☐ Yes ☐ No

If no, explain:_____

Does your child have allergies? ☐ No ☐ Yes, To: Medications (list)_____

Food (list)_____

Other:_____

Is the child current with immunizations? ☐ Yes ☐ No

If no, explain: _____

Is the doctor aware of your child's blood lead history? ☐ Yes ☐ No

Has the child ever been hospitalized for lead poisoning?

☐ No ☐ Yes If yes, specify dates: _____

Has the child ever received chelation therapy?

☐ No ☐ Yes If yes, specify dates: _____

Is the child receiving or has the child been referred to Children Special Health Care Services?

☐ Receiving services ☐ Referred to services ☐ Neither

Barriers to obtaining medical care: ☐ lack of medical insurance ☐ transportation

☐ language barrier ☐ not convenient for work schedule ☐ cannot find child care for other children

☐ literacy ☐ Other _____.

Comments: _____

Sibling Lead History

Comments:_____

_____

_____

Developmental Assessment:

Does the caregiver feel the child's development is normal for his/her age? ☐ Yes ☐ No

If no, specific concerns_____

_____

Date of ASQ or other assessment:_____

_____

Deficits noted? If yes, explain:_____

_____

Nutritional Assessment:

Do you have food available for the family all days of the month? ❑ Yes ❑ No

Does your child have a good appetite? ❑ Yes ❑ No

How many meals does your child eat each day? ___ How many snacks? ___

Do your child's eating habits fluctuate frequently? ❑ Yes ❑ No

Does your child eat at the same times each day? ❑ Yes ❑ No

Where does your child usually sit to eat? _____

Does your child eat at school/daycare? ❑ Yes ❑ No Describe:_____

Type of food:_____

Does your child eat fruits and vegetables daily? ❑ Yes ❑ No If no, explain:_____

Does your child take vitamins or dietary supplements (i.e., calcium, iron etc)? ❑ Yes No ❑

If yes, list them:_____

Does your child take any other nutritional supplements/herbal preparations or remedies from another country? ❑ Yes ❑ No If yes, describe: _____

Does the family eat food grown in a garden? ❑ Yes ❑ No

Does your family thoroughly wash all fresh fruits and vegetables? ❑ Yes ❑ No

Does your child ever eat ethnic foods from another country? ❑ Yes ❑ No

Are food items stored in open cans or ceramic containers? ❑ Yes ❑ No

Are handmade or imported ceramic dishes used in the home? ❑ Yes ❑ No

What containers are used to prepare, serve, and store the child's food? _____

Does your child have a favorite cup or eating utensil? ❑ Yes ❑ No

Is it handmade or ceramic? ❑ Yes ❑ No

Do you have a water filter? ❑ Yes ❑ No

Additional Comments:_____

_____

_____

List foods and amounts eaten by the child in the last 24 hours:

Breakfast	Lunch	Dinner	Snacks
Grains			
Vegetables			
Fruits			
Milk			
Meat and Beans			
Liquids (Water, juice, soda)			

Is this typical of your child's diet? ❑ Yes ❑ No

If no, complete the next section.

Record the frequency with which the child eats the following foods:

	Daily	Weekly	Never
Cheese, yogurt			
Chicken, Beef, Pork, Poultry			
Fish and shellfish			
Eggs			
Dried Beans, Peas, Peanut Butter			
Bread, Crackers, Cereal, Macaroni, Spaghetti, Tortillas, Pasta			
Whole Milk			
Skim or Low-fat Milk			
Breast Milk			
Formula			
Fruit, Fruit Juice			
Vegetables			
Potatoes			
Soft Drinks			
Pastry Desserts, Ice Cream, Desserts			
Candy			
Chips, Snacks or other high fat foods			

Compare these lists to the food guidelines appropriate for the child's age.

Comments: _____

_____

Social History:

How long has the child lived at this address? _____

List all locations where the child <u>currently</u> spends or <u>within the past two years</u> has spent more than 20 hours a week.

Address:	Facility:	How Long at Address	Contact Name:	Phone #:

Where does your child spend most of his/her time when at home? _____

Where is your child's most frequent play area? _____

Check the answer that applies.

Does family remove shoes when entering the house?	❑ Yes ❑ No
Does family have a pet that could track contaminated soil/dust from outside? If yes, where does the pet sleep? _____	❑ Yes ❑ No
Does child play in, live in, or have access to areas where shellacs, dyes, etc are kept?	❑ Yes ❑ No
Does your child ever play in the yard or the dirt near the house?	❑ Yes ❑ No
Does your child ever play on the porch or painted steps?	❑ Yes ❑ No
Does your child play in areas of chipping or deteriorated paint?	❑ Yes ❑ No
Does your child play at a park or playground? If yes, specify location: _____	❑ Yes ❑ No

Does your child wash his/her hand before meals, after playing outside, at bedtime and naptime?
❑ Yes ❑ No

Mouthing activity is normal in young children; does your child do any of the following?

☐ sucks fingers	☐ eats/chews paint chips
☐ picks at painted surfaces	☐ eats soil
☐ puts painted objects in mouth	☐ puts matches in mouth
☐ puts soft metal objects in mouth	☐ puts old or foreign printed materials in mouth
☐ sucks on or eats other non-food items (i.e., miniblinds)	☐ plays with cosmetics/hair preparations metal objects or talc or puts them in mouth

Has anyone in the household recently traveled outside the U.S.? ❑ Yes ❑ No

If yes, Who and to what countries? _____

Does anyone in the household use paints, pigments, facial cosmetics, or hair coloring containing lead? ❑ Yes ❑ No If yes, explain: _____

Does anyone in the household use or have access to imported cosmetics, folk medicines, or non prescription medication or ethnic foods? ❑ Yes ❑ No

Check the answer that applies:

Are there imported non-glossy vinyl mini blinds in the house?	❑ Yes ❑ No
Is there an industrial area within one mile of the house? If yes, type of industry:_____	❑ Yes ❑ No
Has any renovation work been done in the past six months?	❑ Yes ❑ No
Have you or anyone in the household had lead-safe work practices training?	❑ Yes ❑ No
Has painted wood ever been burned in a wood-stove or fireplace?	❑ Yes ❑ No
Have ashes ever been emptied onto soil?	❑ Yes ❑ No
Were gasoline or other solvents ever used to clean parts or disposed of at the property?	❑ Yes ❑ No
Has soil ever been tested for lead?	❑ Yes ❑ No
Has the water ever been tested for lead?	❑ Yes ❑ No

Comments: _____

_____

_____

Check all that apply:

Latino:	**Cosmetics**	
	Foods	☐ Tamarind Candy ☐ Chile flavored candies ☐ Chocolate-Covered grasshoppers
	Remedies	☐ Azarcon ☐ Liga ☐ Maria Luisa ☐ Alarcon ☐ Coral ☐ Rueda ☐ Greta ☐ Albayalde ☐ Litargirio
Middle Eastern, Indian, Pakistani, African:	**Cosmetics**	☐ Alkohl ☐ Kohl ☐ Saoott ☐ Surma ☐ Henna
	Foods	☐ Lozeena
	Remedies	☐ Bali Goli ☐ Ghasard ☐ Kandu ☐ Ayurvedic ☐ Kushta ☐ Deshi Dawa ☐ Bint Dahab ☐ Santrinj ☐ Bokhoor ☐ Cebagin ☐ Al Murrah
Southeast Asian, Chinese	**Cosmetics**	
	Foods	
	Remedies	☐ Chuifong Tokuwan ☐ Jin Bu Huan ☐ Po Ying Tan ☐ Ba-Baw-San ☐ Pay-Loo-Ah ☐ Hai Ge Fen ☐ Ju Hua ☐ Litharge ☐ Cordyceps

Other:

Does anyone living in the household or regularly visiting do any of the following as a hobby or occupation? ❑ Yes ❑ No

(Check all that apply.)

- ❑ Home renovation (HVAC, plumbing, painting)
- ❑ Furniture refinishing
- ❑ Glass or metal soldering
- ❑ Glazed-pottery making/Ceramics
- ❑ Stained-glass making
- ❑ Artistic painting
- ❑ Landscaping/Gardening
- ❑ Auto repair(radiator or body work)
- ❑ Electronics soldering
- ❑ Jewelry making/crafts
- ❑ Target shooting
- ❑ Fishing or hunting
- ❑ Making bullets, slugs, or fishing sinkers
- ❑ Construction Type:

Do any adults, involved with the hobbies or occupations listed above, change out of their work clothes as soon as they get home? ❑ Yes ❑ No

Child's Physical Assessment Results

Height: _____ (in/cm) **Weight:** _____ (lbs/kg) ❑ Per parent report

Initial Birth Weight: _____ (lbs/kg)

Level of attention:	❑ Appropriate ❑ Somewhat distractible ❑ Very distractible ❑ Other: _____
Interest in Surroundings:	❑ Alert ❑ Somewhat disinterested ❑ Seriously disinterested ❑ Other: _____
Behavior:	❑ WNL for age ❑ Other: DESCRIBE any instances of impulsivity, difficulty following instructions, aggressiveness toward others observed during visit _____ _____
General Appearance:	❑ Well-nourished ❑ Obese ❑ Thin Other: _____
Skin:	❑ WNL ❑ Laceration ❑ Bruises ❑ Rashes ❑ Other:_____
Stool:	❑Toilet trained? ❑Toilet training begun? Last BM: _____ Usual Pattern: _____ Other:_____
Bladder:	❑Toilet trained? ❑Toilet training begun ❑ Other:_____
Muscles:	❑ WNL ❑ Movement impaired ❑ Other _____
Adaptive Devices	❑ Eye glasses ❑ Hearing Aide ❑ Wheelchair ❑ Other: _____

PROPERTY ASSESSMENT:
Based on direct visual observation by interviewer. Must be completed by PHN if Environmental Investigation is not done at time of IHV or if local protocol does not require Environmental Investigation

Is dwelling located within 2 blocks of a major roadway, freeway, elevated highway, other transportation structure or industrial area?	❑ Yes ❑ No
Is any part of the home currently being renovated or repaired?	❑ Yes ❑ No
Are nearby buildings or structures being renovated, repaired or demolished?	❑ Yes ❑ No
Is there **chewed** paint on: Woodwork, toys, or furniture? (Circle all that apply)	❑ Yes ❑ No
Is there **peeling** paint on: woodwork, toys or furniture? (Circle all that apply)	❑ Yes ❑ No
Is there deteriorated paint on outside of fences, garages, play structures, railings, building siding, windows, trims, or mailboxes?	❑ Yes ❑ No
Are there visible paint chips at the perimeter of the house, fences, garage, or play structures?	❑ Yes ❑ No
Is there any evidence of hobbies or businesses that could cause contamination?	❑ Yes ❑ No
Is food prepared or stored in ceramic or pewter pots or stored in any glazed or earthenware containers?	❑ Yes ❑ No
Are Liquids stored in metal, pewter, or crystal containers? If yes: _____	❑ Yes ❑ No

Comments: _____

_____

_____

_____

_____

_____

_____

PROPERTY ASSESSMENT: Based on direct visual observation by interviewer.

Room	Paint Condition	Observations and Temporary Measures Needed
Primary Play Area	❑ Intact ❑ Not intact	
Living Room	❑ Intact ❑ Not intact	
Dining Room	❑ Intact ❑ Not intact	
Kitchen	❑ Intact ❑ Not intact	
Family Room	❑ Intact ❑ Not intact	
Child's Bedroom	❑ Intact ❑ Not intact	
Parent's Bedroom	❑ Intact ❑ Not intact	
Other Bedroom	❑ Intact ❑ Not intact	
Bathroom	❑ Intact ❑ Not intact	
Porch Entry	❑ Intact ❑ Not intact	
Yard	❑ Intact ❑ Not intact	

Nurse's Signature_____ **Date**_____

Additional notes

Childhood LEAD POISONING prevention program

Updated 10/30/15

Michigan Lead Poisoning Prevention Program Referral Tracking Form

Name of Child: _____
Date of Birth: _____
MRN: _____

Nutrition	Health	Child Development	Housing
WIC Received Referred: Date_____	INSURANCE: Healthy Kids MIChild Received Referred: Date_____	HeadStart/ Early Head Start Received Referred: Date_____	Environmental Investigator Received Referred: Date_____
	Chelation Services/ Lead Poisoning Pediatric Consultants Received Referred: Date_____	Early On (EBLL>10) Received Referred: Date_____	MDHHS Healthy Homes Section Received Referred: Date_____
	Hospitalization Received Referred: Date_____		
	Children's Special Health Care Services (all children who have been chelated are eligible) Received Referred: Date_____		

COMMON REFERRAL OPTIONS

Date of Referral	Name of Agency	Contact at Agency	Type of Referral/ Reason for Referral	Date Services Began	Notes

Childhood LEAD POISONING prevention program

Revised 12/03/15

Report to Health Care Provider
Re: Lead Poisoned Child Case Management

This report is to inform you of recent lead poisoning prevention case management activities undertaken for the child listed below. It highlights issues, referrals, and educational messages that you may wish to reinforce at the child's next office visit.

Child's Name: _____

Date of Birth: _____

Address: _____

_____

Parent/Guardian's Name:

_____

Initial Blood Lead Test Result: _____ µg/dL Date of test: _____

Confirmatory Blood Lead Test Result: _____µg/dL Date of test: _____

Date of Last Health Department Home Visit_____

PLEASE NOTE: The CDC recommends that the child's permanent medical problem list includes his/her history of a confirmed elevated blood lead level.

Suggested date of next blood lead test: _____

(See next page for testing schedule.)

Reason for Referral to Health Department (Check all that apply):

- ☐ Blood lead level
- ☐ Follow-up to a prior EBLL
- ☐ Parent/guardian request
- ☐ Foster child
- ☐ Refugee/Immigrant child (country of origin: _____)

Recent Services Provided by the Health Department (Check all that apply):

- ☐ Telephone Interview
- ☐ Home visit
- ☐ Health education
- ☐ Nutritional assessment
- ☐ Unable to contact family

Possible Lead Exposure Source(s)/ High Risk Factor(s) (Circle all that apply):

Paint Soil Water Dust Frequent hand to mouth behavior

Worker take home exposure Cosmetics/Home Remedy

Ceramics or pottery Hobbies or home businesses

- ☐ Other locations where child spends time:_____
- ☐ Other: _____

Follow-up Home Visits (Check all that apply):

- ☐ Environmental Health Visit/Home Assessment scheduled for: _____(Date)
- ☐ Environmental Health Visit/Home Assessment complete
- ☐ Follow-up PHN visit planned
- ☐ Follow-up PHN visit scheduled for: _____ (Date)

Referrals Made (Check all that apply):

- ☐ Early On ☐ WIC ☐ Medicaid/Medicare ☐ Social Services
- ☐ Referred for developmental follow-up ☐ Housing remediation
- ☐ Relocation to lead safe housing
- ☐ Other:_____

Child/Family Teaching (Check all that were covered)

- ☐ Need for retesting
- ☐ Encouraged testing of siblings
- ☐ Encouraged handwashing
- ☐ Avoidance of chipping or peeling paint
- ☐ Temporary control of sources of exposure
- ☐ Wet mopping/cleaning techniques
- ☐ Reduction of occupational/hobby take home exposure (e.g., changing work clothes)
- ☐ Discontinue use of ceramics for cooking/storing/serving food
- ☐ Discontinue use of lead based home remedy
- ☐ Nutritional education
- ☐ Resources for housing remediation
- ☐ Other: _____

***Nursing recommendations to the provider:** _____

_____

_____

Follow Up Testing Recommendations

- BLL 5-14 retest 1-3 months;
- BLL 15-44 retest within 1 month until levels <15;
- BLL 45+ retest monthly as directed by expert at Children's Hospital of Michigan in Detroit.

If you have any questions, please do not hesitate to contact me at the number listed below. Thank you,

Signature: _____Date:_____

Agency: _____

Phone: _____ Email:_____

CHILDHOOD LEAD POISONING

Blood Lead Level (BLL) Quick Reference for Primary Care Providers

Not Yet Tested

Consider screening ALL children between ages 1-6

Need for testing can be based on risk factors

REMINDER: Medicaid requires all children to be tested at ages 1 & 2. Children who were not tested between 1 & 2 must be tested at least once between 3 & 6.

BLL <5

Review lead levels with family

Provide anticipatory guidance

REMINDER: Medicaid requires all children to be tested at ages 1 & 2. Children who were not tested between 1 & 2 must be tested at least once between 3 & 6.

BLL 5-14

Review lead levels with family

Confirm results with venous blood sample

Review venous sample with family

Perform environmental history. Consider other children who may be exposed

Consider iron sufficiency, provide nutritional counseling r/t calcium and iron

Provide anticipatory guidance

Refer to case management

FOLLOW UP: Retest venous sample within 1-3 months to ensure BLL is not rising

REMINDER: Medicaid requires all children to be tested at ages 1 & 2. Children who were not tested between 1 & 2 must be tested at least once between 3 & 6.

BLL 15-44

Review lead levels with family

Confirm results with venous blood sample

Perform environmental history. Consider other children who may be exposed

Consider if a specific evaluation of the child is necessary such as an abdominal x-ray. Gut decontamination may be needed if leaded foreign bodies are visualized in x-ray

Consider iron sufficiency, provide nutritional counseling r/t calcium and iron

Refer to case management

FOLLOW UP: Retest venous sample monthly until levels are <15, repeat every 1-3 months until levels are <5

REMINDER: Medicaid requires all children to be tested at ages 1 & 2. Children who were not tested between 1 & 2 must be tested at least once between 3 & 6.

BLL >44

Review lead levels with family

Confirm results with venous blood sample

Review venous sample with family

Any treatment at this level should be performed in consultation with an expert at Children's Hospital of Michigan in Detroit.

FOLLOW UP: As directed by expert. Monthly venous samples will be required.

REMINDER: Medicaid requires all children to be tested at ages 1 & 2. Children who were not tested between 1 & 2 must be tested at least once between 3 & 6.

Questions? Contact us at (888) 322-4453 or (517) 335-8885

MDHHS
Michigan Department of Health & Human Services
RICK SNYDER, GOVERNOR | NICK LYON, DIRECTOR

Childhood LEAD POISONING prevention program

From: Peeler, Nancy (DHHS)
Sent: Monday, December 07, 2015 5:09 PM
To: Fink, Brenda (DHHS);Lishinski, Karen (DCH) (LishinskiK@michigan.gov)
Subject: FW: Flint Briefing 4Dec15
Attachments: 2015-12-04 - Flint Lead MDHHS Sitrep.pdf

Sharing, FYI. Update from last Friday.

From: Bouters, Janese (DHHS)
Sent: Monday, December 07, 2015 5:07 PM
To: Anderson, Paula (DHHS) <AndersonP3@michigan.gov>; Barr, Jacqui (DHHS) <BarrJ3@michigan.gov>; Becker, Timothy (DHHS) <beckert1@michigan.gov>; Bruneau, Michelle (DHHS) <BruneauM@michigan.gov>; Colston, Leslie (DHHS) <ColstonL@michigan.gov>; DeMyers, Deborah (DHHS) <DeMyersD@michigan.gov>; Dykema, Linda D. (DHHS) <DykemaL@michigan.gov>; Eggleston, Debbie (DHHS) <egglestond@michigan.gov>; Eisner, Jennifer (DHHS) <EisnerJ@michigan.gov>; Granger, Patricia (DHHS) <GrangerP@michigan.gov>; Grijalva, Nancy (DHHS) <GrijalvaN@michigan.gov>; Groetsch, Kory J. (DHHS) <GroetschK@michigan.gov>; Harvey, Janice (DHHS) <HarveyJ1@michigan.gov>; Hertel, Elizabeth (DHHS) <HertelE@michigan.gov>; Kaiser Van Dam, Paula (DHHS) <KaiserP@michigan.gov>; Lasher, Geralyn (DHHS) <lasherg@michigan.gov>; Lyon, Nick (DHHS) <LyonN2@michigan.gov>; McKane, Patricia (DHHS) <McKaneP@michigan.gov>; Miller, Corinne (DHHS) <MillerC39@michigan.gov>; Minicuci, Angela (DHHS) <MinicuciA@michigan.gov>; Moran, Susan (DHHS) <MoranS@michigan.gov>; Peeler, Nancy (DHHS) <PeelerN@michigan.gov>; Priem, Wesley F. (DHHS) <priemw@michigan.gov>; Priest, Chris (DHHS) <PriestC1@michigan.gov>; Ridley, Nancy (DHHS) <RidleyN@michigan.gov>; Robinson, Mikelle (DHHS) <RobinsonM18@michigan.gov>; Rockefeller, Cheryl (DHHS) <RockefellerC@michigan.gov>; Scott, Jackie (DHHS) <ScottJ14@michigan.gov>; Shah, Sandip (DHHS) <shahs@michigan.gov>; Sims, Teri (DHHS) <SimsT2@michigan.gov>; Stanbury, Martha (DHHS) <stanburym@michigan.gov>; Stiffler, Kathleen A. (DHHS) <StifflerK@michigan.gov>; Taylor, Kerri (DHHS) <TaylorK10@michigan.gov>; Thompson, Sheryl D. (DHHS) <ThompsonS2@michigan.gov>; Titus, Laura (DHHS) <TitusL@michigan.gov>; Travis, Rashmi (DHHS) <TravisR@michigan.gov>; Wells, Eden (DHHS) <WellsE3@michigan.gov>
Subject: Flint Briefing 4Dec15

Sending on behalf of the PHCSA:

Attached is the MDHHS daily situation report for the Flint water lead project.

Thanks,

Janese Bouters
Executive Secretary to Corinne Miller
Bureau of Disease Control, Prevention and Epidemiology
Michigan Department of Health & Human Services
201 Townsend Street
Lansing, Michigan 48913
Phone: (517) 335-8731
Fax: (517) 335-8263

Flint Water Lead Project

Michigan Department of Health and Human Services
Situation Report for December 4, 2015

NOTE: Contains potentially identifiable information- REDACT AS INDICATED
New items for the day listed first and in bold print.

Daily Briefing and Situation Report prepared by Linda Dykema

Surveillance Indicators: People Tested since 10/1/2015: 1,361;
Children less than 6 years old ≥ 5 µg/dl since 10/1/2015: 15
Children 6 to 17 years old ≥ 5 µg/dl since 10/1/2015: 6
Adults 18 years and older ≥ 5 µg/dl since 10/1/2015: 9
Severity Indicators: Hospitalized/Discharged-1/1; Deaths- 0

DAILY ACTIVITY SUMMARY

Elevated Blood Level (EBL) Environmental Investigations – ETC Contractors, Wes Priem, Courtney Wisinski

- **EBL investigation for high EBLL home completed on Friday 12/4/15.**
- 3 EBL investigations completed.
- 8 investigations scheduled.

MDHHS/Genesee County Health Department (GCHD) Case Management (CM) Services – Nancy Peeler

- **Child with EBLL of 52 µg/dl: blood level has decreased to 28 µg/dl per confirmed lab report.**
- CM report through 11/25/15:
  - # of contacts attempted: 136
  - # offered CM: 46
  - # CM started: 5
  - # of children receiving CM who live in Flint: 5
  - # billed to Medicaid: 5
  - # Other disposition: 2 (2 children moved to Oakland County)

Epidemiology/Surveillance – Patti McKane, Martha Stanbury, Bob Scott, Jessica Cooper, Karen Lishinski

- **EPA, CDC, MDHHS, local health department call scheduled for later this week to discuss Legionellosis.**

Filter Distribution Sheryl Thompson

- November Distribution
  - 778 Filters
  - 63 Pitchers
  - 924 Replacement Filters
- Total Distribution since October 1, 2015
  - 10,951 Filters
  - 184 Pitchers
  - 924 Replacement Filters

Communications/Information Sharing – Linda Dykema, Eden Wells

- **EPA drinking water experts will present to Technical Advisory Committee meeting on December 9th. Topics will include water treatment/corrosion, the status of Flint's water and next steps.**

Health Education Resources Updates - Michelle Bruneau, Emily Houk

- **Finalized Phosphates fact sheet with GCHD; sent final version to MDHHS Communication office to be finalized and posted on the website.**
- **Bath time poster finalized and forwarded to HHS Communications/PIO for review and approval.**
- **Per Emily Houk, mailed 1000 Keep Your Child Lead-Safe booklets (English), 500 Keep Your Child Lead-Safe booklets (Spanish), and 4 boxes of Fight Lead Poisoning with a Healthy Diet to GCHD.**
- **Finalized time/date of technical meeting with GCHD to discuss phosphate dosing and health (Wednesday, 12/9; 9:30-11a).**
- Pending: Aerator/Filter Maintenance Fact Sheet; Flint Parent Letter re-do in partnership with Emily Houk.

Toxicology - Kory Groetsch, Jennifer Gray, Junaid Maqsood, Veronica Tijerina

- **Collaborating with Surveillance, CM, and EBL response staff to develop a Data Dictionary and Database to track services provided to EBL children/families.**
- Working with GCHD and DEQ to address questions concerning impact of phosphate treatment on drinking water filters.
- Working with Healthy Homes Section staff to revise EBL report for Flint Residents.

WIC

- Letter sent 11/24 to GCHD about Ready-to-feed formula availability from WIC program
- Talking points for WIC staff and for providers shared

Healthcare/Providers

- **Drafted HAN to Flint healthcare providers for review by the project communications team and GCHD. The HAN encourages enhanced BLL testing for children less than six, particularly outside of the 1 and 2 years of age that are required by Medicaid.**
- Moran, Wells and Miller met with Medicaid health plan staff 2 to discuss increased promotion by health plans of EBL testing of Flint children < 6 years of age. Status update on Flint provided. Medicaid put this issue on its agenda for discussion at its December 3 meeting with Medicaid health plan CEOs and suggested inviting Dr. Wells to speak to Medicaid health plan medical directors.
- Medicaid identified three individuals to partner with epidemiology staff to develop methodology to measure/report progress on the percentage of Flint children enrolled in Medicaid who receive EBL testing.

DEQ Information - Linda Dykema as Liaison

- No updates for 12/4/2015.

From: Peeler, Nancy (DHHS)
Sent: Monday, December 07, 2015 5:34 PM
To: Lishinski, Karen (DCH) (LishinskiK@michigan.gov)
Subject: email to send out on Tuesday morning

See below, trying to keep it short! Please copy me and Linda Dykema on the email to Candace. Thanks!

_____

Dear Candace,

I just wanted to follow up on your inquiry to our program about assistance with Representative Neely's upcoming health fair in Flint.

We wanted to confirm that the Genesee County Health Department is your best resource for materials, and we understand they do have print materials about nutrition related to children and lead exposure. Either the WIC staff at the Genesee County Health Department, or potentially staff at MSU Extension, could be good resources related to your proposed 'healthy eating' demonstration. Good luck with your event!

Karen Lishinski RN MA

Nurse Consultant

MDHHS Childhood Lead Poisoning Prevention Program

517 241 3599

lishinskik@michigan.gov

From: Ludtke, Mary (DHHS)
Sent: Tuesday, December 22, 2015 11:54 AM
To: Peeler, Nancy (DHHS)
Subject: RE: question about Pediatric Symptom Checklist

For young children that are screened with the ASQ, the process is clear in most communities (to Early On) but with older children, the identification of mental health issues would mean a referral to a mental health professional for assessment. For Medicaid children the health plans should have practices/agencies identified in the community or for those with very severe issues, a referral to Genesee Health Systems (community mental health) would be warranted. Valinda Christopher is the children's services director in Genesee. Would you like me to contact her?

Mary

From: Peeler, Nancy (DHHS)
Sent: Tuesday, December 22, 2015 11:49 AM
To: Ludtke, Mary (DHHS) <ludtkem@michigan.gov>
Subject: RE: question about Pediatric Symptom Checklist

This would be the nurse case managers from the local health department using the tool, with 6-17 year olds. If they had a finding on the screener, they might send info the PCP for them to order further testing or follow-up, or perhaps the ISD for special ed, or CMH. We haven't started yet, so not sure what they will find or where the referral would go.

From: Ludtke, Mary (DHHS)
Sent: Tuesday, December 22, 2015 11:40 AM
To: Peeler, Nancy (DHHS) <PeelerN@michigan.gov>
Subject: RE: question about Pediatric Symptom Checklist

Nancy...we have supported the use of the Pediatric Symptom Checklist in discussions with Medicaid and primary care (as we did in LAUNCH). There are not any specific training videos, to my knowledge, but the Mass General website has all of the materials that one would need. I appreciate that they have a youth version (over 13 years) and the tool in multiple languages including a pictorial version. Since this tool is used in general pediatric care, I don't foresee any issues with using the tool. I trust that it will be useful in primary care. Has anyone let the CMH know that additional screening will be going on to make sure that they know that they may get calls from pediatric care/families?

Of course, the PSC does not screen for other developmental issues besides social emotional health. Will the docs have additional surveillance questions to ensure all of the developmental issues are addressed?

Mary

From: Peeler, Nancy (DHHS)
Sent: Tuesday, December 22, 2015 10:08 AM
To: Ludtke, Mary (DHHS) <ludtkem@michigan.gov>
Subject: question about Pediatric Symptom Checklist

Hi Mary – We are working closely with Genesee County Health Department as they provide case management services to children in Flint with elevated blood lead levels. Our case management protocol includes developmental screening

with the ASQ for younger children, . However, there are also some 6-17 year olds that may receive services, and I am considering substituting the PSC for the ASQ for that older group. A couple of questions for you:

- Do you see any issues with using the PSC in this type of circumstance?
- We accessed the tool, scoring materials, administration information are available for free online. Are there any training videos or materials specific to this tool that you are aware of? Would that be needed (it didn't look like it to me).

Thanks for any info you can offer!

Nancy

From: PeelerN@michigan.gov
Sent: Tuesday, January 05, 2016 1:05 PM
To: Stanbury, Martha (DHHS)
Subject: Fwd: 010116 Edited FLINT BLOOD LEAD CM - weekly status tracking form v5 12.22.15.xlsx
Attachments: 010116 Edited FLINT BLOOD LEAD CM - weekly status tracking form v5 12.22.15.xlsx; ATT00001.htm

Received from GCHD this morning.

Sent from my iPad

Begin forwarded message:

From: "Noble, Kim" <knoble@gchd.us>
Date: January 5, 2016 at 7:57:11 AM EST
To: "July, Jori" <jjuly@gchd.us>, "Lishinski, Karen (DHHS)" <LishinskiK@michigan.gov>, "Peeler, Nancy (DHHS)" <PeelerN@michigan.gov>, "LaRocco, Toni" <tlarocco@gchd.us>
Cc: "Wenstrom, Janet" <jwenstrom@gchd.us>, "Cook, April" <acook@gchd.us>, "Taylor, Sherry" <STAYLOR@gchd.us>, "Taylor, Sherry" <STAYLOR@gchd.us>
Subject: 010116 Edited FLINT BLOOD LEAD CM - weekly status tracking form v5 12.22.15.xlsx

Hello
Here is an updated file. Not much movement over last 2 weeks due to short weeks and holidays. No new file from Bob until this week. I added a column (B) to report week's lists numbers instead of the number being buried in the first column (A). It helped for the formulas. The columns shifted once to right to become C to O. We did open one child to case management during this time period.
Thank you

Kim Noble RN, BSN
Public Health Nurse
Genesee County Health Department
G-3373 S. Saginaw Street
Burton, MI 48529
Telephone: 810- 237-4571
Fax: 810- 237-4612
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For a copy of the Health Department's Notice of Information Practices, contact the Health Department or visit the Health Department's website at http://www.gchd.us/

	A
1	**Target Population**
2	
3	
4	
5	
6	All 0-5 year old children with elevated Capillary≥ 5 from April 2014 – September 2015
7	
8	All 0-5 year old children with newly elevated Venous≥ 5 from April 2014 – September 2015
9	
10	All 0-5 year old children with new elevated Capillary≥ 5 since October 2015
11	
12	All 0-5 year old children with new elevated Venous≥ 5 since October 2015
13	
14	**TOTALS**
15	All **6-17** year old children with elevated Capillary or Venous > 5 since April 2014
16	
17	
18	** Column B will reflect the new, weekly numbers*
19	Metrics included in contract (as amended 11.18.15):
20	1. Number and percentage of target children with elevated blood lead levels of≥ **5 ug/dL** for whom contact has been attempted.
21	2. Number and percentage of target children with elevated blood lead levels of≥ **5 ug/dL** that are successfully contacted and offered case management services.
22	3. Number and percentage of target children receiving case management services.
23	4. Number and percentage of target children receiving case management services residing in the City of Flint.
24	5. Number of Medicaid claims filed for children enrolled in Medicaid who receive testing or nursing assessment visits.
25	
26	
27	
28	*v5 12.22.15*

	B	C	D	E
1	**Total for Row**	**# for whom contact has been attempted**	**% for whom contact has been attempted** (Col.C/Col.B)	**# successfully contacted and offered CM**
2				
3				
4				
5				
6	77	77	100%	41
7				
8	83	83	100%	47
9				
10	11	11	100%	8
11				
12	15	15	100%	13
13				
14				
15	12	12	100%	6
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				

	F	G	H
1			
2			
3	**% of total** (Col.E/Col.B) **% of attempted** (Col.E/Col.C)	**# of children receiving CM**	**% of total** (Col.G/Col.B) **% of contacted** (Col.G/Col.E)
4			
5			
6	53%	NA	#VALUE!
7	53%		#VALUE!
8	57%	19	23%
9	57%		40%
10	73%	NA	#VALUE!
11	73%		#VALUE!
12	87%	6	40%
13	87%		46%
14			
15	50%	2	17%
16	50%		33%
17			
18			
19			
20			
21			
22			
23			
24			
25			
26			
27			
28			

	I	J	K	L
1	**# of children receiving CM who live in Flint**	**% of CM in Flint** (Col.I/Col.G)	**# of CM Medicaid claims filed**	**% for whom Medicaid claims filed** (Col. K / Col. G)
2				
3				
4				
5				
6	NA	#VALUE!	NA	#VALUE!
7				
8	19	100%	9	47%
9				
10	NA	#VALUE!	NA	#VALUE!
11				
12	6	100%	5	83%
13				
14				
15	2	100%	1	50%
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				

	M	N	O
1	**# other disposition** (closed, moved)	**% with other disposition** (Col.M/Col.B)	**Disposition notes**
2			
3			
4			
5			
6	5	6%	
7			
8	14	17%	
9			
10	1	9%	
11			
12	3	20%	
13			
14			
15	1	8%	
16			
17			
18			
19			
20			
21			
22			
23			
24			
25			
26			
27			
28			

From: Peeler, Nancy (DHHS)
Sent: Tuesday, December 08, 2015 2:01 PM
To: Lishinski, Karen (DCH) (LishinskiK@michigan.gov)
Subject: GCHD info about challenges
Attachments: GCHD info about challenges.docx

My notes, FYI. I will share these in my daily update, and we can escalate the question about the CM and EBL always being together.

12.8.15 – CM Status call with Sherry, Kim, Andrew, Jim?, Nancy, Karen.

GCHD info about challenges/barriers with CM in Flint:

- CM staff have another 6 scheduled, not seen yet.
- Some families with multiple kids, but GCHD has been counting the family, not # of children. So numbers look low.
    - *Follow up: Genesee staff will discuss with their Supervisor including count of children (in columns F and H), not count of families. Both parties understand that the # of Medicaid claims filed will not match the # of children.*
- Many of these are old tests – so families are choosing to get a new test, want to see what those results are before they have someone come out.
- Some families have moved, are not at the same address as when the child had the EBL, therefore do not want someone to come out.
- Some people have asked for more information, so they can think about whether they want someone to come out.
- Some people live with other people, so need to loop others into the decision to accept CM or invite the EBL investigator into the home.
- Currently offering both CM and EBL when they call; some families don't want a 6 hour visit. Also the nurses are trying to go out with the EBL investigator, which holds up the CM visits.
    - *Follow up: Are we comfortable with the two services being offered separately, in case the family will accept one but not the other? We will review this here with Wes and Courtney; Genesee will review this with Jori to get her input.*
- Some families are convinced that the water is the only problem, so they are not feeling the need for CM and/or EBL investigation that looks at the house. Some have accepted filters, but not CM/EBL.
- Some children have a history of even higher EBLs, so a 5 or even a 10 now is not a big concern to the family.

From: Peeler, Nancy (DHHS)
Sent: Thursday, December 10, 2015 3:49 PM
To: Travis, Rashmi (DHHS)
Subject: FW: CM for children with lead levels < 5

Here's what I sent…

From: Peeler, Nancy (DHHS)
Sent: Tuesday, December 01, 2015 2:03 PM
To: 'July, Jori' <jjuly@gchd.us>
Cc: Lishinski, Karen (DCH) (LishinskiK@michigan.gov) <LishinskiK@michigan.gov>; LaRocco, Toni (tlarocco@gchd.us) <tlarocco@gchd.us>
Subject: CM for children with lead levels < 5

Good afternoon, Jori.

Per our discussion last week, with this email I am verifying our conversation that there may occasionally be circumstances where GCHD deems it appropriate and necessary to offer Case Management services to a child in Flint/Genesee County, who has been exposed to Flint water, that has a blood lead test showing a lead level <5. If this occurs, we appreciate if you could keep us informed that you have made such determination, and for whom (conversation during the weekly call will suffice). That will help us as we maintain our records here. Please let me know if you have questions.

Nancy Peeler, Manager
Early Childhood Health Section
517/335-9230

Message

From: Peeler, Nancy (DHHS) [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=EC5DDCB9DCEC411293AAAFD42AEF28BD-PEELER NANCY]

Sent: 12/11/2015 2:19:08 PM

To: Mayes, Nanette (DHHS) [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=da9338ebbad4440bbefb62cd9b6c8cf7-Mayes Nanet]; Fink, Brenda (DHHS) [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=336e5968239741c9b9ef34f4ce1d109e-Fink Brenda]; Dunbar, Paulette Dobynes (DHHS) [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=92e1fea4b6664bfba545aa297671178d-Dunbar Paulette Dobynes]; Travis, Rashmi (DHHS) [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=bc18d4344f1b4a58bcb0342b3a68e84f-Travis Rash]; Stiffler, Kathleen A. (DHHS) [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=e500df8476c9488fa2a31ddf884fc912-Stiffler Kathleen A.]; Hamilton, Kimberly (DHHS) [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=e57bd10be65a4e21b2c04d8ed36a25ad-Hamilton Kimberly]; Kwasnik, Monica (DHHS) [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=8c1abedd2996404bac7a8b964be4ac46-Kwasnik Monica]; Prokop, Jackie (DHHS) [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=1374cf31d14b4ae5aae37663aa6e3eb2-Prokop Jackie]; LaPres, Marie (DHHS) [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=6e5673da0c534b179f61fb28defd7ef4-LaPres Marie]; Dilernia, Lisa (DHHS) [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=6beefba9799848999e143567c7a124e7-Dilernia Li]; Diebolt, Pamela J. (DHHS) [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=6e9e698cd0b24b3bbc9ea75dc709de9a-Diebolt Pamela J.]; Said, Manal (DHHS) [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=cc87b72546bb49a8a81068893f876fd1-Said Manal]; Barnett, Lonnie D. (DHHS) [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=8f90b95ed3c94f41909498f6e6c2e79b-Barnett lonnie D.]; McCandless, Karla K. (DHHS) [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=b873e244cece4204a55104478685cbec-McCandless Karla K.]; Barron, Brad (DHHS) [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=3b282aa42d534a4e95f0fd9b06a234ca-Barron Brad]; Hambleton, Matthew (DHHS) [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=c7b102bb02084a7bbcce63a563b73c87-Hambleton Matthew]; Linn, Cindy (DHHS) [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=8d0b438c4ea34c52ad410989d77b1d4c-Linn Cindy]

CC: Hennesey, Diane (DHHS) [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=e5de31fe80a04ddbaff229236cc213ff-Hennesey Diane]; Lounds, Elizabeth (DHHS) [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=ddd111d8f6f24bee9fd0a2964762b3cd-Lounds Elizabeth]; Reinhart, Denise (DCH) [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=e95abf8730b248fe8ed980835fcef814-Reinhart Denise]; Larner, Trena (DHHS) [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=5e5827bfe6a444e6af91c0a9537ca6f4-Larner Trena]; Stanbury, Martha (DHHS) [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=9051f88309e84aea86fb48005135336d-Stanbury Martha]; Priem, Wesley F. (DHHS) [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=162739ec0e9c4406bc6eaf42c5e2c1be-Priem Wesley F.]

Subject: RE: DFCH/HP Planning

Attachments: Agenda MHPs and Lead Services 12 11 15.docx; FLINT CM Protocol.pdf

Good morning - I' m sending an agenda for today' s meeting about Medicaid Health Plans and lead, along with our updated CLPPP Case Management protocol, FYI. Also note that I have added Martha Stanbury and Wes Priem to this email list, as they weren' t on the original invitation. Martha and Wes, not sure you can join on short notice, and I apologize that you didn' t receive notice about this meeting earlier.

The conference call information is listed on the agenda as well as below. I will be sending the updated workplan later, just before the meeting. See you this afternoon!

Nancy

Conference line:
Passcode: PPI PPI

-----Original Appointment-----
From: Mayes, Nanette (DCH)
Sent: Thursday, May 14, 2015 4:20 PM
To: Mayes, Nanette (DCH); Fink, Brenda (DCH); Dunbar, Paulette Dobynes (DCH); Peeler, Nancy (DCH); Travis, Rashmi (DCH); Stiffler, Kathleen A. (DCH); Hamilton, Kimberly (DCH); Kwasnik, Monica (DCH); Prokop, Jackie (DCH); LaPres, Marie (DCH); Dilernia, Lisa (DCH); Diebolt, Pamela J. (DCH); Said, Manal (DCH); Barnett, Lonnie D. (DCH); McCandless, Karla K. (DCH); Barron, Brad (DCH); Hambleton, Matthew (DCH); Linn, Cindy (DCH)
Cc: Hennesey, Diane (DCH); Lounds, Elizabeth (DCH); Reinhart, Denise (DCH); Larner, Trena (DCH)
Subject: DFCH/HP Planning
When: Friday, December 11, 2015 1:00 PM-2:30 PM .
Where: MDCH-WSB-206

Added Participants: Manal S, Lonnie B, Karla M, Brad B, Matthew H and Cindy L

Updated list of participants:

Brenda F, Paulette D, Nancy P, Rashmi T, Kathleen S, Kimberly H, Monica K, Jackie P, Marie L, Lisa D, Pam D

Medicaid Health Plans and Childhood Lead services

December 11, 2015, 1:00-2:30 pm

WSB 206

Conference line: PPI

Passcode: **PPI**

1. Introductions and Review Agenda

2. Status updates since last meeting
    a. Review work plan
    b. Service Protocols
    c. Payment
    d. Timeline

3. NEW BUSINESS: Workplan and Overarching items
    a. Check in on presentation for Health Plan MCH meeting next week
    b. Other?

Michigan's Case Management Protocol for Children with Elevated Blood Lead Levels in Flint, Michigan

Section 1: Application of this Protocol

The State of Michigan's childhood lead poisoning elimination goal is to identify and provide appropriate follow-up services to all children with Elevated Blood Lead Levels (EBLLs) in order to support their continued health and safety.

To meet this goal, case management services should be performed for children with BLLs≥5ug/dL as determined by a venipuncture test.

Origin

This document represents a standard of care as prescribed by the United States Centers for Disease Control and Prevention (CDC), the American Academy of Pediatrics (AAP), Michigan state law and Medicaid. This document contains case management guidelines developed by the Nursing and Health Support component of the Michigan Department of Health and Human Services Childhood Lead Poisoning Prevention Program (CLPPP).

Section 2: Expectations

Desired outcomes of EBLL case management include:

- Reducing an elevated blood lead level below the current CDC reference value of ≥5 ug/dL;
- Evidence that communication has occurred between caregivers and other service providers to ensure the child's continued health and safety;
- Evidence and assurance that appropriate action has been taken by case managers as required by this protocol.

Section 3: Required Activities

Activities defined by Medicaid, the CDC and AAP as encompassing case management include:

- Client identification and outreach
- Individual assessment and diagnosis
- Service planning and resource identification
- Linking clients to needed services
- Service implementation and coordination
- Monitoring of service delivery
- Advocacy
- Evaluation

1. Client Identification and Outreach

Case managers must continually review the list of EBLLs ≥5ug/dL provided on a weekly basis by the MDHHS Surveillance Manger. Case managers must contact and offer case management services to these families based on the schedule below. Outreach efforts must be deliberate, ongoing and varied in order to ensure that contact with families is made.

All outreach activities must be documented in activity logs and the HHLPP system.

a. Schedule

The following schedule must be used when initiating initial in-home nursing visits:

- BLL 5-14 within 2 weeks of referral;
- BLL 15-44 within one week of referral;
- BLL 45+ within 48 hours of referral;

b. Fees for Services

Medicaid provides reimbursement for the following in-home visits related to a venipuncture EBLL ≥ 5ug/dL:

- Two Environmental Investigations (One initial and one alternative location as needed)
- Two Blood Lead Nursing Assessment Visits (two in-home visits)

2. In Home Visits

Nursing Assessments Overview

Nursing Assessment visits must be provided in the child's home. The objectives of the first home visit are:

- **Individual assessment and diagnosis** through a health, development, social and

dietary history for the affected child and identification of the possible sources of lead in the child's environment.

- **Development of a Plan of Care** that identifies resources specific to the individual child and family so that exposure is reduced, appropriate referrals and recommendations can be implemented, and the impact of lead exposure minimized.
- **To provide education and anticipatory guidance for caregivers** so that the effects of exposure are minimized
- T**o advocate for families** to ensure they receive the appropriate support for managing their child's exposure through community referrals and resources; and
- **To ensure that the Individualized Plan of Care is continually reevaluated** until the child's lead level is below the current CDC reference value of 5ug/dL.

The initial visit will focus on:

- Assessment of the growth and development of the child, including any symptomology that may be present in the child (refer to Initial Home Visit assessment form for a list of common symptoms)
- Behavioral assessment of the child including any aggressive and/or hyperactivity
- Nutritional assessment of the child
- Assessment of typical family practices that may produce lead risk (e.g., hobbies, occupation, cultural practices)
- Limited physical identification of lead hazards within the dwelling
- Identification and planning for testing of any other family member at risk for lead hazard exposure
- Education and information regarding lead hazards and ways to minimize those risks in the future
- Development of a family plan of care to increase the safety of the child from lead hazards
- Facilitating blood lead follow-up testing and treatment recommended by the PCP.

a. First visit activities

The purpose of the initial nursing assessment home visit is to gather sufficient information to develop an Individualized Plan of Care for the child with an EBLL and to ensure that all siblings and pregnant women in the household are identified for further screening. The child with EBLL must be present at the initial visit for a physical assessment and observation of his/her behavior. During the initial visit, the following must be accomplished:

- Obtaining Caregiver authorization to release protected health information to the case management team and to referral sources as needed using the MOCH HIPAA Authorization to Disclose Protected Health Information Form or any other

agency-developed disclosure form.

- Discuss possible sources of lead exposure:
  - Lead Paint (walls, doors, windows, furniture)
  - Child's toys or common household items
  - Cultural foods, cookware or other items
  - Parent occupation
  - Lead in water or pipes
  - Other
- Interview of the child's caregiver(s) to collect the child's health, social and nutritional history. (Refer to the Initial Nursing Visit form).
  - Obtaining a health history that addresses the current health status of the child, including:
    - Past history of lead testing and, if necessary, chelation for the child;
    - Past history of lead testing for other family members;
    - Child's history of anemia (if any); ask caregiver to relate information re: the child's hemoglobin status;
    - Caregiver's observations about the child's developmental progress;
    - Caregiver's assessment of the child's behavior;
    - Caregiver's assessment of the child's cognitive development;
    - A visual/physical assessment of the child's body systems including eyes, heart and lungs, abdomen/digestive, elimination, muscular and skeletal;
    - Performing a standardized developmental screening to provide a baseline for the future (ASQ).
    - If the child is already enrolled in Early On or Special Education, you may instead obtain parent consent and request the evaluation assessment results from Early On or Special Education.
  - A complete nutrition history for the child including the following:
    - Caregiver's description of the child's usual diet pattern. This should begin with a twenty-four hour recall of his/her intake and ask if this is typical of the child's intake.
    - Ask about child's intake of breast milk, formula and/or cow's milk;
    - Ask about child's intake of other dairy/calcium sources;
    - Ask caregiver about child's intake of iron-containing foods and dietary fat;
    - Inquire about ethnic food products imported or carried from another country;
    - Ask about dietary supplements;
    - Ask caregiver the number of meals and number of snacks the child consumes each day; and
    - Ask where the child sits to eat.
  - A social history for the child including:

- Caregiver's description of play and sleep habits;
  - A child's usual play area;
  - Environments other than the child's primary residence where the child spends 20 hours per week or more (address and caregiver name(s));
  - Family occupational and hobby history: include occupations and hobbies of adults in the home and other adults with whom the child spends time;
  - Cultural practices or foods in use by the immediate family as well as other adults with whom the child spends time;
  - Behavior: ask the caregiver about mouthing/hand-to-mouth behaviors (to be expected in young children), including fingers in mouth; chewing on toys, crayons, newspaper/other print material, matches; consumes non-food items, such as dirt, grass, cigarettes/ashes; chews on furniture? crib/playpen? window sills/frames/doors?; plays at or near chipping or flaking paint, or has been seen eating paint chips.

- Documentation of other information including:
  - Family income source
  - Whether the family receives: WIC, food stamps, Medicaid/Medicare, other support, such as a food pantry.
  - If the residence is a rental property: name, address, phone number and/or other contact information for the rental property owner.
  - Barriers to obtaining medical care: time, both amount of time needed and time of day, child care, transportation, literacy, language barrier, etc.

After the child's history is completed, ask the caregiver for permission to look around the child's common areas for visual evidence of exposure sources, exposure behaviors and family practices.

The Individualized Plan of Care and Referral forms should be completed after reviewing the information obtained in the course of the initial nursing visit.

Appropriate referrals will be made in a timely manner. Early On referrals should include ASQ results as well as documentation of diagnosis. A report to the child's healthcare provider should also be completed and submitted at this time. (Use the Report to Healthcare Provider form).

b. Second and subsequent home visit activities

The purpose of the second and/or subsequent nursing home visits is to assess caregiver implementation of the plan of care, including compliance with medical follow up, housekeeping practices, and reductions in exposure. Objectives of the second home

visit are to:

- **Reinforce the educational information** presented to the family during the first visit
- **Validate** the family's ability to carry out activities to minimize risks of continued lead exposure
- **Modify** the plan of care to minimize lead risks, as needed
- **Facilitate blood lead follow-up testing** and treatment recommended by the PCP
- **Follow up on any referrals made**

The second visit must include:

- A review of contact information and primary care provider information with child's caregiver(s);
- Review of initial forms and documenting changes in EBLL, child's health history, nutritional history, social history, and conditions in the home;
- Review of the Individualized Plan of Care to identify additional messages to communicate at this visit;
- Assessment of the family's understanding of their responsibilities under the Plan of Care and a determination as to whether additional education or resources are needed to implement the plan;
- Revising the Individualized Plan of Care as needed and obtaining consent or signatures; and
- Notifying the health care provider and other members of the team, including the Environmental Investigators, of significant changes.
- Complete any activities not finished during the first visit.
- Timing of the second subsequent visits may be influenced by observations/ information from the first visit, and at the case manager's discretion, may take place relatively quickly.

Results of the second and/or subsequent follow-up visits must be recorded on the Follow Up Visit form.

c. Nursing assessment case closure activities

Nursing services may not be discontinued until all of the following are completed

- At least 2 home visits in which lead education was provided are done
- Nutritional, medical and developmental assessments are done
- There is one blood lead level below 5 ug/dL
- Recommended abatements and/or lead hazard reduction is completed

Use of administrative case closure should be infrequent and reserved for the following extenuating circumstances:

- Parent refuses services

- Family has moved out of jurisdiction (a new referral MUST be made)
- At least 3 documented attempts to locate or gain access to the child and caregiver have failed (2 visits/ 1 certified mail) **and** attempts to reach the family using PCP or MIWIC, MICAR, CLPPP staff and other resources have been made

Section 4: Environmental Investigations

The Michigan Department of Health and Human Services Healthy Homes Section is available to assist case managers with environmental investigations.

The case manager must work collaboratively with the environmental investigator to maximize the opportunity for scheduling joint visits and to ensure that inspection and remediation take place in a timely fashion.

If the child's BLL is > 44mcg/dl, the case manager will contact the primary care provider and the hospital immediately to understand the plan of care. Coordination with the EBL investigators, and hospital must be done to ensure that the child will discharged to a safe environment (e.g. the designated property has been certified free of lead hazards before the child returns to that location.)

Contact the Health Homes Section at (866) 691-5323 or 517 335 8252 or refer to the case management guidelines for environmental visits at http://www.michigan.gov/documents/mdch/EBL_EI_Protocol_February_2015_484429_7.pdf.

Contacting Families

Child Elevated Lead Case Management

Genesee County Health Department

It is imperative that the Case Managers make every reasonable and possible attempt to contact the families of the EBLL children in order to offer Case Management and Environmental Investigation Services.

After three documented initial attempts (two home visits and one certified letter) to locate the family, further attempts should be made to find and contact the family via other resources, including, but not limited to:

- Primary Care Physician
- MI WIC data base
- MCIR data base
- Other local resources
- State of Michigan CLPPP staff (to access other state data bases)

Revised 12/03/15

CLPPP
Lead Poisoning
Nursing Initial Home Visit

MRN _____

Client Information:

Case Child's Name (Last, First Mi): _____ DOB: _____ Race: _____ Sex: _____ Ethnicity: _____

Childs Primary Address: _____ City: _____ County _____ Zip code _____

MA# _____ Other ID: _____ Construction date: _____

PCP Name: _____ Address: _____ Phone #: _____

Alt . Medical Provider: _____ Address: _____ Phone #: _____

Relationship:	Age:	Phone #:	Occupation:
Mother		Home	
		Business	
Father		Home	
		Business	
Other		Home	
		Business	
Other		Home	

Alternate Contact person

Name:	Address:	Phone #:	Relationship:

Child's Lead Test History:

Date of Blood Draw:	Type (Capillary or Venous):	Lead Level:	Date of Blood Draw:	Type (Capillary or Venous):	Lead Level:

Caregiver Information:

Primary Caregiver is: ☐ Mother ☐ Father ☐ Foster Parent/Guardian

☐ Other Specify: _____

Person Interviewed: _____

Primary language of the household: _____

What is the primary source of income for the family? _____

Does family receive:

☐ WIC ☐ Food assistance ☐ Medicaid/Medicare/SSI/SSDI

☐ MI Child ☐ Maternal Infant Health

☐ Public housing

☐ Other: Social service agency support, food pantry etc._____

Does the family own or rent the property? ☐ Own ☐ Rent If rented:

Owners Name: **Address:** **Phone #:**

_____

_____

Property Management Firm: _____

Other living arrangement (explain): _____

_____

_____

_____

Child's Health History:

When was the last time your child was seen by the doctor? _____

Do you have any concerns about your child's health? ☐ Yes ☐ No

If yes, explain: _____

Does the child have a history of (Check all that apply):

☐ Asthma ☐ Birth defects ☐ Diabetes ☐ Heart conditions ☐ Sickle cell ☐ Seizures

Other:_____

_____

Is the child currently taking prescribed medications? ☐ Yes ☐ No

If yes, list medications: _____

Does the child have a history of iron deficiency Anemia? ☐ Yes ☐ No

Do you know the child's hemoglobin status? ☐ Yes ☐ No

If no, explain:_____

Does your child have allergies? ☐ No ☐ Yes, To: Medications (list)_____

Food (list)_____

Other:_____

Is the child current with immunizations? ☐ Yes ☐ No

If no, explain: _____

Is the doctor aware of your child's blood lead history? ☐ Yes ☐ No

Has the child ever been hospitalized for lead poisoning?

☐ No ☐ Yes If yes, specify dates: _____

Has the child ever received chelation therapy?

☐ No ☐ Yes If yes, specify dates: _____

Is the child receiving or has the child been referred to Children Special Health Care Services?

☐ Receiving services ☐ Referred to services ☐ Neither

Barriers to obtaining medical care: ☐ lack of medical insurance ☐ transportation

☐ language barrier ☐ not convenient for work schedule ☐ cannot find child care for other children

☐ literacy ☐ Other _____.

Comments: _____

Sibling Lead History

Comments:_____

_____

_____

Developmental Assessment:

Does the caregiver feel the child's development is normal for his/her age? ☐ Yes ☐ No

If no, specific concerns_____

_____

Date of ASQ or other assessment:_____

_____

Deficits noted? If yes, explain:_____

_____

Nutritional Assessment:

Do you have food available for the family all days of the month? ❑ Yes ❑ No

Does your child have a good appetite? ❑ Yes ❑ No

How many meals does your child eat each day? ___ How many snacks? ___

Do your child's eating habits fluctuate frequently? ❑ Yes ❑ No

Does your child eat at the same times each day? ❑ Yes ❑ No

Where does your child usually sit to eat? _____

Does your child eat at school/daycare? ❑ Yes ❑ No Describe:_____

Type of food:_____

Does your child eat fruits and vegetables daily? ❑ Yes ❑ No If no, explain:_____

Does your child take vitamins or dietary supplements (i.e., calcium, iron etc)? ❑ Yes No ❑

If yes, list them:_____

Does your child take any other nutritional supplements/herbal preparations or remedies from another country? ❑ Yes ❑ No If yes, describe: _____

Does the family eat food grown in a garden? ❑ Yes ❑ No

Does your family thoroughly wash all fresh fruits and vegetables? ❑ Yes ❑ No

Does your child ever eat ethnic foods from another country? ❑ Yes ❑ No

Are food items stored in open cans or ceramic containers? ❑ Yes ❑ No

Are handmade or imported ceramic dishes used in the home? ❑ Yes ❑ No

What containers are used to prepare, serve, and store the child's food? _____

Does your child have a favorite cup or eating utensil? ❑ Yes ❑ No

Is it handmade or ceramic? ❑ Yes ❑ No

Do you have a water filter? ❑ Yes ❑ No

Additional Comments:_____

_____

_____

List foods and amounts eaten by the child in the last 24 hours:

Breakfast	Lunch	Dinner	Snacks
Grains			
Vegetables			
Fruits			
Milk			
Meat and Beans			
Liquids (Water, juice, soda)			

Is this typical of your child's diet? ❑ Yes ❑ No

If no, complete the next section.

Record the frequency with which the child eats the following foods:

	Daily	Weekly	Never
Cheese, yogurt			
Chicken, Beef, Pork, Poultry			
Fish and shellfish			
Eggs			
Dried Beans, Peas, Peanut Butter			
Bread, Crackers, Cereal, Macaroni, Spaghetti, Tortillas, Pasta			
Whole Milk			
Skim or Low-fat Milk			
Breast Milk			
Formula			
Fruit, Fruit Juice			
Vegetables			
Potatoes			
Soft Drinks			
Pastry Desserts, Ice Cream, Desserts			
Candy			
Chips, Snacks or other high fat foods			

Compare these lists to the food guidelines appropriate for the child's age.

Comments: _____

_____

Social History:

How long has the child lived at this address? _____

List all locations where the child <u>currently</u> spends or <u>within the past two years</u> has spent more than 20 hours a week.

Address:	Facility:	How Long at Address	Contact Name:	Phone #:

Where does your child spend most of his/her time when at home? _____

Where is your child's most frequent play area? _____

Check the answer that applies.

Does family remove shoes when entering the house?	❑ Yes ❑ No
Does family have a pet that could track contaminated soil/dust from outside? If yes, where does the pet sleep? _____	❑ Yes ❑ No
Does child play in, live in, or have access to areas where shellacs, dyes, etc are kept?	❑ Yes ❑ No
Does your child ever play in the yard or the dirt near the house?	❑ Yes ❑ No
Does your child ever play on the porch or painted steps?	❑ Yes ❑ No
Does your child play in areas of chipping or deteriorated paint?	❑ Yes ❑ No
Does your child play at a park or playground? If yes, specify location: _____	❑ Yes ❑ No

Does your child wash his/her hand before meals, after playing outside, at bedtime and naptime?
❑ Yes ❑ No

Mouthing activity is normal in young children; does your child do any of the following?

☐ sucks fingers	☐ eats/chews paint chips
☐ picks at painted surfaces	☐ eats soil
☐ puts painted objects in mouth	☐ puts matches in mouth
☐ puts soft metal objects in mouth	☐ puts old or foreign printed materials in mouth
☐ sucks on or eats other non-food items (i.e., miniblinds)	☐ plays with cosmetics/hair preparations metal objects or talc or puts them in mouth

Has anyone in the household recently traveled outside the U.S.? ❑ Yes ❑ No

If yes, Who and to what countries? _____

Does anyone in the household use paints, pigments, facial cosmetics, or hair coloring containing lead? ❑ Yes ❑ No If yes, explain: _____

Does anyone in the household use or have access to imported cosmetics, folk medicines, or non prescription medication or ethnic foods? ❑ Yes ❑ No

Check the answer that applies:

Are there imported non-glossy vinyl mini blinds in the house?	❑ Yes ❑ No
Is there an industrial area within one mile of the house? If yes, type of industry:_____	❑ Yes ❑ No
Has any renovation work been done in the past six months?	❑ Yes ❑ No
Have you or anyone in the household had lead-safe work practices training?	❑ Yes ❑ No
Has painted wood ever been burned in a wood-stove or fireplace?	❑ Yes ❑ No
Have ashes ever been emptied onto soil?	❑ Yes ❑ No
Were gasoline or other solvents ever used to clean parts or disposed of at the property?	❑ Yes ❑ No
Has soil ever been tested for lead?	❑ Yes ❑ No
Has the water ever been tested for lead?	❑ Yes ❑ No

Comments: _____

_____

_____

Check all that apply:

Latino:	**Cosmetics**	
	Foods	☐ Tamarind Candy ☐ Chile flavored candies ☐ Chocolate-Covered grasshoppers
	Remedies	☐ Azarcon ☐ Liga ☐ Maria Luisa ☐ Alarcon ☐ Coral ☐ Rueda ☐ Greta ☐ Albayalde ☐ Litargirio
Middle Eastern, Indian, Pakistani, African:	**Cosmetics**	☐ Alkohl ☐ Kohl ☐ Saoott ☐ Surma ☐ Henna
	Foods	☐ Lozeena
	Remedies	☐ Bali Goli ☐ Ghasard ☐ Kandu ☐ Ayurvedic ☐ Kushta ☐ Deshi Dawa ☐ Bint Dahab ☐ Santrinj ☐ Bokhoor ☐ Cebagin ☐ Al Murrah
Southeast Asian, Chinese	**Cosmetics**	
	Foods	
	Remedies	☐ Chuifong Tokuwan ☐ Jin Bu Huan ☐ Po Ying Tan ☐ Ba-Baw-San ☐ Pay-Loo-Ah ☐ Hai Ge Fen ☐ Ju Hua ☐ Litharge ☐ Cordyceps

Other:

Does anyone living in the household or regularly visiting do any of the following as a hobby or occupation? ❑ Yes ❑ No

(Check all that apply.)

- ❑ Home renovation (HVAC, plumbing, painting)
- ❑ Furniture refinishing
- ❑ Glass or metal soldering
- ❑ Glazed-pottery making/Ceramics
- ❑ Stained-glass making
- ❑ Artistic painting
- ❑ Landscaping/Gardening
- ❑ Auto repair(radiator or body work)
- ❑ Electronics soldering
- ❑ Jewelry making/crafts
- ❑ Target shooting
- ❑ Fishing or hunting
- ❑ Making bullets, slugs, or fishing sinkers
- ❑ Construction Type:

Do any adults, involved with the hobbies or occupations listed above, change out of their work clothes as soon as they get home? ❑ Yes ❑ No

Child's Physical Assessment Results

Height: _____ (in/cm) **Weight:** _____ (lbs/kg) ❑ Per parent report

Initial Birth Weight: _____ (lbs/kg)

Level of attention:	❑ Appropriate ❑ Somewhat distractible ❑ Very distractible ❑ Other: _____
Interest in Surroundings:	❑ Alert ❑ Somewhat disinterested ❑ Seriously disinterested ❑ Other: _____
Behavior:	❑ WNL for age ❑ Other: DESCRIBE any instances of impulsivity, difficulty following instructions, aggressiveness toward others observed during visit _____ _____
General Appearance:	❑ Well-nourished ❑ Obese ❑ Thin Other: _____
Skin:	❑ WNL ❑ Laceration ❑ Bruises ❑ Rashes ❑ Other:_____
Stool:	❑Toilet trained? ❑Toilet training begun? Last BM: _____ Usual Pattern: _____ Other:_____
Bladder:	❑Toilet trained? ❑Toilet training begun ❑ Other:_____
Muscles:	❑ WNL ❑ Movement impaired ❑ Other _____
Adaptive Devices	❑ Eye glasses ❑ Hearing Aide ❑ Wheelchair ❑ Other: _____

PROPERTY ASSESSMENT:
Based on direct visual observation by interviewer. Must be completed by PHN if Environmental Investigation is not done at time of IHV or if local protocol does not require Environmental Investigation

Is dwelling located within 2 blocks of a major roadway, freeway, elevated highway, other transportation structure or industrial area?	❑ Yes ❑ No
Is any part of the home currently being renovated or repaired?	❑ Yes ❑ No
Are nearby buildings or structures being renovated, repaired or demolished?	❑ Yes ❑ No
Is there **chewed** paint on: Woodwork, toys, or furniture? (Circle all that apply)	❑ Yes ❑ No
Is there **peeling** paint on: woodwork, toys or furniture? (Circle all that apply)	❑ Yes ❑ No
Is there deteriorated paint on outside of fences, garages, play structures, railings, building siding, windows, trims, or mailboxes?	❑ Yes ❑ No
Are there visible paint chips at the perimeter of the house, fences, garage, or play structures?	❑ Yes ❑ No
Is there any evidence of hobbies or businesses that could cause contamination?	❑ Yes ❑ No
Is food prepared or stored in ceramic or pewter pots or stored in any glazed or earthenware containers?	❑ Yes ❑ No
Are Liquids stored in metal, pewter, or crystal containers? If yes: _____	❑ Yes ❑ No

Comments: _____

_____

_____

_____

_____

_____

_____

PROPERTY ASSESSMENT: Based on direct visual observation by interviewer.

Room	Paint Condition	Observations and Temporary Measures Needed
Primary Play Area	❑ Intact ❑ Not intact	
Living Room	❑ Intact ❑ Not intact	
Dining Room	❑ Intact ❑ Not intact	
Kitchen	❑ Intact ❑ Not intact	
Family Room	❑ Intact ❑ Not intact	
Child's Bedroom	❑ Intact ❑ Not intact	
Parent's Bedroom	❑ Intact ❑ Not intact	
Other Bedroom	❑ Intact ❑ Not intact	
Bathroom	❑ Intact ❑ Not intact	
Porch Entry	❑ Intact ❑ Not intact	
Yard	❑ Intact ❑ Not intact	

Nurse's Signature_____ **Date**_____

Additional notes

Childhood LEAD POISONING prevention program

Revised 12/03/15

Individualized Plan of Care

To be initiated during the first home visit (in addition to the Initial Home Visit Form) and revised on subsequent home visits.

Case Child's Name: _____ Date initiated: _____

MRN, Medical Record Number _____

Problem	Outcomes	Actions	Additional Information (specific for family)	Date Covered	PHN Initials
Elevated Blood Lead Level.	Child will have 1 blood lead tests <5ug/dL	PHN will discuss with the child's caretaker and communicate with the medical provider the need for repeat BLL testing within recommended timeframes.	Date of next blood lead test should be:		
		PHN will monitor changes in BLL for a steady decline in lead levels. If a decline does not occur, the PHN will reassess exposures and need for additional referrals.			

Problem	Outcomes	Actions	Additional Information (specific for family)	Date Covered	PHN Initials
Elevated Blood Lead Level (continued)	Child will have 1 consecutive blood lead tests <5ug/ dL.	PHN will provide information on good hygiene and housekeeping measures to reduce lead exposure.	Key housekeeping and health messages specific to family (check all that were discussed): ___ Encouraged frequent adult-supervised handwashing, especially prior to meals, snacks, after playing outside, and at and bedtime . ___ Discussed wet mopping and cleaning techniques. ___ Observe child for pica/mouthing behavior. ____Discourage child from eating or sleeping on the floors until lead hazards are corrected. ___ Encourage caregiver to wash toys, pacifiers, and bottles frequently. ___ Educational pamphlets were provided. ___ Other (Specify):		

Problem	Outcomes	Actions	Additional Information (specific for family)	Date Covered	PHN Initials
Lead hazard present.	Lead hazards in the child's environment will be identified.	PHN will conduct an assessment to identify potential lead hazards in the home at the time of the first home visit.	Age of home _____ Check off main lead sources found during initial visit: ___ Deteriorated Paint ___ Bare Soil ___ Water ___ Imported painted toys, lead jewelry ___ Food storage & preparation ___ Ethnic foods/medications ___ Occupation/hobby sources ___ Neighborhood exposures ___ Other (Specify):		
		PHN will follow-up with the environmental investigator to ensure that an investigation is completed within recommended timeframes.	Date of environmental investigation should be no later than:_____(Date)		
		Once complete, PHN will ensure that results of the lead investigation were reviewed with the family.			

Problem	Outcomes	Actions	Additional Information (specific for family)	Date Covered	PHN Initials
Lead hazard present. (continued)	Lead hazards are addressed.	PHN will ensure that ways to decrease the identified lead exposure risks (both short and long-term strategies) are discussed with the family.	Specific SHORT-TERM recommendations for family (check all that were discussed): ___ Advised on ways to create barriers between the child and lead sources (contact paper, duct tape, relocation of furniture, etc.). ___ Relocation to lead safe housing. ___ Reviewed ways to eliminate work and hobby related exposures. ___ Discussed ways to avoid exposure through food containers, folk remedies, or cosmetics. ___ Encouraged the use of door mats. ___ Other (Specify): Specific LONG-TERM recommendations for family (check all that were discussed): ___ Discussed ways to cover bare soil. ___ Discussed remediation of lead hazards and follow-up dust testing. ___ Discussed ways to reduce exposure to lead in drinking water. ___ Reviewed use of lead-safe work practices in renovation. ___ Other (Specify):		

Problem	Outcomes	Actions	Additional Information (specific for family)	Date Covered	PHN Initials
Lead hazard present. (continued)	Lead hazards are addressed. (continued)	PHN will work with the environmental investigator to identify resources for addressing lead hazards.	Referrals made:		
		PHN will check with the environmental investigator to see if the rental property owner/homeowner is aware of need to address lead hazards.			
		PHN will check with the Environmental investigator to ensure that property owner is referred to prosecutor's office or district court if lead hazards are not addressed within specified period of time.			
Need for medical follow-up.	Child will have a physical exam and be screened for anemia.	PHN will communicate all necessary information to the primary care provider.			
		PHN will encourage the family and provider to make sure the child has a complete physical exam.			
		PHN will encourage the family and provider to test the child for anemia.	Results of anemia test: Date for next anemia test:		

Problem	Outcomes	Actions	Additional Information (specific for family)	Date Covered	PHN Initials
Need for medical follow-up. (continued)	All children in the home will be tested for an EBLL.	PHN will encourage the family to test all children in the home, especially those under the age of six.	Gender and ages of other children in the home that should be tested:		
	An EBLL will be recorded in the child's permanent medical problem list.	PHN will encourage family and medical provider to include an EBLL in the problem list of the child's medical record.			

Problem	Outcomes	Actions	Additional Information (specific for family)	Date Covered	PHN Initials
Potential for poor nutrition.	Child will be provided a diet following the food pyramid recommendations.	PHN will assess child's current diet, especially iron, vitamin C, calcium, and total fat intake.	Specific dietary recommendations based on dietary assessment (check all that were recommended): ___ Incorporate more iron rich foods by providing iron-fortified cereals to young children or one serving of lean red meat per day to older children. ___ Provide adequate intake of Vitamin C by providing 2 servings of citrus fruit juices or fruits per day. ___ Increase calcium intake to ensure 2 servings of dairy products or other calcium-rich foods a day. ___ Other (Specify):		
		PHN will provide information on the food pyramid recommendations to the family.	___ Nutrition information pamphlet provided to family.		

Problem	Outcomes	Actions	Additional Information (specific for family)	Date Covered	PHN Initials
Potential for poor nutrition. (continued)	Child will be provided a diet following the food pyramid recommendations (continued).	PHN will encourage families not to give children supplements unless under the direct supervision of a physician.			
	Child will be enrolled in WIC if eligible.	PHN will determine WIC Eligibility.	Check one: ____ Family receiving WIC services ____ Family referred to WIC ____ Not eligible for WIC services		
	Caregiver will get assistance in providing good nutrition for the child.	PHN will provide families with additional nutritional referrals as needed.	Other nutritional referrals recommended for the family:		
Need for long-term developmental follow-up.	Family will verbalize an understanding of the need for long-term development follow-up.	PHN will discuss with the family the need to look for behaviors that may interfere with learning (e.g., inattention, distractibility, impulsivity).	Date of ASQ screening:		

Problem	Outcomes	Actions	Additional Information (specific for family)	Date Covered	PHN Initials
Need for long-term developmental follow-up (continued)	Family will verbalize an understanding of the need for long-term developmental follow-up. (continued)	PHN will discuss with the family and primary care provider periods when development delays may be apparent (1st, 4th, 6th or 7th grade). PHN will encourage parental sharing of child's diagnosis w/ classroom teacher(s)	Specific recommendations for the family based on development screen (check all that apply): ___ Recommend HeadStart/ Early HeadStart. ___ Refer to Early On. ___ Consider YMCA program/ other enrichment programs. ___ Encourage play groups. ___ Recommended games for parents to play on-one-one with child. ___Provide contact information for the appropriate MSU Extension program (geographically accessible) ___ Other (Specify):		
		PHN will provide family with recommendations for informal/ formal intervention programs and refer the child for additional testing if necessary.			
Potential for family lost to follow-up services.	PHN and medical provider will be notified within one month if family changes addresses.	PHN will discuss with family the importance of maintaining contact with the PHN and medical provider. PHN will reinforce parent responsibility for ongoing health & developmental monitoring.			

Problem	Outcomes	Actions	Additional Information (specific for family)	Date Covered	PHN Initials
Need for additional services.					

PHN Signature: _____ Date _____

I have discussed my child's care plan with the Health Department representative and agree to follow the recommendations to protect my child from further exposure to lead.

Parent/Guardian Signature: _____ Date: _____

Childhood LEAD POISONING prevention program

Updated 10/30/15

Michigan Lead Poisoning Prevention Program Referral Tracking Form

Name of Child: _____
Date of Birth: _____
MRN: _____

Nutrition	Health	Child Development	Housing
WIC Received Referred: Date_____	INSURANCE: Healthy Kids MIChild Received Referred: Date_____	HeadStart/ Early Head Start Received Referred: Date_____	Environmental Investigator Received Referred: Date_____
	Chelation Services/ Lead Poisoning Pediatric Consultants Received Referred: Date_____	Early On (EBLL>10) Received Referred: Date_____	MDHHS Healthy Homes Section Received Referred: Date_____
	Hospitalization Received Referred: Date_____		
	Children's Special Health Care Services (all children who have been chelated are eligible) Received Referred: Date_____		

COMMON REFERRAL OPTIONS

Date of Referral	Name of Agency	Contact at Agency	Type of Referral/ Reason for Referral	Date Services Began	Notes

Childhood LEAD POISONING prevention program

Revised 10/30/15

Michigan Lead Poisoning Prevention Program
Follow Up Home Visit Report

Child's Name _____ Date of Visit: _____

Date of Birth: _____

MRN_____ Environmental investigator_____

Has there been a change in any of the following:

- ❑ Child's Primary Address _____
- ❑ Parents' contact information _____
  _____
- ❑ Child Care contact information _____
  _____
- ❑ Medical Provider _____
  _____
- ❑ Medical Insurance _____

Reason(s) for Visit: (check all that apply)

Medical:

- ❑ BLL remains > 5µg/dL ❑ Persistent EBLL ❑ Chelation ❑ Post-chelation
- ❑ Pregnancy in the household ❑ Failure to comply with follow up testing schedule
- ❑ Other (specify):
  _____

Environmental:

- ❑ Discuss EBL Investigation report ❑ Plan for relocation to lead safe housing
- ❑ Discuss lead hazard remediation options ❑ Investigate site other than primary address
- ❑ Housing unit is associated with more than one case of lead poisoning over time
- ❑ Persistent use of home remedies/products with high lead content
- ❑ Other (specify): _____

Nutritional and Developmental:

- ❑ Follow up on anemia status ❑ Child exhibits new developmental/nutritional problems
- ❑ Follow up on WIC or other social service referrals
- ❑ Follow up on informal developmental services ❑ Follow up on formal developmental services referrals
- ❑ Other_____

Review Care Plan/ Reinforce Caregiver Education:

- ❑ Evaluate implementation of care plan ❑ Assess need for additional referrals
- ❑ Assess reasons for caregiver noncompliance
- ❑ Other (specify): _____

Notes and Observations:

Child Name: _____

Revisions to Care Plan:

PHN Signature: _____ Date: _____

I have discussed my child's care plan with the Health Department representative and agree to follow the recommendations to protect my child from further exposure to lead.

Parent/Guardian Signature: _____Date: _____

Childhood LEAD POISONING prevention program

Revised 10/30/15

Michigan Lead Poisoning Prevention Program
Case Activity Log

Child's Name: _____

Additional information:_____

MRN: _____

Record all activities in this log, including unsuccessful contacts, transfer of files to other offices, contacts with medical providers, etc. Record YOUR name for each activity.

Date	**Action** (phone, visit, etc.) **Name** of staff member making contact	**Contact Name and Phone**	**Purpose**

Childhood LEAD POISONING prevention program

Revised 12/03/15

Report to Health Care Provider
Re: Lead Poisoned Child Case Management

This report is to inform you of recent lead poisoning prevention case management activities undertaken for the child listed below. It highlights issues, referrals, and educational messages that you may wish to reinforce at the child's next office visit.

Child's Name: _____

Date of Birth: _____

Address: _____

_____

Parent/Guardian's Name:

_____

Initial Blood Lead Test Result: _____ µg/dL Date of test: _____

Confirmatory Blood Lead Test Result: _____µg/dL Date of test: _____

Date of Last Health Department Home Visit_____

PLEASE NOTE: The CDC recommends that the child's permanent medical problem list includes his/her history of a confirmed elevated blood lead level.

Suggested date of next blood lead test: _____

(See next page for testing schedule.)

Reason for Referral to Health Department (Check all that apply):

- ☐ Blood lead level
- ☐ Follow-up to a prior EBLL
- ☐ Parent/guardian request
- ☐ Foster child
- ☐ Refugee/Immigrant child (country of origin: _____)

Recent Services Provided by the Health Department (Check all that apply):

- ☐ Telephone Interview
- ☐ Home visit
- ☐ Health education
- ☐ Nutritional assessment
- ☐ Unable to contact family

Possible Lead Exposure Source(s)/ High Risk Factor(s) (Circle all that apply):

Paint Soil Water Dust Frequent hand to mouth behavior

Worker take home exposure Cosmetics/Home Remedy

Ceramics or pottery Hobbies or home businesses

- ☐ Other locations where child spends time:_____
- ☐ Other: _____

Follow-up Home Visits (Check all that apply):

- ☐ Environmental Health Visit/Home Assessment scheduled for: _____(Date)
- ☐ Environmental Health Visit/Home Assessment complete
- ☐ Follow-up PHN visit planned
- ☐ Follow-up PHN visit scheduled for: _____ (Date)

Referrals Made (Check all that apply):

- ☐ Early On ☐ WIC ☐ Medicaid/Medicare ☐ Social Services
- ☐ Referred for developmental follow-up ☐ Housing remediation
- ☐ Relocation to lead safe housing
- ☐ Other:_____

Child/Family Teaching (Check all that were covered)

- ☐ Need for retesting
- ☐ Encouraged testing of siblings
- ☐ Encouraged handwashing
- ☐ Avoidance of chipping or peeling paint
- ☐ Temporary control of sources of exposure
- ☐ Wet mopping/cleaning techniques
- ☐ Reduction of occupational/hobby take home exposure (e.g., changing work clothes)
- ☐ Discontinue use of ceramics for cooking/storing/serving food
- ☐ Discontinue use of lead based home remedy
- ☐ Nutritional education
- ☐ Resources for housing remediation
- ☐ Other: _____

***Nursing recommendations to the provider:** _____

_____

_____

Follow Up Testing Recommendations

- BLL 5-14 retest 1-3 months;
- BLL 15-44 retest within 1 month until levels <15;
- BLL 45+ retest monthly as directed by expert at Children's Hospital of Michigan in Detroit.

If you have any questions, please do not hesitate to contact me at the number listed below. Thank you,

Signature: _____Date:_____

Agency: _____

Phone: _____ Email:_____

CHILDHOOD LEAD POISONING
Blood Lead Level (BLL) Quick Reference for Primary Care Providers

Not Yet Tested

Consider screening ALL children between ages 1-6

Need for testing can be based on risk factors

REMINDER: Medicaid requires all children to be tested at ages 1 & 2. Children who were not tested between 1 & 2 must be tested at least once between 3 & 6.

BLL <5

Review lead levels with family

Provide anticipatory guidance

REMINDER: Medicaid requires all children to be tested at ages 1 & 2. Children who were not tested between 1 & 2 must be tested at least once between 3 & 6.

BLL 5-14

Review lead levels with family

Confirm results with venous blood sample

Review venous sample with family

Perform environmental history. Consider other children who may be exposed

Consider iron sufficiency, provide nutritional counseling r/t calcium and iron

Provide anticipatory guidance

Refer to case management

FOLLOW UP: Retest venous sample within 1-3 months to ensure BLL is not rising

REMINDER: Medicaid requires all children to be tested at ages 1 & 2. Children who were not tested between 1 & 2 must be tested at least once between 3 & 6.

BLL 15-44

Review lead levels with family

Confirm results with venous blood sample

Perform environmental history. Consider other children who may be exposed

Consider if a specific evaluation of the child is necessary such as an abdominal x-ray. Gut decontamination may be needed if leaded foreign bodies are visualized in x-ray

Consider iron sufficiency, provide nutritional counseling r/t calcium and iron

Refer to case management

FOLLOW UP: Retest venous sample monthly until levels are <15, repeat every 1-3 months until levels are <5

REMINDER: Medicaid requires all children to be tested at ages 1 & 2. Children who were not tested between 1 & 2 must be tested at least once between 3 & 6.

BLL >44

Review lead levels with family

Confirm results with venous blood sample

Review venous sample with family

Any treatment at this level should be performed in consultation with an expert at Children's Hospital of Michigan in Detroit.

FOLLOW UP: As directed by expert. Monthly venous samples will be required.

REMINDER: Medicaid requires all children to be tested at ages 1 & 2. Children who were not tested between 1 & 2 must be tested at least once between 3 & 6.

Questions? Contact us
at (888) 322-4453
or (517) 335-8885

MDHHS
Michigan Department of Health & Human Services
Rick Snyder, Governor | Nick Lyon, Director

Childhood LEAD POISONING prevention program

Childhood LEAD POISONING prevention program

Revised 12/03/15

Name of Child:_____
Date of Birth: _____
MRN: _____

Michigan Lead Poisoning Prevention Program
Child Case Closure Form

Child's Full Legal Name (Last Name, First, Middle Initial): DOB:

_____ _____

Name of PCP/ notified of case closure:_____

Last Blood Lead Level: _____µg/dL

Recommendations for Case Closure		
Cases can be closed when all 3 of the following criteria are met: • Environmental lead hazards have been controlled or eliminated. • 1 BLLs <5µg/dL • Other objectives of the plan are achieved (e.g., including provision of long-term developmental follow-up).	**OR**	Use administrative case closure ONLY if: • Parent refuses services • Family has moved out of jurisdiction (new referral MUST be made) • At least 3 documented attempts to locate or gain access to the child and caregiver have failed (2 visits/1 certified mail) **and** attempts to reach the family using PCP or MIWIC, MICR, CLPPP or other resources have been made.

Check all that apply	**Closure Reasons**	**Additional Notes:**
	1 BLLs below 5µg/dL	
	Environmental lead hazards have been eliminated	
	Other objectives of the plan have been met	
	Administrative Closure: Lost to follow-up/Unable to locate	Date of first home visit attempt: _____ Date of second home visit attempt: _____ Other strategies used (include dates): _____ _____
	Services refused	
	Moved out of Jurisdiction/State	Date of referral to different jurisdiction/jurisdiction name & contact person: _____
	Other (Specify):	

SIGNATURE _____ DATE CLOSED TO SERVICE _____

From: Peeler, Nancy (DHHS)
Sent: Friday, December 11, 2015 4:27 PM
To: Lishinski, Karen (DCH) (LishinskiK@michigan.gov);Fink, Brenda (DHHS)
Subject: FW: FOR IMMEDIATE RELEASE: MDHHS releases latest round of Flint blood lead level data

Wanted to make sure you see this -- FYI.

Nancy

From: Michigan Department of Health and Human Services [mailto:MDHHS@govsubscriptions.michigan.gov]
Sent: Friday, December 11, 2015 4:02 PM
To: Peeler, Nancy (DHHS) <PeelerN@michigan.gov>
Subject: FOR IMMEDIATE RELEASE: MDHHS releases latest round of Flint blood lead level data

Right-click here to download pictures. To help protect your privacy, Outlook prevented automatic download of this picture from the Internet.
Michigan Department of Health & Human Services logo

Press Release

FOR IMMEDIATE RELEASE: December 11, 2015

CONTACT: Jennifer Eisner, (517) 241-2112

MDHHS releases latest round of Flint blood lead level data

LANSING, Mich. – The Michigan Department of Health and Human Services today issued its newest summary report on lead testing in Flint. According to preliminary data, 39 of 1,836 adults and children tested had elevated blood lead levels since Oct. 1.

"As testing continues, our focus remains on helping families reduce all potential exposures to lead," said Dr. Eden Wells, MDHHS chief medical executive. "We are working closely with the Genesee County Health Department to provide information and offer tools in the community, and encourage families to explore the resources that are available to them."

Both capillary and venous blood tests are included in the report, and people who have had multiple tests are counted only once. Tests and their results cover the time since the state action plan was

put in place on Oct. 2, and capture the number of elevated blood lead levels greater than 5 micrograms per deciliter.

MDHHS is working closely with local partners to offer resources and distribute important lead testing and prevention information. Additional state funding has allowed for Genesee County Health Department (GCHD) nurses to work with families when an elevated blood lead level is detected. These families can also choose to have the nurse coordinate an environmental health investigation in their home to identify lead exposures, which could be lead from paint, soil, plumbing, and other sources.

To support these efforts, the state is coordinating with its Medicaid health plans and provider communities on enhanced screening and testing. In addition to mandated testing at ages one and two for the Medicaid population, MDHHS has recommended blood lead testing for any child younger than six years of age in Flint who has not previously been tested. The state, in coordination with GCHD, developed and issued a Health Alert Network (HAN) notification for local providers to help ensure consistent messaging and protocols among primary care providers.

Free water filters and replacement cartridges are still available to Flint residents. For a full list of locations and hours of distribution, or to view the full blood lead level report, visit www.michigan.gov/flintwater. The summary will be updated as more data becomes available.

To help residents properly install water filters, and to demonstrate how to replace the original when it expires, MDHHS has created an instructional video on its YouTube channel. For this and other updates, visit www.michigan.gov/flintwater.

###

- Flint EBL Data Press Release Dec 11.pdf
- Flint Blood Testing Report December 11.pdf

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DHHS Foster

Become a foster parent through Michigan Department of Health & Human Services foster care program.

Questions? Contact Us

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This email was sent to peslem@michigan.gov using GovDelivery, on behalf of: Michigan Dept of Health & Human Services · 235 S. Grand Ave W. · Lansing, MI 48909 · 1-855-275-6424

From: Peeler, Nancy (DHHS)
Sent: Tuesday, December 15, 2015 4:05 PM
To: Lishinski, Karen (DCH) (LishinskiK@michigan.gov);Fink, Brenda (DHHS)
Subject: FW: Flint Briefing 14Dec15
Attachments: 2015-12-14 - Flint Lead MDHHS Sitrep.pdf

Forwarding as an FYI

From: Bouters, Janese (DHHS)
Sent: Tuesday, December 15, 2015 3:47 PM
To: Anderson, Paula (DHHS) <AndersonP3@michigan.gov>; Barr, Jacqui (DHHS) <BarrJ3@michigan.gov>; Becker, Timothy (DHHS) <beckert1@michigan.gov>; Bruneau, Michelle (DHHS) <BruneauM@michigan.gov>; Colston, Leslie (DHHS) <ColstonL@michigan.gov>; DeMyers, Deborah (DHHS) <DeMyersD@michigan.gov>; Dykema, Linda D. (DHHS) <DykemaL@michigan.gov>; Eggleston, Debbie (DHHS) <egglestond@michigan.gov>; Eisner, Jennifer (DHHS) <EisnerJ@michigan.gov>; Granger, Patricia (DHHS) <GrangerP@michigan.gov>; Grijalva, Nancy (DHHS) <GrijalvaN@michigan.gov>; Groetsch, Kory J. (DHHS) <GroetschK@michigan.gov>; Harvey, Janice (DHHS) <HarveyJ1@michigan.gov>; Hertel, Elizabeth (DHHS) <HertelE@michigan.gov>; Kaiser Van Dam, Paula (DHHS) <KaiserP@michigan.gov>; Lasher, Geralyn (DHHS) <lasherg@michigan.gov>; Lyon, Nick (DHHS) <LyonN2@michigan.gov>; McKane, Patricia (DHHS) <McKaneP@michigan.gov>; Miller, Corinne (DHHS) <MillerC39@michigan.gov>; Miller, Mark (DHHS) <millerm1@michigan.gov>; Minicuci, Angela (DHHS) <MinicuciA@michigan.gov>; Moran, Susan (DHHS) <MoranS@michigan.gov>; Peeler, Nancy (DHHS) <PeelerN@michigan.gov>; Priem, Wesley F. (DHHS) <priemw@michigan.gov>; Priest, Chris (DHHS) <PriestC1@michigan.gov>; Ridley, Nancy (DHHS) <RidleyN@michigan.gov>; Robinson, Mikelle (DHHS) <RobinsonM18@michigan.gov>; Rockefeller, Cheryl (DHHS) <RockefellerC@michigan.gov>; Scott, Jackie (DHHS) <ScottJ14@michigan.gov>; Shah, Sandip (DHHS) <shahs@michigan.gov>; Sims, Teri (DHHS) <SimsT2@michigan.gov>; Stanbury, Martha (DHHS) <stanburym@michigan.gov>; Stiffler, Kathleen A. (DHHS) <StifflerK@michigan.gov>; Taylor, Kerri (DHHS) <TaylorK10@michigan.gov>; Thompson, Sheryl D. (DHHS) <ThompsonS2@michigan.gov>; Titus, Laura (DHHS) <TitusL@michigan.gov>; Travis, Rashmi (DHHS) <TravisR@michigan.gov>; Wells, Eden (DHHS) <WellsE3@michigan.gov>
Subject: Flint Briefing 14Dec15

Sending on behalf of the PHCSA:

Attached is the MDHHS daily situation report for the Flint water lead project.

Thanks,

Janese Bouters
Executive Secretary to Corinne Miller
Bureau of Disease Control, Prevention and Epidemiology
Michigan Department of Health & Human Services
201 Townsend Street
Lansing, Michigan 48913
Phone: (517) 335-8731
Fax: (517) 335-8263

Flint Water Lead Project

Michigan Department of Health and Human Services
Situation Report for December 14, 2015

NOTE: Contains potentially identifiable information- REDACT AS INDICATED
New items for the day listed first and in bold print.

Daily Briefing and Situation Report prepared by Linda Dykema

Surveillance Indicators: People Tested 10/1/2015 to 12/4/2015: 1,836;
Children less than 6 years old ≥ 5 µg/dl since 10/1/2015: 19
Children 6 to 17 years old ≥ 5 µg/dl since 10/1/2015: 8
Adults 18 years and older ≥ 5 µg/dl since 10/1/2015: 12
Severity Indicators: Hospitalized/Discharged-1/1; Deaths- 0

DAILY ACTIVITY SUMMARY

Elevated Blood Level (EBL) Environmental Investigations – ETC Contractors, Wes Priem, Courtney Wisinski

- **9 EBL investigations completed.**
- 5 investigations scheduled.
- EBL investigation for high EBLL home completed on Friday 12/4/15. Unpaid taxes must be resolved to qualify for Lead Safe Home abatement. Project staff will work with family to resolve.

MDHHS/Genesee County Health Department (GCHD) Case Management (CM) Services – Nancy Peeler

- CM report through 12/04/15:
  - # of contacts attempted: 171
  - # offered CM: 68
  - # CM started: 10
  - # of children receiving CM who live in Flint: 10
  - # billed to Medicaid: 3
  - # other disposition: 4 (3 children moved to Oakland County, 1 to Tuscola County): Working with M. Miller and Counties to set up CM for children that have moved out of Flint.

Epidemiology/Surveillance – Patti McKane, Martha Stanbury, Bob Scott, Jessica Cooper, Karen Lishinski

- **Meeting scheduled for December 16 to develop a method to extract information from the MDHHS data warehouse on infants and children < 6 enrolled in Medicaid and residing in Flint. These data would be used to monitor blood lead testing outreach efforts in Flint.**
- **The amended data use agreement with Dr. Hanna-Attisha was approved.**
- Preparing 2014 lead surveillance data by Michigan zip code in response to media requests.

Filter Distribution Sheryl Thompson

- December through 12/10/15
  - 214 Brita Filters
  - 38 Zero Water Pitchers
  - 275 Brita Replacement Cartridges
- Total Distribution since October 1, 2015
  - 11,171 Water Filters
  - 222 Water Pitchers
  - 1,206 Replacement Cartridges

Communications/Information Sharing – Linda Dykema, Eden Wells

- **Received a call from EPA R5 Drinking Water: they are getting calls from Flint residents regarding safety of adding phosphates to drinking water. EPA's position is in agreement with MDHHS that phosphates do not present a health concern at the levels expected in Flint drinking water.**

Health Education Resources Updates - Michelle Bruneau, Emily Houk

- **Sent 2nd draft of aerator cleaning fact sheet out to GCHD and MDHHS partners for comment (MB)**
- Continuing to write and coordinate additions to the EBL Case Manager Binder, now known as the MDHHS Lead Safe Family Guide Book. (MB)
- Awaiting Communications Office approval on Bath Time poster (MB)
    - Submitted publication form on 12/9
- Awaiting Communications Office approval on Phosphate Fact Sheet (MB)
    - Submitted publication form on 12/9
    - Made or responded to suggested edits on phosphate fact sheet from EPA and MDEQ on 12/10
- Pending: Filter cartridge changing fact sheet; clarifying uses of filtered/vs unfiltered water (MB)
- Pending: Lead and Nutrition fact sheet and Flint Parent Letter re-do in partnership with Emily Houk.

Toxicology - Kory Groetsch, Jennifer Gray, Lisa Quiggle

- **Gathering information on uncertainties related to water filters.**
- Collaborating with Surveillance, CM, and EBL response staff to develop a Data Dictionary and Database to track services provided to EBL children/families.

WIC

- Letter sent 11/24 to GCHD about Ready-to-feed formula availability from WIC program
- Talking points for WIC staff and for providers shared

Healthcare/Providers

- **HAN recommending enhanced BLL testing for children less than six, particularly outside of the 1 and 2 years of age that are required by Medicaid, was sent to Flint health care providers.**

DEQ Information - Linda Dykema as Liaison

- **DEQ is requesting Phosphate fact sheet as phosphate dosing of Flint water has started.**

From: Peeler, Nancy (DHHS)
Sent: Thursday, December 17, 2015 4:43 PM
To: 'natpeeler@sbcglobal.net'
Subject: FW: Weekly lead screening report for MHPs

To include in workplan

From: Stiffler, Kathleen A. (DHHS)
Sent: Thursday, December 17, 2015 12:56 PM
To: Mayes, Nanette (DHHS) <MayesN@michigan.gov>; Fink, Brenda (DHHS) <FinkB@michigan.gov>; Dunbar, Paulette Dobynes (DHHS) <dunbarp@michigan.gov>; Peeler, Nancy (DHHS) <PeelerN@michigan.gov>; Travis, Rashmi (DHHS) <TravisR@michigan.gov>; Hamilton, Kimberly (DHHS) <HamiltonK@michigan.gov>; Kwasnik, Monica (DHHS) <KwasnikM@michigan.gov>; Prokop, Jackie (DHHS) <prokopj@michigan.gov>; LaPres, Marie (DHHS) <LaPresM@michigan.gov>; Dilernia, Lisa (DHHS) <DilerniaL@michigan.gov>; Diebolt, Pamela J. (DHHS) <DieboltP@michigan.gov>; Said, Manal (DHHS) <SaidM@michigan.gov>; Barnett, Lonnie D. (DHHS) <BarnettL@michigan.gov>; McCandless, Karla K. (DHHS) <mccandlessk@michigan.gov>; Barron, Brad (DHHS) <BarronB@michigan.gov>; Hambleton, Matthew (DHHS) <HambletonM@michigan.gov>; Linn, Cindy (DHHS) <linnc@michigan.gov>; Slawinski, Heather (DHHS) <SlawinskiH@michigan.gov>; Stanbury, Martha (DHHS) <stanburym@michigan.gov>
Subject: Weekly lead screening report for MHPs

Based on the response we received from all the MHPs we believe there will be great benefit to a revised report that we would design here that would give the plans more frequent results (weekly) for their members like the LHDs receive for children in their jurisdictions. Some plans are getting more frequent data directly from their lab vendors, however, that was not the case for the majority, so we would like to move forward with the report development as we have been discussing ASAP and make that available to the plans as another task on our workplan. Let Monica, Kim, Heather or I know if you have any questions. Who needs to get this moving?

K.

From: Peeler, Nancy (DHHS)
Sent: Monday, December 21, 2015 3:20 PM
To: Lishinski, Karen (DCH) (LishinskiK@michigan.gov);Houk, Emily (DHHS)
Subject: FW: Look for a statement

Importance: High

Sharing FYI, so you are up to date.

-----Original Message-----
From: Travis, Rashmi (DHHS)
Sent: Monday, December 21, 2015 2:23 PM
To: Peeler, Nancy (DHHS) <PeelerN@michigan.gov>
Cc: Fink, Brenda (DHHS) <FinkB@michigan.gov>
Subject: FW: Look for a statement
Importance: High

Nancy,
Please read and share with your team if you feel it is appropriate.

I would consider the source and take with a grain of salt the context and form by which it was sent. If Jennifer has any specific questions, she will send our way.
Thanks,
Rashmi

-----Original Message-----
From: Moran, Susan (DHHS)
Sent: Monday, December 21, 2015 11:44 AM
To: Travis, Rashmi (DHHS) <TravisR@michigan.gov>
Subject: FW: Look for a statement
Importance: High

You need to read this asap

-----Original Message-----
From: Dykema, Linda D. (DHHS)
Sent: Monday, December 21, 2015 11:41 AM
To: Eisner, Jennifer (DHHS) <EisnerJ@michigan.gov>; Lyon, Nick (DHHS) <LyonN2@michigan.gov>; Becker, Timothy (DHHS) <beckert1@michigan.gov>; Wells, Eden (DHHS) <WellsE3@michigan.gov>; Moran, Susan (DHHS) <MoranS@michigan.gov>; Miller, Corinne (DHHS) <MillerC39@michigan.gov>; Lasher, Geralyn (DHHS) <lasherg@michigan.gov>; Minicuci, Angela (DHHS) <MinicuciA@michigan.gov>; Krause, Kurt (DHHS) <KrauseK2@michigan.gov>; Rick, Matthew (DHHS) <RickM@michigan.gov>
Subject: RE: Look for a statement

http://flintwaterstudy.org/category/articles/

-----Original Message-----
From: Eisner, Jennifer (DHHS)

Sent: Monday, December 21, 2015 9:58 AM
To: Lyon, Nick (DHHS) <LyonN2@michigan.gov>; Becker, Timothy (DHHS) <beckert1@michigan.gov>; Wells, Eden (DHHS) <WellsE3@michigan.gov>; Moran, Susan (DHHS) <MoranS@michigan.gov>; Dykema, Linda D. (DHHS) <DykemaL@michigan.gov>; Miller, Corinne (DHHS) <MillerC39@michigan.gov>; Lasher, Geralyn (DHHS) <lasherg@michigan.gov>; Minicuci, Angela (DHHS) <MinicuciA@michigan.gov>; Krause, Kurt (DHHS) <KrauseK2@michigan.gov>; Rick, Matthew (DHHS) <RickM@michigan.gov>
Subject: FW: Look for a statement
Importance: High

All --

Marc Edwards is issuing a report this afternoon based on the documents he received via FOIA. He's already sent copies to members of the media -- we haven't seen the report yet but will need to respond once we do.

Thank you,
Jennifer

-----Original Message-----
From: Dupnack, Jessica [mailto:jessica.dupnack@abc12.com]
Sent: Monday, December 21, 2015 9:44 AM
To: Eisner, Jennifer (DHHS) <EisnerJ@michigan.gov>
Subject: Re: Look for a statement

I was given the preliminary report. Once they post it publicly online I can send you a link. I think that will happen this afternoon.

Thanks!
Jessica Dupnack

> On Dec 21, 2015, at 9:41 AM, Eisner, Jennifer (DHHS) <EisnerJ@michigan.gov> wrote:
>
> Hi Jessica -- can you send me a copy of the report?
>
> -----Original Message-----
> From: Dupnack, Jessica [mailto:jessica.dupnack@abc12.com]
> Sent: Monday, December 21, 2015 9:40 AM
> To: Eisner, Jennifer (DHHS) <EisnerJ@michigan.gov>
> Subject: Look for a statement
>
> Hello! I received some information from Marc Edwards this morning regarding some FOIA information that he received. I'm wondering if you are aware of the documentation he's received? And if the department has any comment.
>
> The "headline" of their report is "Michigan Health department his evidence of health had due to lead contaminated water"...so clearly some strong statements with the FOIA documents as source citing. Let me know if you have any comment! Thanks again.
>
> Thanks!
> Jessica Dupnack

From:	Peeler, Nancy (DHHS)
Sent:	Tuesday, December 22, 2015 10:56 AM
To:	July, Jori
Cc:	Lishinski, Karen (DCH) (LishinskiK@michigan.gov);Robert L. Scott (ScottR9 @michigan.gov)
Subject:	Lead Case management for 6 through 17 year olds
Attachments:	FLINT BLOOD LEAD CM - weekly status tracking form v5 12.22.15.xlsx

Good morning, Jori. Per our conversation last week, I am verifying that GCHD is able to provide lead case management services to children aged 6 through 17 years of age under our contract, as you see appropriate. This would cover children living in Flint or Genesee County exposed to Flint water. Bob Scott has changed his data sheet to add a tab with a list of children in this age group. I have attached a revised weekly reporting form shortly, that adds a row to capture information on any CM activities that you do provide to this age group.

Please let me know if you need further information or documentation from MDHHS.

Nancy Peeler, Manager
Early Childhood Health Section
517/335-9230

	A	B
1	**Target Population**	**# for whom contact has been attempted**
2		
3		
4		
5		
6	All 0-5 year old children with elevated Capillary ≥ 5 from April 2014 – September 2015 (row total = 75)	
7		
8	All 0-5 year old children with newly elevated Venous ≥ 5 from April 2014 – September 2015 (row total = 76)	
9		
10	All 0-5 year old children with new elevated Capillary ≥ 5 since October 2015 (row total = X*)	
11		
12	All 0-5 year old children with new elevated Venous ≥ 5 since October 2015 (row total = X*)	
13		
14	**TOTALS**	
15		
16		
17	All **6-17** year old children with elevated Capillary or Venous > 5 since April 2014 (row total = X*)	
18		
19		
20	** X will reflect the new, weekly numbers*	
21	Metrics included in contract (as amended 11.18.15):	
22	1. Number and percentage of target children with elevated blood lead levels of **≥ 5 ug/dL** for whom contact has been attempted.	
23	2. Number and percentage of target children with elevated blood lead levels of **≥ 5 ug/dL** that are successfully contacted and offered case management services.	
24	3. Number and percentage of target children receiving case management services.	
25	4. Number and percentage of target children receiving case management services residing in the City of Flint.	
26	5. Number of Medicaid claims filed for children enrolled in Medicaid who receive testing or nursing assessment visits.	
27		
28		
29		
30	*v5 12.22.15*	

	C	D	E	F	G
1	**% for whom contact has been attempted** (Col. B / total for row)	**# successfully contacted and offered CM**	**% of total**	**# of children receiving CM**	**% of total**
2			**% of attempted**		**% of contacted**
3			(Col. D / total for row		(Col. F / total for row
4			AND		AND
5			Col. D / Col. B)		Col. F / Col. D)
6	0%		0%		0%
7			#DIV/0!		#DIV/0!
8	0%		0%		0%
9			#DIV/0!		#DIV/0!
10	0%				
11					
12	0%				
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	H	I	J	K	L
1	**# of children receiving CM who live in Flint**	**% of CM in Flint**	**# of CM Medicaid claims filed**	**% for whom Medicaid claims filed** (Col. J / Col. F)	
2		(Col. H / Col. F)			**# other**
3					**disposition**
4					(closed, moved)
5					
6		#DIV/0!		#DIV/0!	
7					
8		#DIV/0!		#DIV/0!	
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30					

	M	N
1		
2	**% with other**	
3	**disposition**	**Disposition notes**
4	(Col. L / total for row)	
5		
6	0%	
7		
8		
9		
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From: Peeler, Nancy (DHHS)
Sent: Tuesday, December 22, 2015 12:00 PM
To: Ludtke, Mary (DHHS)
Subject: RE: question about Pediatric Symptom Checklist

No, not at this point. The CM protocol is still in revision, so we're just not at that point yet. But thanks for the input, and for the offer to contact Valinda – we may take up on that offer later!

From: Ludtke, Mary (DHHS)
Sent: Tuesday, December 22, 2015 11:54 AM
To: Peeler, Nancy (DHHS) <PeelerN@michigan.gov>
Subject: RE: question about Pediatric Symptom Checklist

For young children that are screened with the ASQ, the process is clear in most communities (to Early On) but with older children, the identification of mental health issues would mean a referral to a mental health professional for assessment. For Medicaid children the health plans should have practices/agencies identified in the community or for those with very severe issues, a referral to Genesee Health Systems (community mental health) would be warranted. Valinda Christopher is the children's services director in Genesee. Would you like me to contact her?

Mary

From: Peeler, Nancy (DHHS)
Sent: Tuesday, December 22, 2015 11:49 AM
To: Ludtke, Mary (DHHS) <ludtkem@michigan.gov>
Subject: RE: question about Pediatric Symptom Checklist

This would be the nurse case managers from the local health department using the tool, with 6-17 year olds. If they had a finding on the screener, they might send info the PCP for them to order further testing or follow-up, or perhaps the ISD for special ed, or CMH. We haven't started yet, so not sure what they will find or where the referral would go.

From: Ludtke, Mary (DHHS)
Sent: Tuesday, December 22, 2015 11:40 AM
To: Peeler, Nancy (DHHS) <PeelerN@michigan.gov>
Subject: RE: question about Pediatric Symptom Checklist

Nancy...we have supported the use of the Pediatric Symptom Checklist in discussions with Medicaid and primary care (as we did in LAUNCH). There are not any specific training videos, to my knowledge, but the Mass General website has all of the materials that one would need. I appreciate that they have a youth version (over 13 years) and the tool in multiple languages including a pictorial version. Since this tool is used in general pediatric care, I don't foresee any issues with using the tool. I trust that it will be useful in primary care. Has anyone let the CMH know that additional screening will be going on to make sure that they know that they may get calls from pediatric care/families?

Of course, the PSC does not screen for other developmental issues besides social emotional health. Will the docs have additional surveillance questions to ensure all of the developmental issues are addressed?

Mary

From: Peeler, Nancy (DHHS)
Sent: Tuesday, December 22, 2015 10:08 AM
To: Ludtke, Mary (DHHS) <ludtkem@michigan.gov>
Subject: question about Pediatric Symptom Checklist

Hi Mary – We are working closely with Genesee County Health Department as they provide case management services to children in Flint with elevated blood lead levels. Our case management protocol includes developmental screening with the ASQ for younger children, . However, there are also some 6-17 year olds that may receive services, and I am considering substituting the PSC for the ASQ for that older group. A couple of questions for you:

- Do you see any issues with using the PSC in this type of circumstance?
- We accessed the tool, scoring materials, administration information are available for free online. Are there any training videos or materials specific to this tool that you are aware of? Would that be needed (it didn't look like it to me).

Thanks for any info you can offer!

Nancy

From: Peeler, Nancy (DHHS)
Sent: Wednesday, December 23, 2015 9:32 AM
To: Kwasnik, Monica (DHHS);Hamilton, Kimberly (DHHS)
Cc: Lishinski, Karen (DCH) (LishinskiK@michigan.gov)
Subject: FW: Molina Healthcare - Lead Testing Initiative

Good morning, Monica and Kim – I wasn't sure who to share this with, thought I would start with you. I had a conversation with Dana Brown from Molina after the MCH meeting, and we talked about their upcoming health fairs in Flint, and the fact that they didn't have a LeadCare machine to use at those health fairs. If you are not familiar with it, LeadCare is a point of service machine that can analyze a capillary blood sample for lead, you have the result within about 3 minutes. If the capillary is high, then it is still necessary to get a venous sample to confirm the result. But if the capillary is low, then typically no further testing is needed at that time point.

Dana is going to follow-up with Magellan, as she thought there may be some practices that could meet the testing volume to get a free machine. I wonder if it would be helpful to share the Magellan information with other health plans, or possibly even invite the rep to the next MCH meeting, or host a conference call? Not sure what your usual approach is, but I at least wanted to get this information into your hands, see what you think.

Nancy

From: Peeler, Nancy (DHHS)
Sent: Tuesday, December 22, 2015 3:18 PM
To: 'Dana Brown' <Dana.Brown@MolinaHealthCare.Com>
Cc: Lishinski, Karen (DHHS) <LishinskiK@michigan.gov>
Subject: RE: Molina Healthcare - Lead Testing Initiative

Good afternoon, Dana – I did manage to connect with Magellan today; there are two options that you might consider:

1. Magellan confirmed that they do offer free LeadCare machines for areas with low testing rates, however, you must make a commitment that you would meet a minimum testing volume, that being at least 384 tests/year (e.g. you must purchase 8 test 'kits', each of which contains supplies for 48 individual tests. 8x48 = 384 tests. You purchase 4 test kits up front, then 4 more within the year). You would need to review your potential testing volume to see if this is a standard you could commit to meeting.

2. They have a pilot study/project going on, where you can purchase the LeadCare machine for $2,000, which includes 2 test kits (supplies for 96 individual tests). After that, you would purchase replacement test kits (48 each) as needed, at a cost of $382 for each test kit.

The Midwest Regional Sales Representative for Magellan is Brandon Albright; I've included his contact information below. I did tell him that he may hear from someone. He said that he is working this week and next other than Christmas Day. I hope this information is useful, and you are able to reach him!

Nancy

MAGELLAN CONTACT INFORMATION:

Brandon Albright | Midwest Regional Sales Representative | Magellan Diagnostics, Inc.
Phone: 219-314-9589 | Fax: 978-856-2335 | Email: balbright@magellandx.com
www.magellandx.com | www.LeadCare2.com | www.LCUltra.com

From: Dana Brown [mailto:Dana.Brown@MolinaHealthCare.Com]
Sent: Monday, December 21, 2015 7:34 PM
To: Peeler, Nancy (DHHS) <PeelerN@michigan.gov>
Cc: Lishinski, Karen (DHHS) <LishinskiK@michigan.gov>
Subject: Molina Healthcare - Lead Testing Initiative

Hi Nancy,

I hope all is going well!
Thank you for your presentation at last week's Maternal Child Workgroup Meeting! You passion for you work with the Lead Program is inspiring.

Molina is working diligently on our lead testing initiative. We have a blast fax going to our providers this week re-education them on the lead test recommendations for a test at 12 and 24 months and for children 3 -6 years if they have never been tested. We are also sending our members information regarding lead testing events we planning for Jan – Mar 2016. Four events have been confirmed so far. We are doing these in schools from 3:30 – 6:30PM in the evening so they are convenient for parents.

I'd like to follow-up with our conversation regarding the LeadCare II machines offered by Magellan Diagnostics. Were you able to speak with your contact or do you have the criteria a provider office needs to meet to receive the machine?

Thanks,
Dana

Dana Brown
Manager, QI Intervention/HEDIS
Molina Healthcare of Michigan
880 W. Long Lake Rd., Suite 600
Troy MI 48098

Phone: 1-866-449-6828 Ext 151787
Direct Dial: 248-925-1787
Fax: 248-925-1732
Email: dana.brown@molinahealthcare.com

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From: Peeler, Nancy (DHHS)
Sent: Monday, January 04, 2016 12:08 PM
To: Brewer-Walraven, Lisa (MDE)
Subject: RE: Michigan News: LEAD

Good morning –

1. A good resource to share with your providers is www.michigan.gov/flintwater. There are resources being posted at that website that they can use. Some are being edited so there is another version with a lower reading level – that work is underway.
2. State and local partners have been working together to make sure water filters/filter replacements are available to families who are on the Flint water system. It is a good idea to continue to remind your providers to continue to use the filters, and how to obtain filter replacements. I believe we have some messaging materials about that already on the website I listed above, that you could utilize if you like. Also about how to change the filter cartridges.
3. The Genesee County Health Department (GCHD) is offering case management services for all children identified with elevated blood lead levels. Your providers could encourage families to take advantage of those services if their child has had an elevated blood lead level based on a blood test. GCHD has a list of all children with elevated levels, and is contacting each family. GCHD also has some good resources for families that providers could use.
4. Our Administration is in the process of putting together a chart of existing follow-up services that can help mitigate/address the impact of lead exposure, and we included high quality child care on that list. I had understood that there is (or will be) some sort of communication from Sue Moran to Susan Broman about this? Not sure since this is being coordinated by Rashmi and Sue – but more to come.

If you have other more specific questions, let me know, happy to share or help you find things.

From: Brewer-Walraven, Lisa (MDE)
Sent: Monday, January 04, 2016 11:45 AM
To: Peeler, Nancy (DHHS) <PeelerN@michigan.gov>; Jansen, Mark (LARA) <JansenM1@michigan.gov>
Subject: FW: Michigan News: LEAD

Nancy and Mark-

Other than offering the water filters I haven't been involved in the efforts, so I'd appreciate an effort on what has been done so I can report back to the Office of Child Care.

Thanks.
Lisa

From: Pestalardo, Maria (ACF) [mailto:Maria.Pestalardo@acf.hhs.gov]
Sent: Monday, January 4, 2016 11:36 AM
To: Brewer-WalravenL@michigan.gov>
Cc: Penak, Kathleen (ACF) <kathleen.penak@acf.hhs.gov>
Subject: FW: Michigan News: LEAD

Good morning Lisa;

Has your office addressed this issue with CCDF providers/families?

Thanks,

Maria Pestalardo
Child Care Program Specialist
U.S. Dept. of Health and Human Services
Administration for Children and Families
Office of Child Care - Region V
233 N. Michigan Ave, Suite 400
Chicago, IL 60601
Phone: (312) 353-4158
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‘Toxic stress’: Max blood lead levels in Flint children 7 times higher than CDC guidelines – doctor

Published time: 29 Dec, 2015 14:54Edited time: 29 Dec, 2015 22:02

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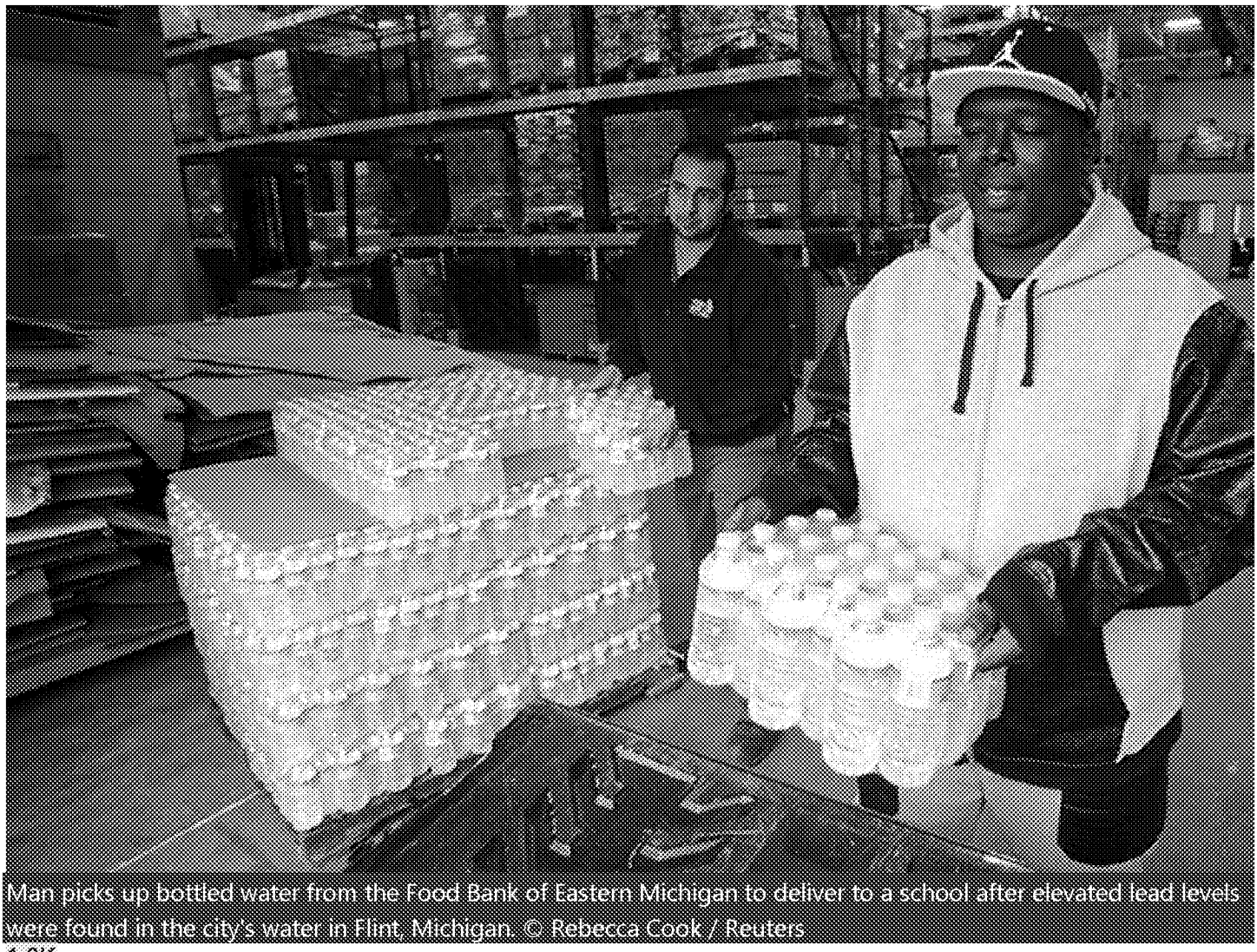


Man picks up bottled water from the Food Bank of Eastern Michigan to deliver to a school after elevated lead levels were found in the city's water in Flint, Michigan. © Rebecca Cook / Reuters

1.6K

Experts who blew the whistle on lead-contaminated water in Flint, Michigan, and its impact on children said some kids had blood lead levels far higher than those US health officials consider "elevated" – and that the state knew kids were being poisoned.

As Michigan officials scramble to help the affected community, a lead researcher who helped expose the toxicity of the water, Virginia Tech professor Marc Edwards, said city and state officials should have known that the Flint River was highly corrosive before they decided to switch from the Detroit water system in 2014. He called the lack of water treatment *"unprecedented."*

Without phosphate treatment, the corrosive water flowed from the Flint River through the city's lead pipes for 17 months and became

contaminated. Failures at multiple levels of government exacerbated the problem and delayed the response to the developing crisis.

On Tuesday, Michigan's top environmental regulator resigned over the crisis.

There is a *"strong correlation"* between high lead water levels in Flint and blood lead levels in children, Dr. Mona Hanna-Attisha said. A pediatrician at the Hurley Medical Center, Hanna-Attisha told RT that the highest readings she and the state recorded for elevated blood levels in Flint were 38 micrograms per deciliter.
That is more than seven times higher than the level classified as *"elevated"* by the Centers for Disease Control and Prevention (5 micrograms). The CDC states there is no safe blood lead level in children.
Hanna-Attisha first revealed that lead levels in Flint children had been rising to dangerous levels in September, although her work was initially panned and dismissed by state officials, including those representing Michigan Governor Rick Snyder. Her latest research shows the percentage of children with elevated blood lead levels (EBLL) nearly doubled – from 2.4 percent before Flint switched water sources to 4.9 percent after the switch was made.

While Hanna-Attisha said that most levels were within the CDC's 5-microgram range, she noted that lead has a very short half-life, making it difficult to determine when peak levels occur in children.

"Our whole research grossly underestimates risk," she said, adding that her team is assuming Flint's entire child population has been exposed. Infants getting formula for the first six months of their life with water sourced from the Flint River face permanent damage,

she added. These problems include developmental issues, a lower IQ, and decreases in motor skills, reading, math and more. Lead affects children in utero as well, meaning it can cause miscarriages and reduced birth weights.

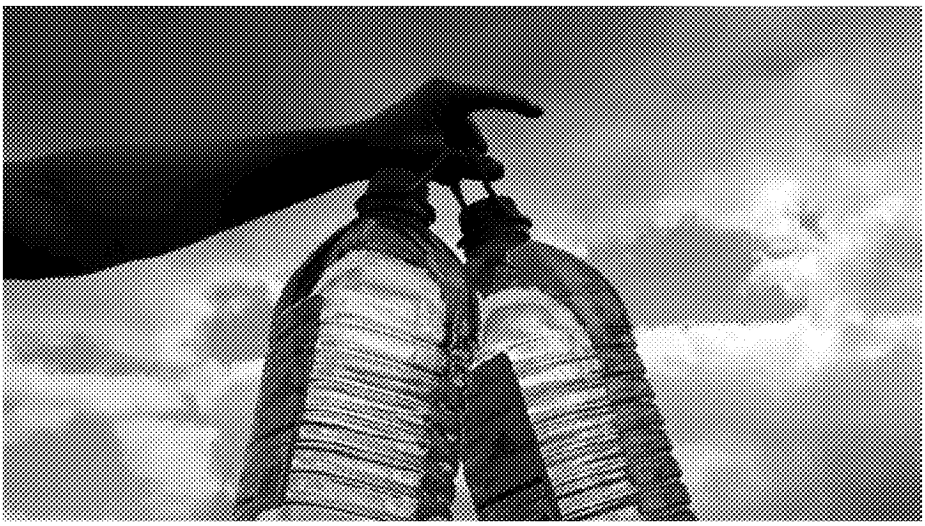
"In the 1920s, people used to take lead pills to induce abortions," she said. *"How many less children were born because of this [water contamination]? That's what we're looking at right now."*

According to the doctor's research, published Monday by the American Public Health Association, one particular ward in Flint saw the percentage of kids with EBLL more than triple, jumping from 4.9 percent to an astonishing 15.7 percent.

'The only city in America'

The crisis in Flint began in April 2014, when the city – under the direction of a state-appointed emergency manager – moved to switch its water supply away from the Detroit system, which pumped water from Lake Huron. Flint opted to tap the local river as its drinking source until a competing pipe system via the Karegnondi Water Authority became ready in 2016, as a way to sidestep the renegotiation of interim rates with Detroit, which severed its contract with Flint in order to do so. The move was projected to save the financially struggling city between $5 million and $7 million a year.

Read more

 Flint mayor declares emergency over lead water crisis, FEMA delivers 28,000 liters of H20

A 2014 letter from then-Emergency Manager Darnell Earley to the Detroit Water and Sewerage Department, obtained by the American Civil Liberties Union of Michigan, declared the decision to go ahead and expressed Earley's confidence that the city's water treatment plant was *"fully operational and capable of treating"* the water. However, Flint never actually treated the water with the necessary chemicals to ensure it remained safe to drink as it traveled through the city's infrastructure, which contained numerous lead pipes, nor did state officials require that the city follow federal law and do so. As the water flowed for a year and a half, it would leach away lead from the pipes and become contaminated.

*"It is unprecedented for a city to not have a corrosion control plan,"*said Virginia Tech's Edwards, a civil and environmental engineer who helped lead the research effort, to RT. *"Flint is the only city in America who did not have a corrosion control plan, as required by Federal law."*

Residents complained almost immediately after the switch was made, citing the water's yellow color, bad taste, and smell. An advocacy group called Water You Fighting For was formed to raise

awareness about the issue, and it worked with the ACLU and local activists like Concerned Pastors for Social Action to highlight the predicament. When Edwards arrived in Michigan to test the water, these groups helped his team carry out its research.

However, over the next year and a half, state and local officials would insist that the water was safe to drink despite mounting evidence that lead levels were moving in the wrong direction.

Rising levels did not trigger action

After switching to the Flint River, officials conducted a six-month round of testing that showed lead levels in the water to be rising. At the end of 2014, officials recorded that 10 percent of tested homes in Flint had water featuring six parts per billion (ppb) of lead or more. That fell under the federal maximum of 15 ppb, but it still represented the first time in a decade that officials were able to detect lead in the water.

"In isolation, it should have been a red flag," Edwards said of the results, "*but coupled with the fact they had no corrosion control and many lead pipes, sirens should have been going off to act quickly.*" *"On top of that consumers had been complaining about corrosion problems months before the state determined lead was rising to six ppb, so there was every reason to believe there was a problem."*

Another round of testing showed that by June, levels had risen to 11 ppb. Edwards said that even before these levels were recorded officials should have known the river would be problematic as a water source. If they didn't, these readings should have pushed them to reconsider their lack of corrosion control treatment.

"The high corrosivity of the Flint water is perfectly obvious to anyone with training in the field, or it would have been revealed if the state had required Flint to follow federal law," he said.

In June 2015, Environmental Protection Agency water specialist Miguel Del Toral penned a memo warning of *"major concern"* over lead after a concerned resident contacted the agency. Toral discovered that lead and iron levels in one resident's water were both extremely high, and that medical records showed the resident's child had elevated blood lead levels after the Flint River switch was made.

In mid-July, the Michigan Department of Environmental Quality (MDEQ) insisted to the public that the water was safe and that the findings in the EPA memo were outliers.

"Let me start here – anyone who is concerned about lead in the drinking water in Flint can relax," agency spokesman Brad Wurfel told Michigan Radio. *"It does not look like there is any broad problem with the water supply freeing up lead as it goes to homes."*

'Conclusive evidence': Gov't docs showed lead poisoning increase

About two weeks after Wurfel's comments, officials at the Michigan Department of Health and Human Services (DHHS) were aware that blood lead levels in kids spiked the summer following the switch, according to internal emails recently released thanks to a Freedom of Information Act request by Edwards.

The collection of documents included a DHHS report, marked current as of July 27, 2015, that showed *"positive test results for EBLL were higher than usual for children under age 16 living in the City of Flint during the months of July, August, and September, 2014."*

According to Edwards, the documents illustrate that state officials had *"scientifically conclusive evidence"* that EBLL increased significantly even as MDEQ and Flint officials continued to insist that the water was safe.

In September 2015, Edwards and his team announced their testing had shown water in Flint was 19 times more corrosive than Detroit's, with several samples showing lead levels above 100 ppb.

© Rebecca Cook / Reuters

In response, MDEQ continued to resist the idea that lead levels were rising. Wurfel contended that MDEQ data showed that samples collected by Edwards' team did not *"match the testing that we've*

been doing in the same kind of neighborhoods all over the city for the past year."
"With these kind of numbers, we would have expected to be seeing a spike somewhere else in the other lead monitoring that goes on in the community."
Dr. Hanna-Attisha was next to challenge Michigan officials, announcing on September 24 that her findings showed EBLL in Flint children had doubled in 2015 compared to the 20 months before the water switch was made. Her research was immediately criticized and dismissed by the state.

Governor Snyder's spokesperson called the data "spliced and diced" in an email. Wurfel said the doctor's comments were*"unfortunate"* and arrived at a time of "near-hysteria" over the water. Officials maintained that recorded spikes in lead levels were seasonal.
Hanna-Attisha said the whole whirlwind of events was *"emotionally jarring."*
"It makes you second-guess yourself," she said of the government response. *"As a scientist as a researcher you double-check, you triple-check, you go by data and numbers."*
"When the state tells you you're wrong, how can you not doubt yourself?"

Failures at multiple levels

On October 2, state officials acknowledged the problem and confirmed Hanna-Attisha's findings. Evidence had already begun surfacing that officials mishandled the Flint situation at multiple points in time, and it continued to mount over the next couple of months. For example, the Detroit Free Press reported that internal state data actually supported Hanna-Attisha's findings and showed the

percentage of children with EBLL had not only risen, but also that it was a clear reversal of a trend that had seen lead poisoning drop in the previous years.

Additionally, it was discovered that to compile their data, officials used blood level results from children who didn't even live in Flint – kids who resided outside of city limits and were drinking water supplied by Detroit. Internal emails noted *"concern"* over Genesee County health officials raising *"the issue of including data for children outside of the city limits."*

The Food Bank of Eastern Michigan holds stacks of bottled water in the agency's warehouse that will be distributed to the public, after elevated

lead levels were found in the city's water, in Flint, Michigan. © Rebecca Cook / Reuters

While worries over the water supply continued to rise, Flint officials filed certified documents with state regulators claiming that city workers were specifically targeting high-risk homes supplied by lead pipes in order test for contamination, as required by federal law. They weren't. City documents revealed that they *"almost always"* tested homes with non-lead plumbing, according to MLive.

Moving back even further, the city of Flint commissioned a report in 2011 that ultimately determined the river water would need to be treated with phosphate in order to reduce its corrosiveness and make it safe to drink. It was completed in 2013, sent to MDEQ – which approved of the water switch – and then sent again to another state official.

By not treating the water, officials didn't just overlook the report's findings; they also violated federal standards calling for treatment, with state workers blaming the oversight on confusion regarding EPA rules. In October, MDEQ Director Dan Wyant said the state thought it was following the proper protocol, but that it was actually using the wrong standards for a city the size of Flint.

In a letter to a state senator, Michigan's independent Auditor General Doug Ringler said that mistakes were made, but that officials did not intentionally misinform the EPA when it came to the city's lack of corrosion control treatment.

"*We have no specific reason to believe that MDEQ willfully misrepresented the information to the EPA,"* Ringler wrote, according to Michigan Radio. "*We did not note any instances of major infractions (i.e., intentional disregard of policies, laws, regulations or specific directions) committed by DEQ staff during the course of our review."*

Following a series of revelations, Wyant resigned from MDEQ on December 29 and Governor Snyder apologized to Flint for the lead situation.

"I want the Flint community to know how very sorry I am that this has happened," Snyder said. "*And I want all Michigan citizens to know that we will learn from this experience, because Flint is not the only city that has an aging infrastructure.*"

Dealing with 'toxic stress'

On October 2, state officials released a 10-point plan to deal with the crisis, one that included expanded testing, providing water filters to residents, accelerating corrosion control treatments, and expediting the completion of the competing Port Huron-linked water system. A task force appointed by Governor Snyder recommended appointing a single person to help coordinate a faster response by the state, which Snyder did in December.

On October 16, Flint reconnected to the Detroit water system after state lawmakers and a local grant making foundation gathered the $12 million necessary to buy water for the city.

In terms of infrastructure, Edwards said the damage done by the corrosive water to the pipes was *"severe"* and *"in the range of a hundred million dollars."* Since switching back to the Detroit water supply, *"the damage rate has slowed again, but what has been done, cannot be undone,"* he said.

Meanwhile, Dr. Hanna-Attisha has pushed officials to deliver a strong response for the children, because while lead damage is permanent, its effects can be alleviated with the proper resources, nutrition and support.

"This is a toxic stress to our kids, and they're already rattled by a bunch of stresses," she said, including poverty and crime.*"I'm an optimist. Our community has been traumatized and it needs hope."* She said affected children need easy access to intervention services, mental health care, guaranteed early education, and better food. If that is supplied, she is hopeful that the community can mitigate the long-term consequences of lead poisoning.

"We have to throw every resource at these kids," she said, adding that the state's eventual acknowledgment of the crisis was a *"sigh of relief"* for the community.

"Unfortunately, it took children being poisoned for someone to listen."

From: Lyon, Nick (DCH)
Sent: Friday, July 31, 2015 10:39 AM
Subject: Fw: Director's Office Assignment -- Flint - need update asap
Attachments: Flint Testing and EBLLs_2.xlsx

Dennis - This is in response to your request to look at the DEQ testing.

From: Grijalva, Nancy (DCH)
Sent: Wednesday, July 29, 2015 11:23 AM
To: Lyon, Nick (DCH)
Subject: FW: Director's Office Assignment -- Flint - need update asap

FYI.....

-----Original Message-----
From: Peeler, Nancy (DCH)
Sent: Tuesday, July 28, 2015 2:57 PM
To: Anderson, Paula (DCH); Miller, Corinne (DCH); Travis, Rashmi (DCH); Moran, Susan (DCH); Grijalva, Nancy (DCH); Fink, Brenda (DCH)
Cc: Priem, Wesley F. (DCH); Dykema, Linda D. (DCH); Bouters, Janese (DCH); Barr, Jacqui (DCH)
Subject: RE: Director's Office Assignment -- Flint - need update asap

I apologize for the delay in responding more specifically to this assignment, it took some time to review our Childhood Lead Poisoning Prevention program data to see if it might contribute to the understanding of the situation in Flint with their water supply. Here is what we found:

We looked at lead testing results for May 2014-April 2015, which is the 12 month time frame just after Flint started drawing their water from the river (water source changed in April 2014). We compared lead testing rates and lead testing results to the same time frame for the previous 3 years, to see if there were any patterns that suggested that there were increased rates of lead poisoning after the water supply was switched. Per the attached charts –

- Lead testing rates remained about the same from year to year (chart on the right).
- There was a spike in elevated blood lead tests from July-September 2014 (chart on the left, gold line).
- However that pattern was not terribly different from what we saw in the previous three years, especially in 2011-2012 (we are working with our Epidemiologist to statistically verify any significant differences).
- We commonly see a 'seasonal effect' with lead, related to people opening and closing windows more often in the summer, which disturbs old deteriorating paint on the windows, sills and sashes. Window fans frequently blow and spread the lead dust from the deteriorating paint to other parts of the room/house. We suspect that the summer data spike may be related to this effect.
- If the home water supply lines and/or river water were contributing to elevated blood lead tests, we expected that the increased rates would extend beyond the summer, but they drop quite a bit from September to October, stayed low over the winter, and are just starting to tail up again in the spring of 2015.

So upon review, we don't believe our data demonstrates an increase in lead poisoning rates that might be attributable to the change in water source for Flint. We recognize that lead exposure via the water is only a small piece of what may be happening for families in Flint, however, we hope the information is helpful.

Nancy Peeler

-----Original Message-----
From: Anderson, Paula (DCH)
Sent: Wednesday, July 22, 2015 5:31 PM
To: Miller, Corinne (DCH); Travis, Rashmi (DCH)
Cc: Priem, Wesley F. (DCH); Dykema, Linda D. (DCH); Peeler, Nancy (DCH); Bouters, Janese (DCH); Barr, Jacqui (DCH)
Subject: Director's Office Assignment -- Flint - need update asap
Importance: High

Good afternoon,
Please see the message below received from the Director's office just before 5. If at all possible, please provide an update of what you may, or may not, know ASAP, today if at all possible. Include Nancy Grijalva and Sue Moran in the response. Thank you.

-----Original Message-----
From: Miller, Mark (DCH)
Sent: Wednesday, July 22, 2015 5:28 PM
To: Anderson, Paula (DCH)
Subject: RE: Flint - need update asap

There's an article from the metro times I located:

http://www.metrotimes.com/Blogs/archives/2015/07/14/flint-family-finds-hazardous-waste-levels-of-lead-in-its-tap-water

Based on this it sounds like at least one family might have had a child with elevated lead blood levels, which might or might not have come from the water. Sounds like the issue is old lead service lines, but their seems to be some difference of opinion on appropriate testing methods.

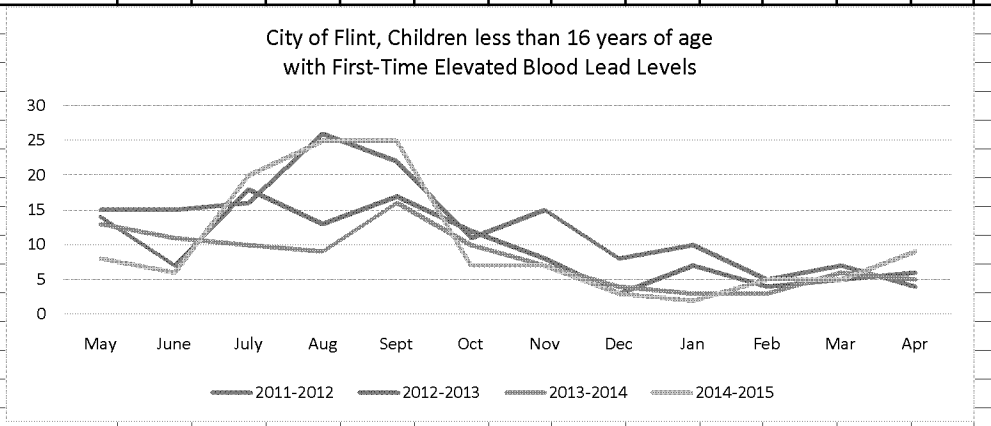
I'd send this over to Linda Dykema, Wes Priem and Nancy Peeler for their comments.

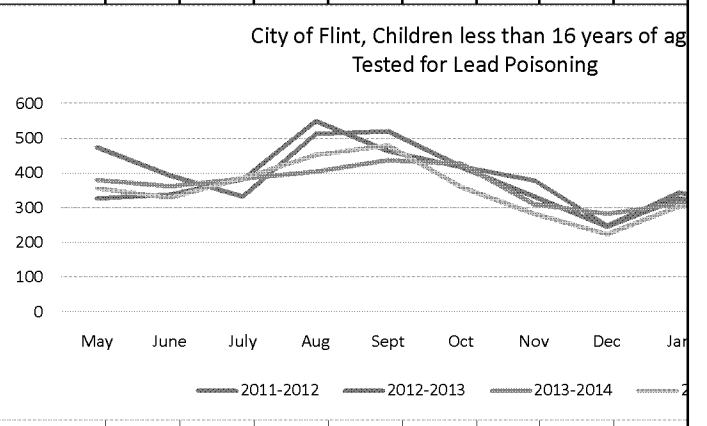
DEQ has jurisdiction over municipal water supplies, but we do have a program to follow-up on children with elevated blood lead levels, so I think it would be appropriate for the folks above to discuss the situation and recommend any action.

Mark

-----Original Message-----
From: Anderson, Paula (DCH)
Sent: Wednesday, July 22, 2015 4:51 PM
To: Miller, Mark (DCH)
Cc: Moran, Susan (DCH)
Subject: FW: Flint - need update asap
Importance: High

Nancy requested an answer TODAY. Thanks.





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2014-2015		8	6	20	25	25	7	7	3	2	5	5	9

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2011-2012		474	393	332	513	520	420	379	249
2012-2013		328	338	383	550	464	417	332	246
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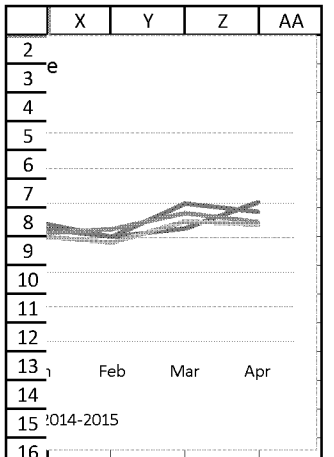

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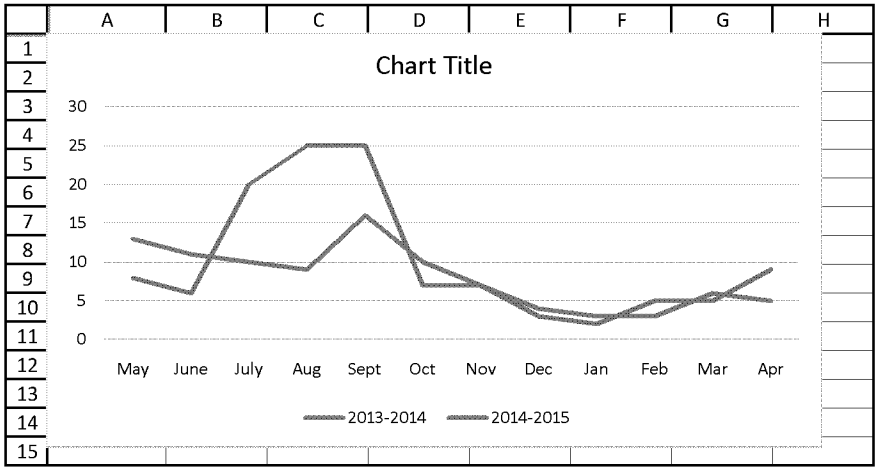
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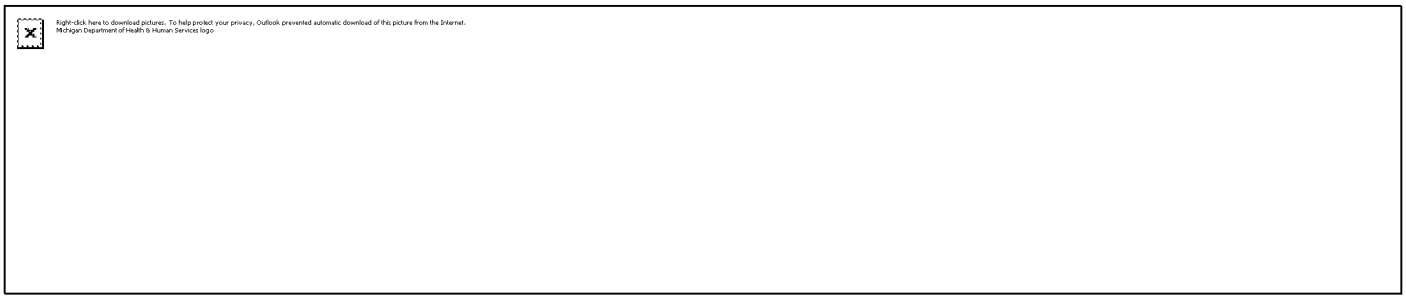
From: Michigan Department of Health and Human Services <MDHHS@govsubscriptions.michigan.gov>
Sent: Wednesday, December 23, 2015 3:01 PM
To: Lyon, Nick (DHHS)
Subject: FOR IMMEDIATE RELEASE: Updated summary report on Flint blood lead level data now available



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Press Release

FOR IMMEDIATE RELEASE: December 23, 2015

CONTACT: Angela Minicuci, 517-241-2112

Updated summary report on Flint blood lead level data now available

LANSING, Mich. – The Michigan Department of Health and Human Services today issued its bi-weekly summary report on lead testing in Flint. Preliminary data indicate that 43 of 2,182 adults and children tested had elevated blood lead levels since Oct. 1.

"In partnership with the Genesee County Health Department, we are working to engage and provide resources to residents to reduce all potential exposures to lead," said Dr. Eden Wells, MDHHS chief medical executive. "Case management and home lead analysis are available for families in which an elevated blood lead level has been detected."

The first MDHHS summary report on blood lead levels in Flint was issued Dec. 3, 2015. Updated reports are posted on a bi-weekly basis on the www.michigan.gov/flintwater website. After refining our methods to identify age, some people are now counted in a different age group than on previous reports. The total counts for each year have not changed.

The report includes both capillary and venous blood tests, and people who have had multiple tests are counted only once. Tests and their results cover the time since the state action plan was put in place on Oct. 2, and capture the number of elevated blood lead levels greater than 5 micrograms

per deciliter.

MDHHS, together with the Genesee County Health Department (GCHD), is working with local partners to distribute educational information around lead testing and prevention. Supplemental state dollars are funding GCHD nurses to work with families when an elevated blood lead level is detected.

Families with an elevated blood lead level can also choose to have a nurse coordinate an environmental health investigation in their home to help identify lead exposures, which could be lead from paint, soil, plumbing, and other sources. Families with questions about their blood lead levels or test results are also encouraged to contact their primary care physician or local health department.

In addition to mandated testing at ages one and two for the Medicaid population, MDHHS is coordinating with its Medicaid health plans and provider communities to recommend blood lead testing for any child younger than six years of age in Flint who has not previously been tested. The state, in coordination with GCHD, developed and issued a Health Alert Network (HAN) notification for local providers to help ensure consistent messaging and protocols among primary care providers.

Free water filters and replacement cartridges are available to Flint residents. For a full list of locations and hours of distribution, or to view the full blood lead level report, visit www.michigan.gov/flintwater. The summary will be updated as more data becomes available.

To help residents properly install water filters, and to demonstrate how to replace the original when it expires, MDHHS has created an instructional video on its YouTube channel. For this and other updates, visit www.michigan.gov/flintwater.

###

- Flint Blood Testing Report 23Dec15 .pdf
- Flint EBL Data Press Release 122315.pdf

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From: Moran, Susan (DHHS)
Sent: Tuesday, November 10, 2015 4:13 PM
To: Lyon, Nick (DHHS)
Subject: RE: Flint water situation

Yes, she is the governmental affairs person for Michigan chapter of the AAP (American Academy of Pediatricians) .

From: Lyon, Nick (DHHS)
Sent: Tuesday, November 10, 2015 4:12 PM
To: Wells, Eden (DHHS); Moran, Susan (DHHS)
Subject: `FW: Flint water situation

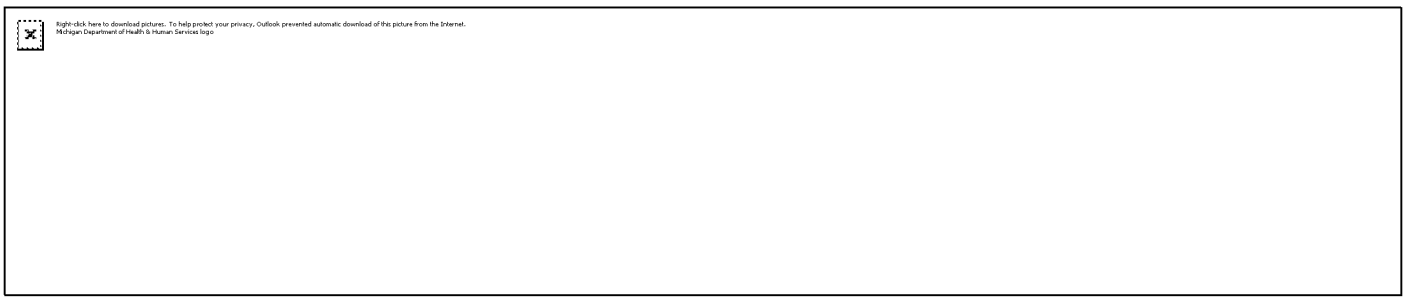
Do you know who this is?

From: Lyon, Nick (DHHS)
Sent: Monday, November 09, 2015 3:11 PM
To: Lyon, Nick (DHHS) <LyonN2@michigan.gov>
Subject: Fwd: Flint water situation

Begin forwarded message:

> **From:** Denise Sloan <dsloan9@gmail.com>
> **Date:** October 1, 2015 at 8:08:25 PM EDT
> **To:** "Nick Lyon, (DCH)" <LyonN2@michigan.gov>
> **Subject: Flint water situation**
>
> Nick,
> Please see our call to state, Genesee officials on lead levels in kids in Flint due to the water situation. This is serious to pediatricians and to the children we serve. We need an aggressive action from MDHHS and local folks .
> Please let me know how we might collaborate.
> Thanks.
> Denise

From: Michigan Department of Health and Human Services <MDHHS@govsubscriptions.michigan.gov>
Sent: Friday, December 11, 2015 4:02 PM
To: Lyon, Nick (DHHS)
Subject: FOR IMMEDIATE RELEASE: MDHHS releases latest round of Flint blood lead level data



Press Release

FOR IMMEDIATE RELEASE: December 11, 2015

CONTACT: Jennifer Eisner, (517) 241-2112

MDHHS releases latest round of Flint blood lead level data

LANSING, Mich. – The Michigan Department of Health and Human Services today issued its newest summary report on lead testing in Flint. According to preliminary data, 39 of 1,836 adults and children tested had elevated blood lead levels since Oct. 1.

"As testing continues, our focus remains on helping families reduce all potential exposures to lead," said Dr. Eden Wells, MDHHS chief medical executive. "We are working closely with the Genesee County Health Department to provide information and offer tools in the community, and encourage families to explore the resources that are available to them."

Both capillary and venous blood tests are included in the report, and people who have had multiple tests are counted only once. Tests and their results cover the time since the state action plan was put in place on Oct. 2, and capture the number of elevated blood lead levels greater than 5 micrograms per deciliter.

MDHHS is working closely with local partners to offer resources and distribute important lead testing and prevention information. Additional state funding has allowed for Genesee County Health Department (GCHD) nurses to work with families when an elevated blood lead level is detected. These families can also choose to have the nurse coordinate an environmental health investigation in their home to identify lead exposures, which could be lead from paint, soil, plumbing, and other

sources.

To support these efforts, the state is coordinating with its Medicaid health plans and provider communities on enhanced screening and testing. In addition to mandated testing at ages one and two for the Medicaid population, MDHHS has recommended blood lead testing for any child younger than six years of age in Flint who has not previously been tested. The state, in coordination with GCHD, developed and issued a Health Alert Network (HAN) notification for local providers to help ensure consistent messaging and protocols among primary care providers.

Free water filters and replacement cartridges are still available to Flint residents. For a full list of locations and hours of distribution, or to view the full blood lead level report, visit www.michigan.gov/flintwater. The summary will be updated as more data becomes available.

To help residents properly install water filters, and to demonstrate how to replace the original when it expires, MDHHS has created an instructional video on its YouTube channel. For this and other updates, visit www.michigan.gov/flintwater.

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- Flint EBL Data Press Release Dec 11.pdf
- Flint Blood Testing Report December 11.pdf

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DHHS Foster

Become a foster parent through Michigan Department of Health & Human Services foster care program.

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From: Mona <monahannaattisha@gmail.com>
Sent: Monday, December 14, 2015 11:06 AM
To: Lyon, Nick (DHHS)
Subject: Fwd:
Attachments: Secondary Prevention MI 121415.pptx; ATT00001.htm

Mona Hanna-Attisha MD MPH FAAP
Director, Pediatric Residency Program
Hurley Children's Hospital
Michigan State University

Mona Hanna-Attisha

Begin forwarded message:

> **From:** Mona Hanna-Attisha <MHanna1@hurleymc.com>
> **Date:** December 14, 2015 at 9:10:41 AM EST
> **To:** Mona Hanna-Attisha <MHanna1@hurleymc.com>, "monahannaattisha@gmail.com" <monahannaattisha@gmail.com>
>
> Mona Hanna-Attisha MD MPH FAAP
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> Mhanna1@hurleymc.com

#flintwatercrisis

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Background & Secondary Prevention

Mona Hanna-Attisha MD MPH FAAP
Hurley Children's Hospital
Michigan State University College of Human Medicine

Agenda

- Flint Water Timeline
- Lead Facts
- Hurley Research Findings
- Introduction to Toxic Stress
- Next steps – Secondary Prevention

Flint Drinking Water Crisis

- Financial Emergency Managers
- Water switch to Flint River (April 2014)
- Fecal coliform and boil advisories *3 (Sept 2014)
- GM stopped using Flint water – corroding parts (Oct 2014)
- Disinfectant byproducts TTHM (Jan 2015-Sept 2015)

Flint Drinking Water Crisis

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- Perfect storm for lead leaching
  - Flint water more corrosive
  - Lack of corrosion control
  - Aging infrastructure (lead plumbing)
  - Decreased water use - population loss, high water rates

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Flint Drinking Water Crisis

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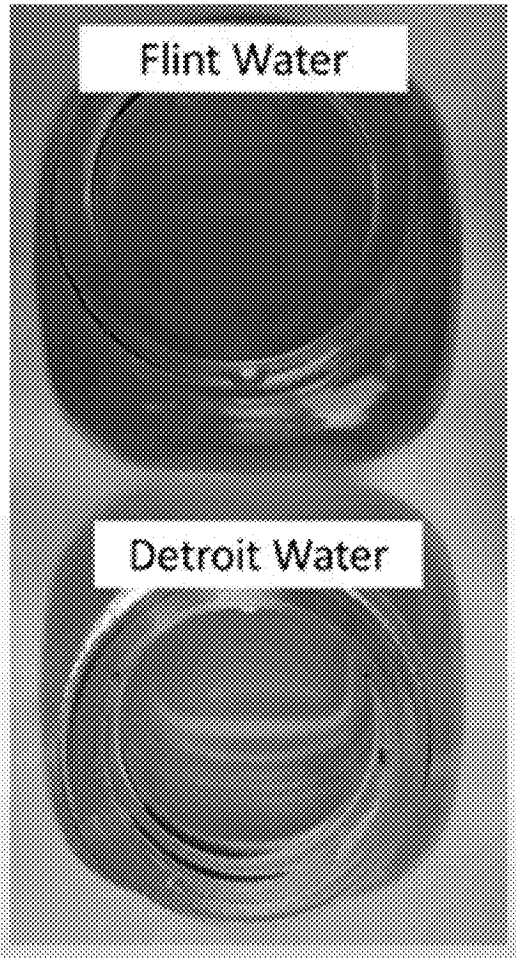
- High lead levels detected, EPA contacted (February 2015)
- Leaked EPA memo (June 2015)
  - LeeAnn Walters WLL 13,200 ppb (toxic waste)
- Dr Marc Edwards, Virginia Tech Research (Aug 2015)
  - Flintwaterstudy.org
  - Corrosion & water lead
- Hurley Research (Sept 2015)



https://www.wsws.org/en/articles/2015/09/26/flin-s26.html

Why do we care about lead?

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- Lead is a potent neurotoxin with lifelong, multigenerational impacts
- Blood lead levels (BLL) 5 ug/dL or more considered elevated blood lead levels (EBLL)
- Just a few years ago (2012), 10 ug/dL was cutoff
- NO safe blood lead level
- Disproportionately impacts low income and minority children
- Primary prevention is most important

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Primary Prevention

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- "Because no measurable level of blood lead is known to be without deleterious effects, and because once engendered, the effects appear to be irreversible in the absence of any other interventions, public health, environmental and housing policies should encourage PREVENTION of all exposure to lead."

"Low Level Lead Exposure Harms Children: A Renewed Call for Primary Prevention." 2012 CDC Advisory Committee on Childhood Lead Poisoning Prevention.

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Impact on cognition

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- Vast evidence supports increased likelihood of:
  - Decrease in IQ
    - An increase in BLL from 1 to 4 ug/dL, drops mean IQ -3.7 points
  - Small change in mean IQ, shifts entire population IQ distribution
    - Reduces high achievers IQs (>130) and increases kids with low IQs (<70)
    - Implications for early intervention, special education services, employment, incarceration, life achievement, etc

Lanphear BP et al., Low-level environmental lead exposure and children's intellectual function: an international pooled analysis. Environ Health Perspect, 2005. 113:894-9.
Fewtrell LJ, Pruss-Ustun A, Landrigan P, and Ayuso-Mateos JL, Estimating the global burden of disease of mild mental retardation and cardiovascular diseases from environmental lead exposure. Environmental Research, 2004. 94:120-33.

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Impact on behavior

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- Increased likelihood of :
  - ADHD behaviors
  - Delinquent behaviors and arrests
  - Total arrests and increased rates of arrests involving violent offenses
  - Other health effects: hematologic, cardiovascular, immunologic, endocrine, etc

Wright, JP, KN Dietrich, MD Ris, et al. 2008. Association of prenatal and childhood blood lead concentrations with criminal arrests in early adulthood. *PLoS Med* 5(5): e101

Chen, A, B Cai, KN Dietrich, et al. 2007. Lead exposure, IQ, and behavior in urban 5-7 year-olds: Does lead affect behavior only by lowering IQ? *Pediatrics* 119(3): e650-e658.

Needleman, HL, C McFarland, RB Ness, et al. 2002. Bone lead levels in adjudicated delinquents: A case control study. *Neurotoxicology and Teratology* 24(6):711-717.

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Cost

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- "For childhood lead poisoning, $5.9 billion in medical care costs, as well as an additional **$50.9 billion** (sensitivity analysis: $44.8–$60.6 billion) per year in lost economic productivity resulting from reduced cognitive potential from preventable childhood lead exposure."

- "The present value of Michigan's economic losses attributable to lead exposure in the 2009 cohort of 5 year-olds ranges from $3.19 (using U.S. blood lead levels) to **$4.85 billion** (using Michigan blood lead levels) per year in loss of future lifetime earnings."

Leonardo Trasande and Yinghua Liu. Reducing The Staggering Costs Of Environmental Disease In Children, Estimated At $76.6 Billion In 2008. *Health Affairs*, 30, no.5 (2011):863-870

The Price of Pollution: Cost Estimates of Environment-Related Childhood Diseases in Michigan. 2010 Report by Michigan Network of Children's Environmental Health

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Lead in Water

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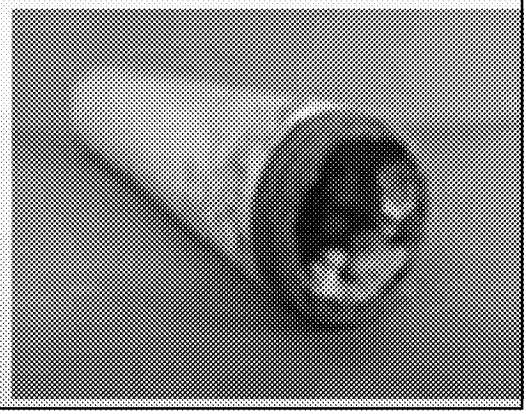
- Not what medicine/public health used to
  - Lead paint obsessed
  - "drinking through a lead painted straw"
- Soluble metal – ingestion via particulate or dissolved in water
- Drinking and cooking risks



Lead in water

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- Disproportionally impacts developmentally-vulnerable formula-fed infants
  - For about 25% of infants drinking formula made from tap water at 10 ppb, blood lead would rise >= 5 ug/dL
- Significant risk to unborn babies
  - Increase in fetal deaths and reduced birth weights

Triantafyllidou, S., Gallagher. D. and Edwards, M. Assessing risk with increasingly stringent public health goals: the case of water lead and blood lead in children. Journal of Water and Health. doi: 10.2166/wh.2013.067 58-68 (2014).
Edwards, M. Fetal Death and Reduced Birth Rates Associated with Exposure to Lead-Contaminated Drinking Water. Env. Sci. and Tech. 2013 DOI: 10.1021/es4034952

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Hurley Children's RESEARCH FINDINGS

Sept 24

Medical Community Press Conference

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Methods

- HMC IRB approved
- Data from all blood lead levels processed at Hurley Medical Center
- ZIP code based
- Two periods of comparison (same seasons):
  - PRE-SWITCH: January 1, 2013 – September 15, 2013
    - **WATER SWITCH APRIL 26, 2014**
  - POST-SWITCH: January 1, 2015 – September 15, 2015

- Analyzed % Elevated Blood Lead (EBLL)
  - EBLL = Blood lead Levels >= 5 ug/dL

Initial Research Results

- Zip code based (in media)

	ALL FLINT ZIPS (n=1746)	HIGH-WLL FLINT ZIPs (48503-48504) (n=742)	NON-FLINT ZIPS (n=1670)
PRE-SWITCH	2.1%	2.5%	0.6%
POST-SWITCH	4.0%	6.3%	1.0%

GEOcoded Analysis

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- N= 1473 for Flint water children (pre n=736, post n=737)
- N= 2202 for non-Flint water children (pre n=1210, post n=992)

Flint results for children 5 years and under:

- PRE-SWITCH % EBLL: **2.4%**
- POST-SWITCH % EBLL: **4.9%**
- **p < 0.05; STATISTICALLY SIGNIFICANT CHANGE**

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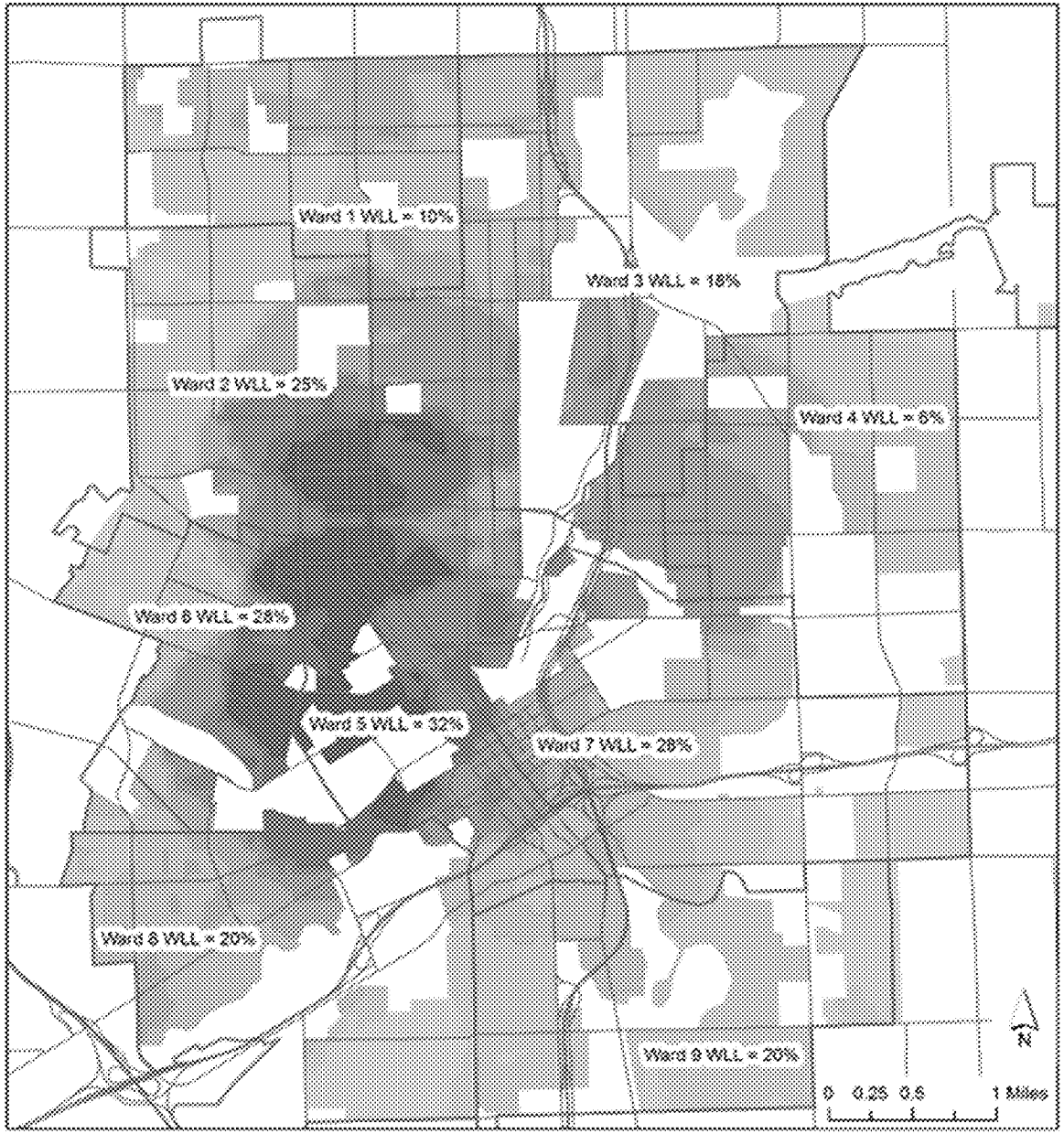

- Focus on high WLL wards (5, 6, 7); ie., those with high water lead levels

Results:

- PRE-SWITCH % EBLL: **4.0%**
- POST-SWITCH % EBLL: **10.6%**
- **$p < 0.05$; STATISTICALLY SIGNIFICANT CHANGE**

- Note: Hot spots between wards/zips

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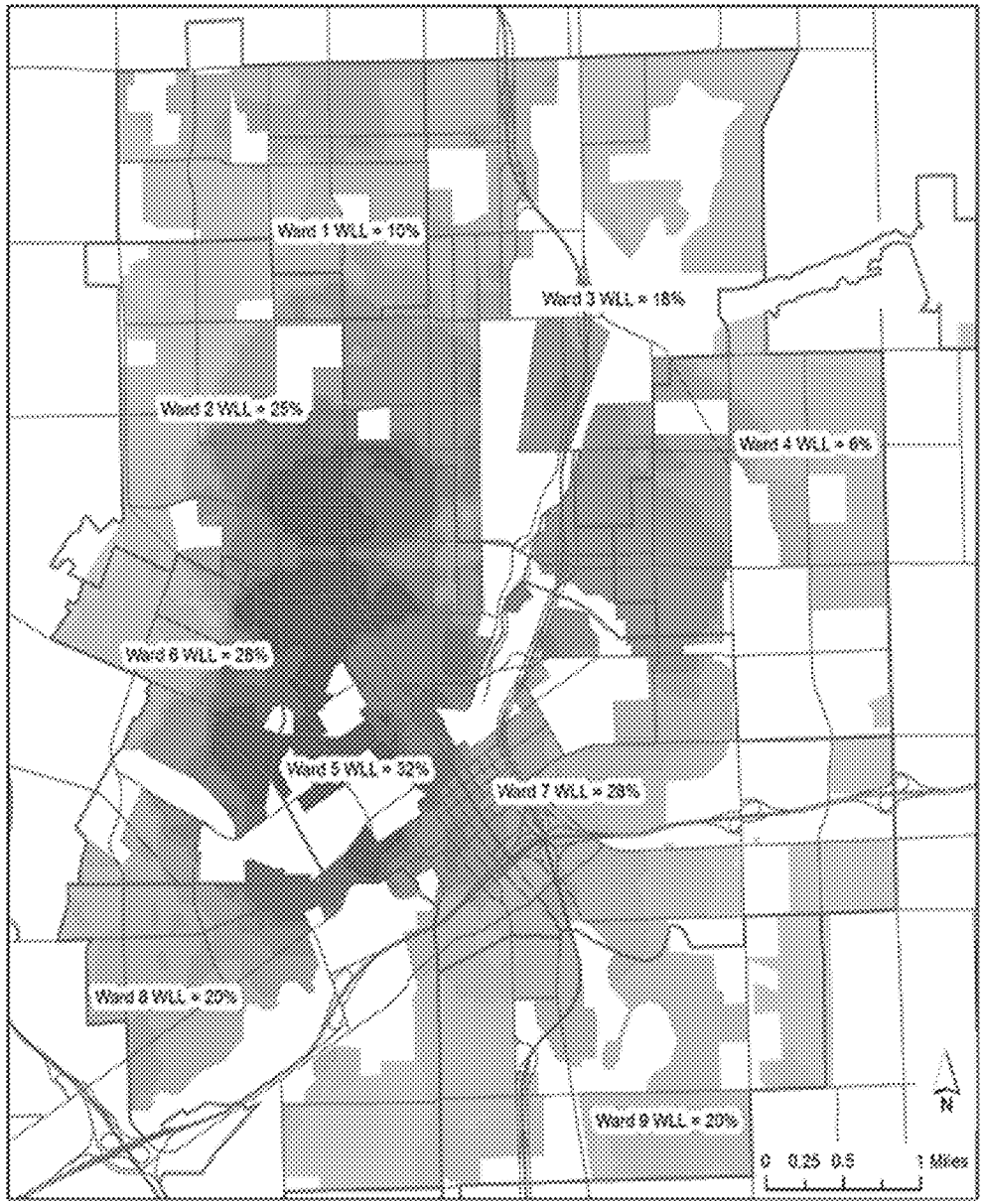


Flint City Wards

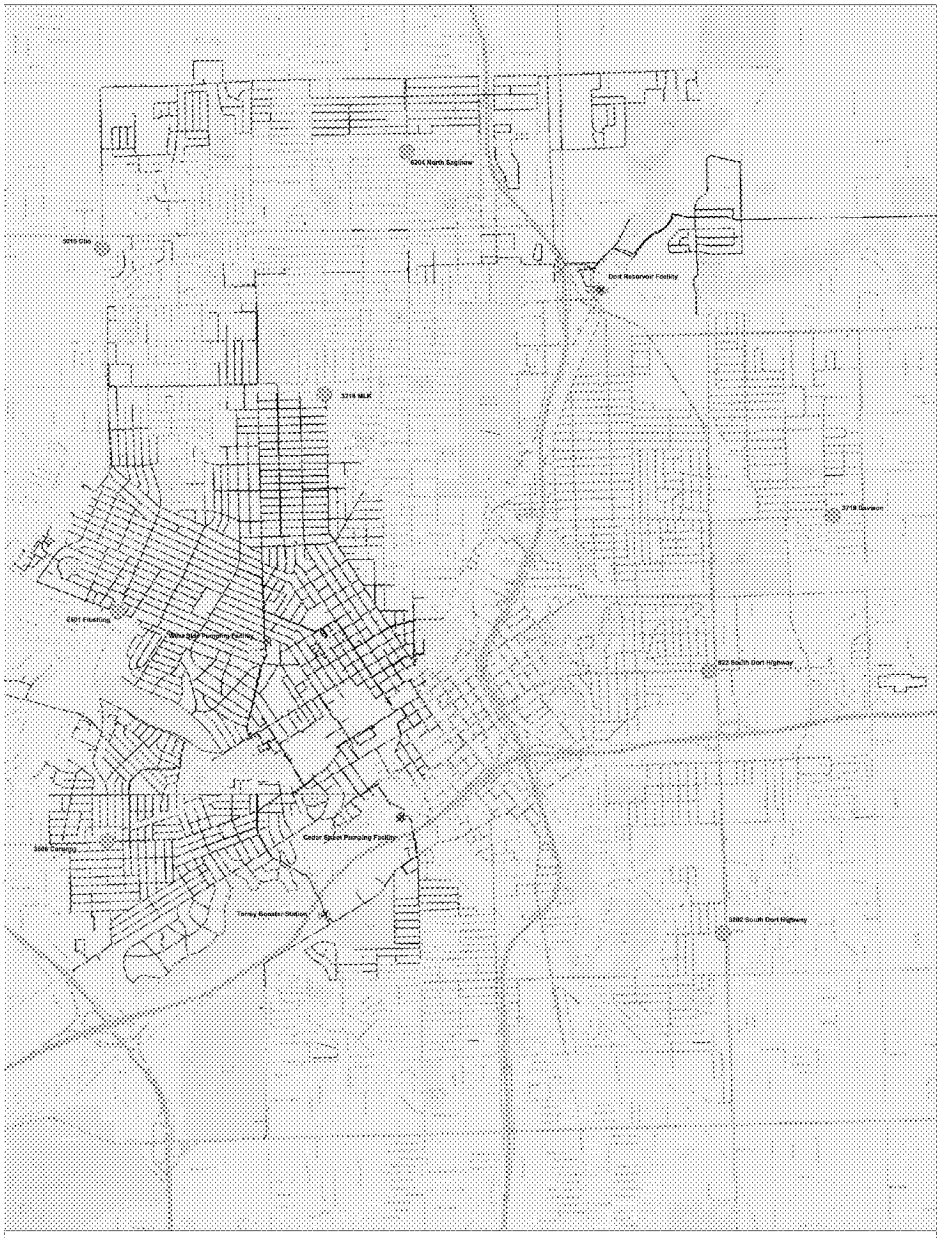
Major Streets

"Ward Y WLL = XX%" → % of ward where any water sample exceeded 15 ppb

Predicted BLL based on Ordinary Kriging Geostatistical Analysis

0.7 - 0.75		1.01 - 1.25	2.01 - 2.25
0.76 - 1		1.26 - 1.5	2.26 - 2.5
		1.51 - 1.75	2.51 - 2.75
		1.76 - 2	2.76 - 3.36

*Non-residential zones screened from results



Legend
Water Quality (Hrs)

- less than 24.0
- 24.0 to 72.0
- 73.0 to 144.0
- greater than 144.0
- Water sample location

CITY OF FLINT MAJOR WATER INFRASTRUCTURE

WATER AGE & WATER SAMPLE LOCATION MAP

January 21, 2015

N

0 550 1,100 2,200 3,300 4,400 Feet

Pre/Post EBLL

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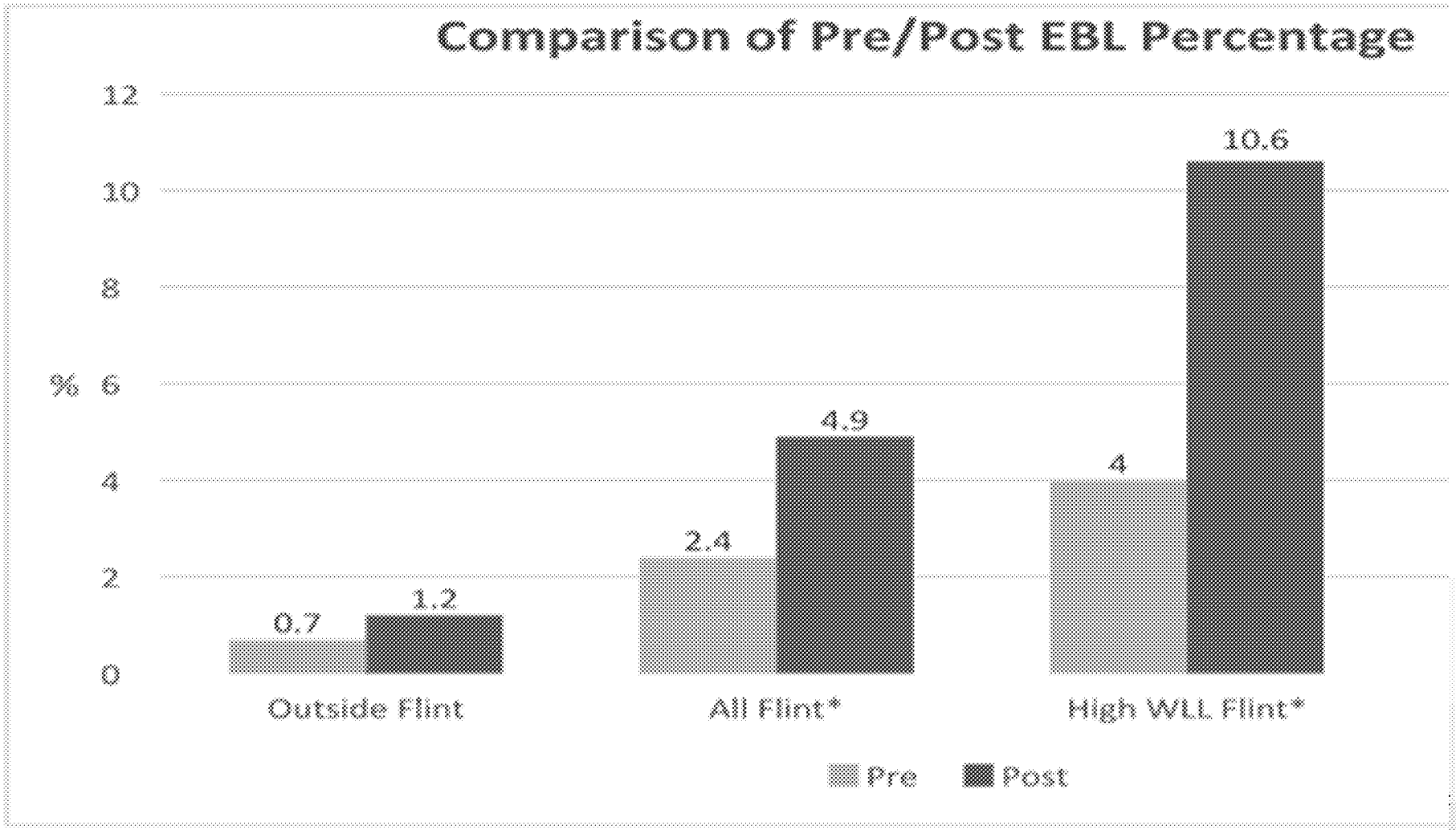

*p<0.05

Research results

- % of children with EBLL in Flint zips increased
  - Most striking increase in areas with highest water lead levels
- **Results significantly underestimate exposure:**
  - Infants not screened for lead
  - BLL may have peaked before being measured (blood half life 20-30 days)
  - Kids exposed in different settings throughout city
- Widened disparities
- Failure of primary prevention

What happened next?

- Sept 25 City of Flint Lead Health Advisory
- Sept 29 GCHD Health Advisory
- Oct 1 GCHD Public Health Emergency
- Oct 2 State filter program, increased water testing, expedited corrosion control
  - Oct 3 First filter distribution
- Oct 8 Three schools toxic WLL, announced reconnection to DWSD
- Oct 16 Water switched back to DWSD

Epigenetics

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Wayne State Researchers Discover Evidence That Lead Exposure in Mothers Can Affect Future Generations

Released: 2-Oct-2015 3:05 PM EDT
Source Newsroom: Wayne State University Division of Research

"A team of researchers at Wayne State University have discovered that mothers with high levels of lead in their blood not only affect the fetal cells of their unborn children, but also their grandchildren. "

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Now

- Preventable population-wide exposure
- Community traumatized
- Loss of trust in government and agencies
  - In 2015, in the middle of the great lakes, no guarantee of safe drinking water
- Ongoing public health emergency

Exposed Population

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- Currently identifying/labeling exposed population
- Cohort includes all children less than 6 years who at any time lived in Flint water limits (geocoded) from April 2014 to end date unknown (extend 9 months for fetal exposure).
- Per census data, approx. 8,000-9,000 children

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Quick Introduction to ACEs/Toxic Stress…

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Adverse Childhood Experiences (ACEs)

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- ACEs are potentially traumatic events that can have negative, lasting effects on health and well-being.
- Also referred to as toxic stress or childhood trauma.
- As number of ACEs increase, the risk for health problems increase in a strong and graded fashion.
- An ACE score of 6 or more results in a 20 year decrease in life expectancy.

- CDC ACE study
  - Kaiser Permanente from 1995 to 1997 with more than 17,000 participants.

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Toxic Stresses

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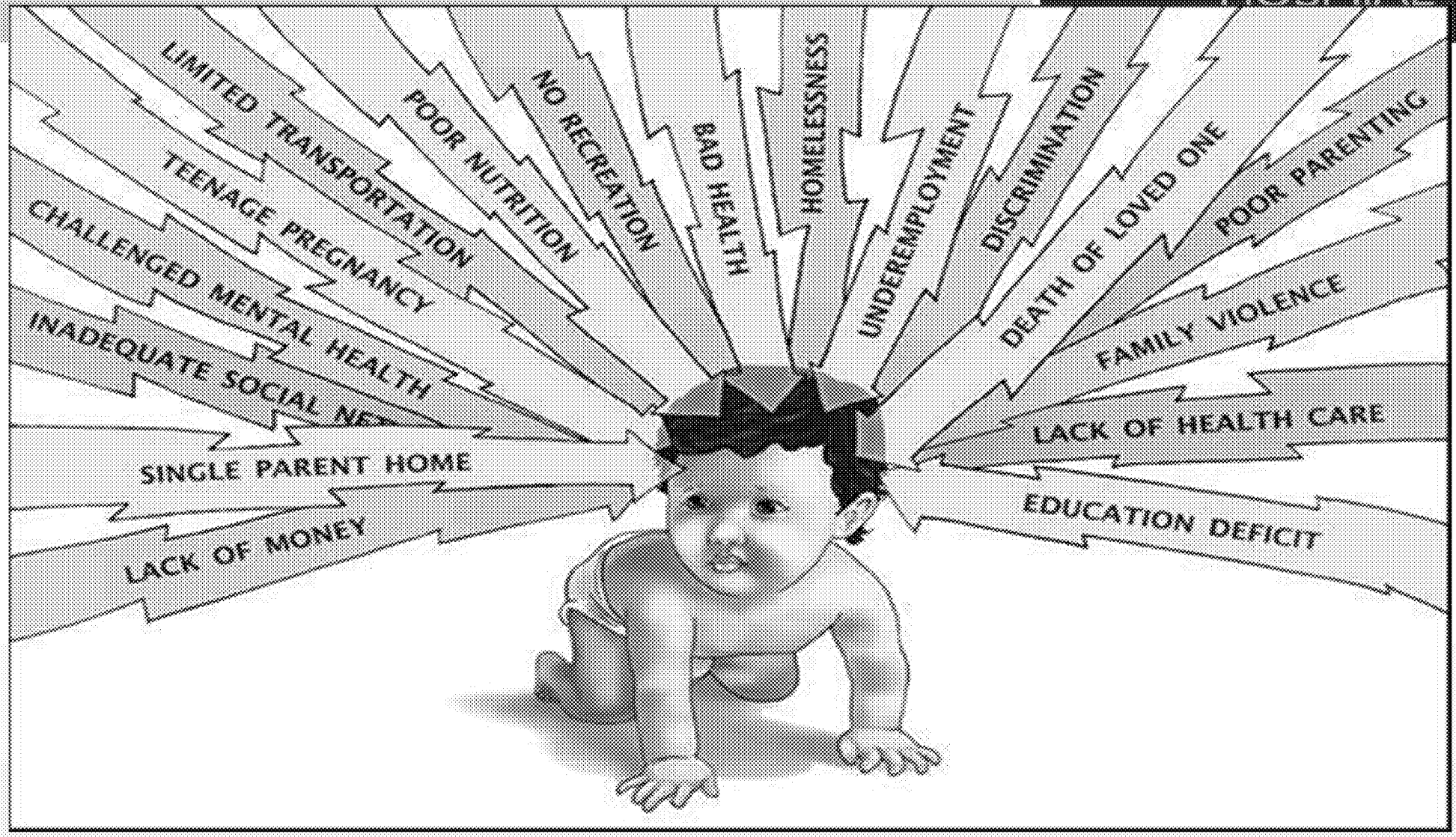

https://casaofsantacruz.wordpress.com/2014/10/08/continuing-education-webinar-how-toxic-stress-impacts-cas-children-families-communities-2/

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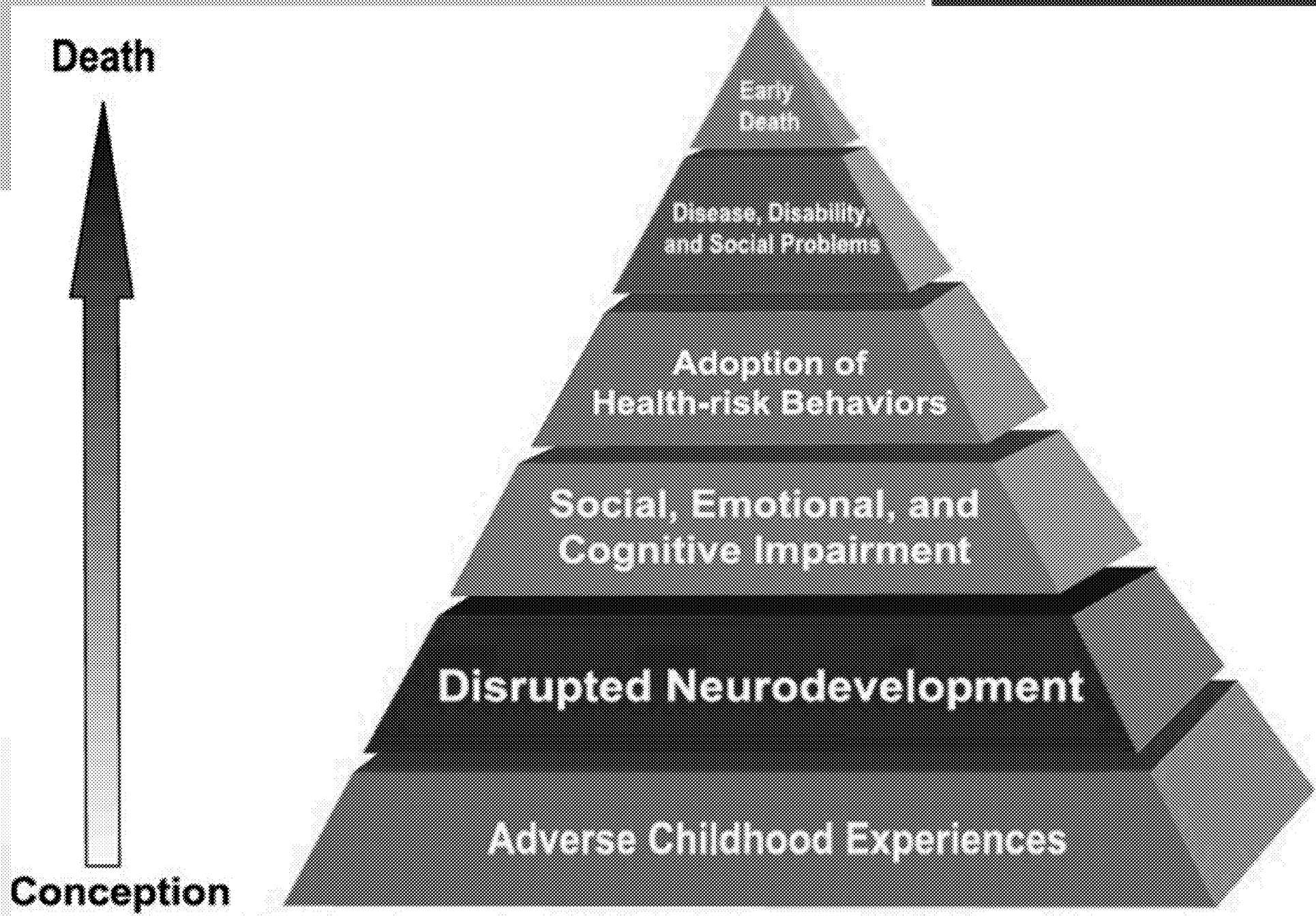

Mechanisms by Which Adverse Childhood Experiences Influence Health and Well-being Throughout the Lifespan

http://www.cdc.gov/violenceprevention/acestudy/

EPIGENETICS

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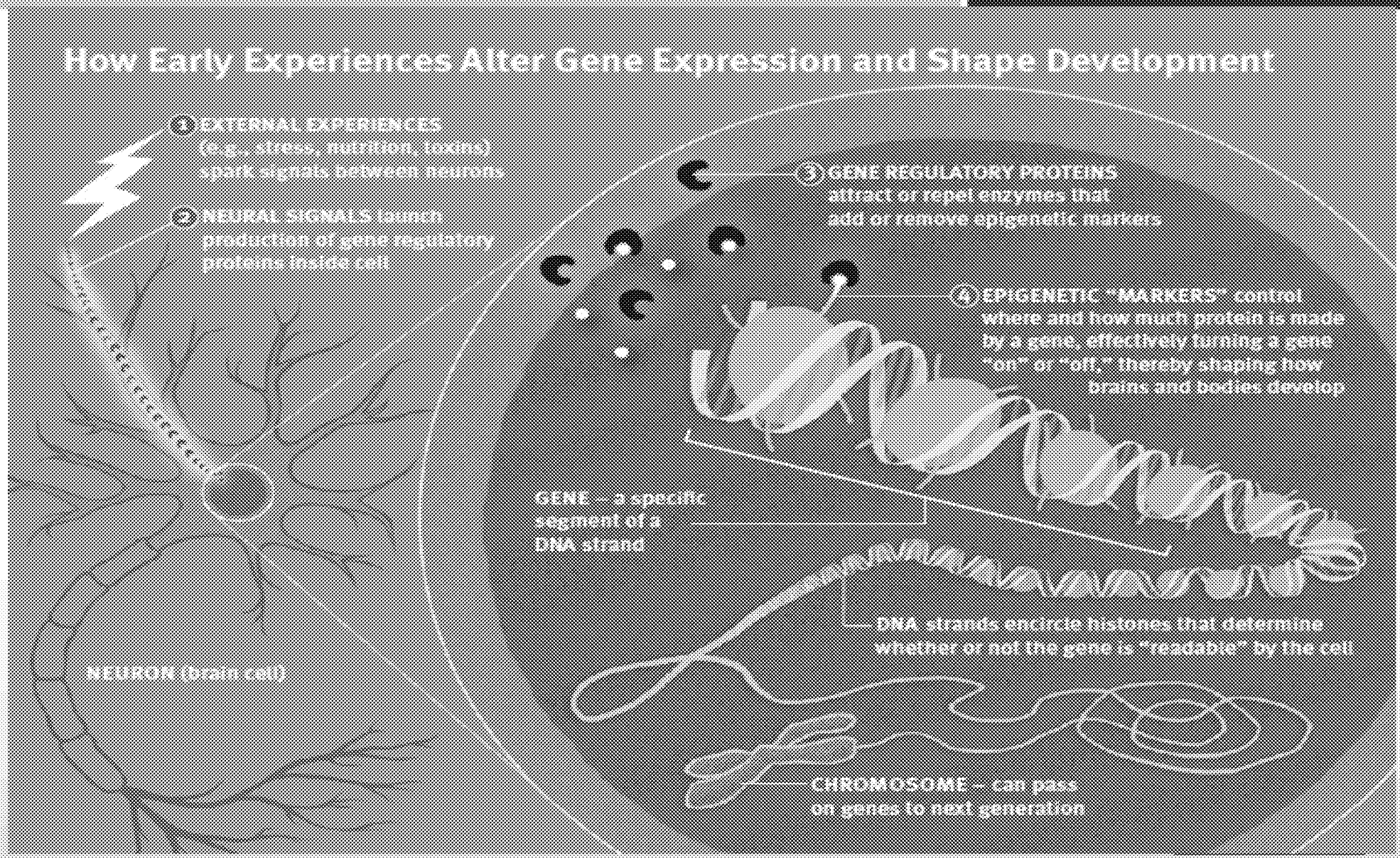

http://developingchild.harvard.edu/science/deep-dives/gene-environment-interaction/

ACE/Toxic Stress

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- Many chronic diseases/disparities in adults are determined decades earlier, by experiences in childhood (0-6 critical)
- Lead exposure is an ACE/toxic stress

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Flint kids...

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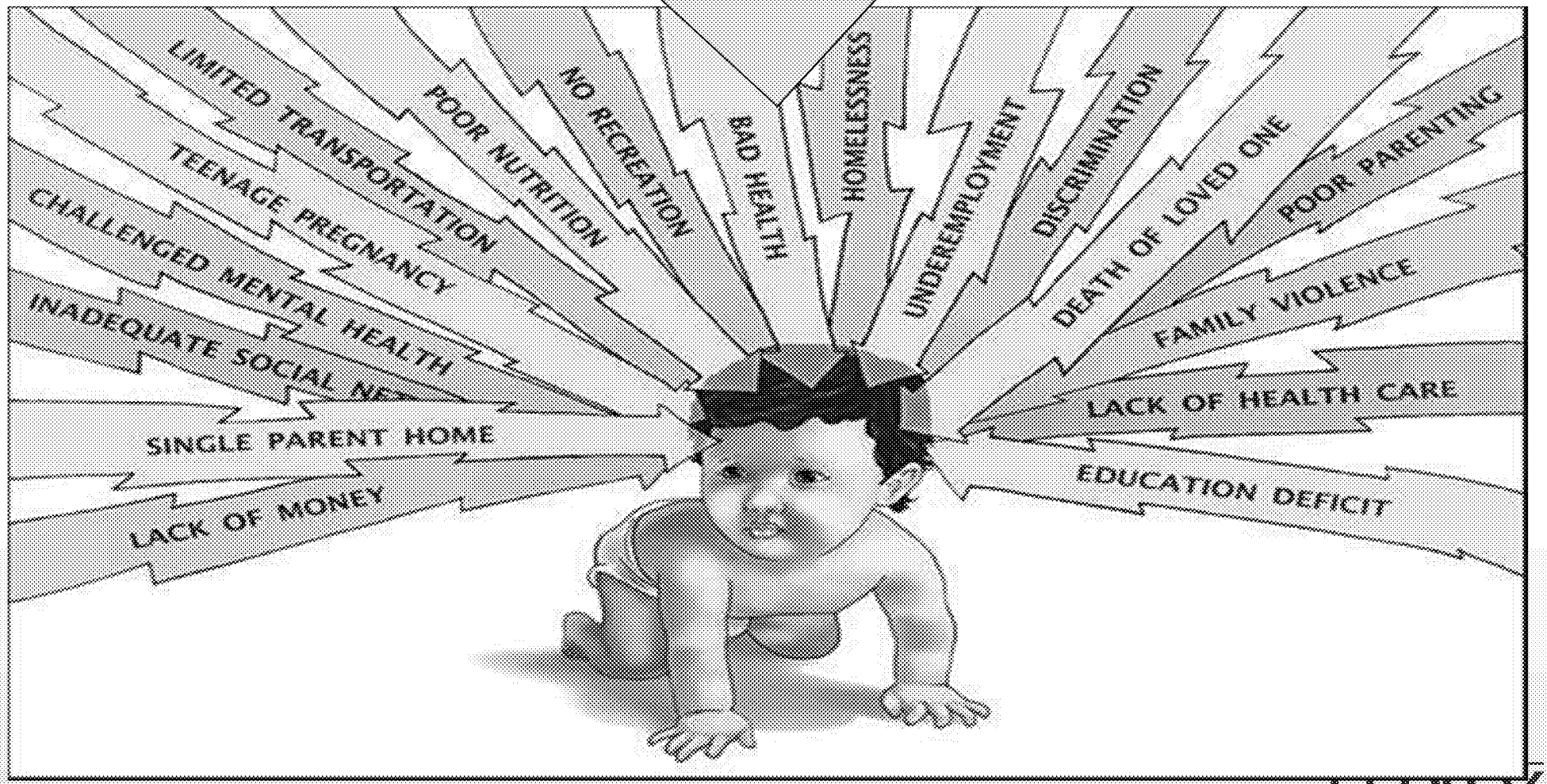

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- Now what can we do???

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Research/Assessment

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- Assess the impact of the exposure
  - Health impact
    - BLL
    - Longitudinal neurodevelopmental f/u
    - Cord blood Pb, brain injury markers, epigenetics
    - Retrospective fetal deaths, IUGR
  - Nutrition impact
  - Psychosocial impact
  - Water quality/infrastructure impact
- Continued monitoring
  - Academic/public health collaborations

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Secondary Prevention

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- Unique opportunity to be proactive, to regain public trust, and to **buffer** impact of exposure
  - Short Term
  - Long Term

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Short-Term Secondary Prevention

- Consistent, coordinated, multi-method, trusted messaging/education/risk communication/PSAs
  - Need for central command/hub/emergency response

Short-Term Secondary Prevention

- Water still not safe (public health emergency)
  - Corrosion control optimization
  - Ongoing risk from scale disruption
  - Door to door filter/replacement distribution
    - # filters distributed approx 1/3 of homes
  - Public education re water precautions (filters, flushing, cold water, cooking, infants, etc)
  - Lead plumbing

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Secondary Prevention Evidence Based Interventions

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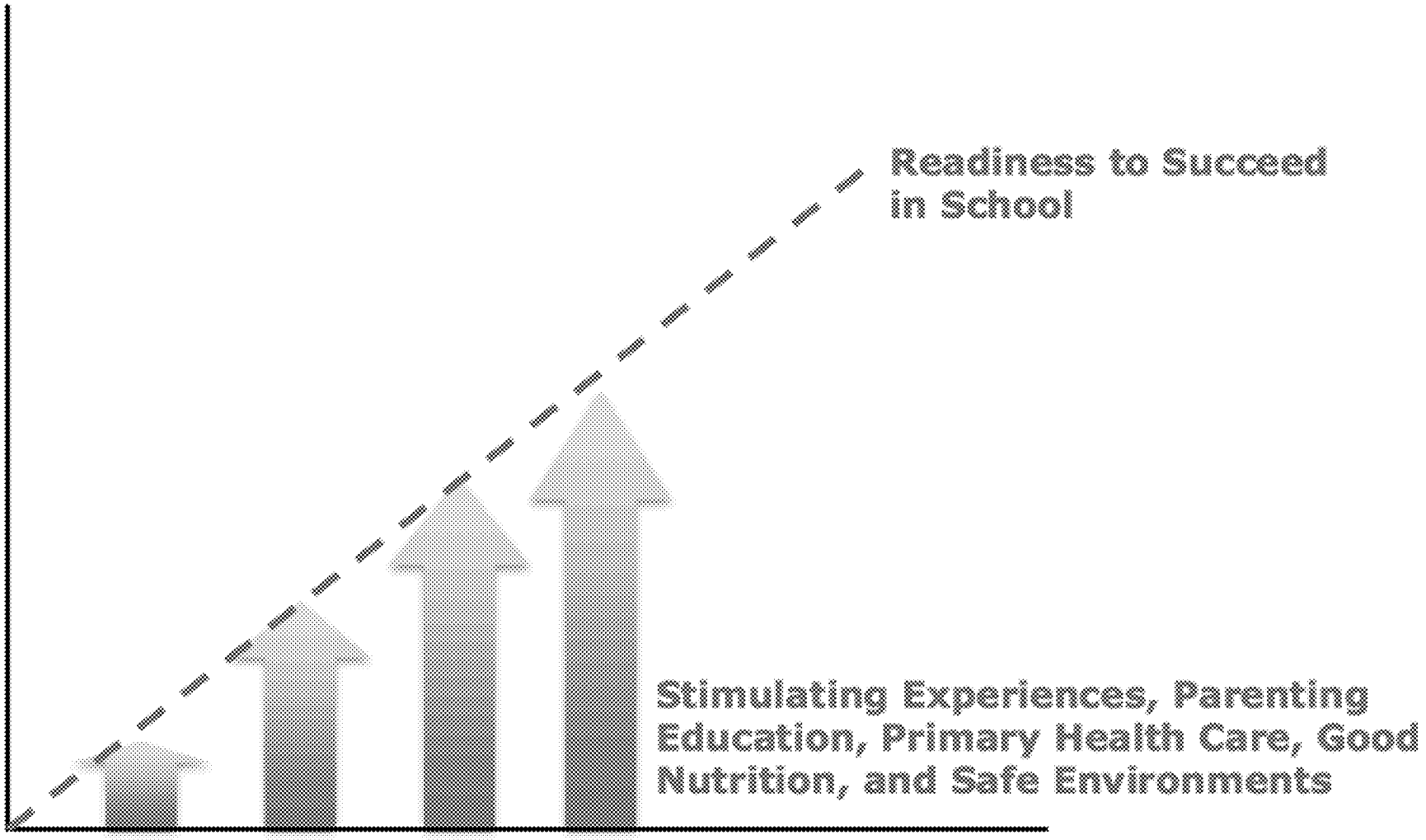
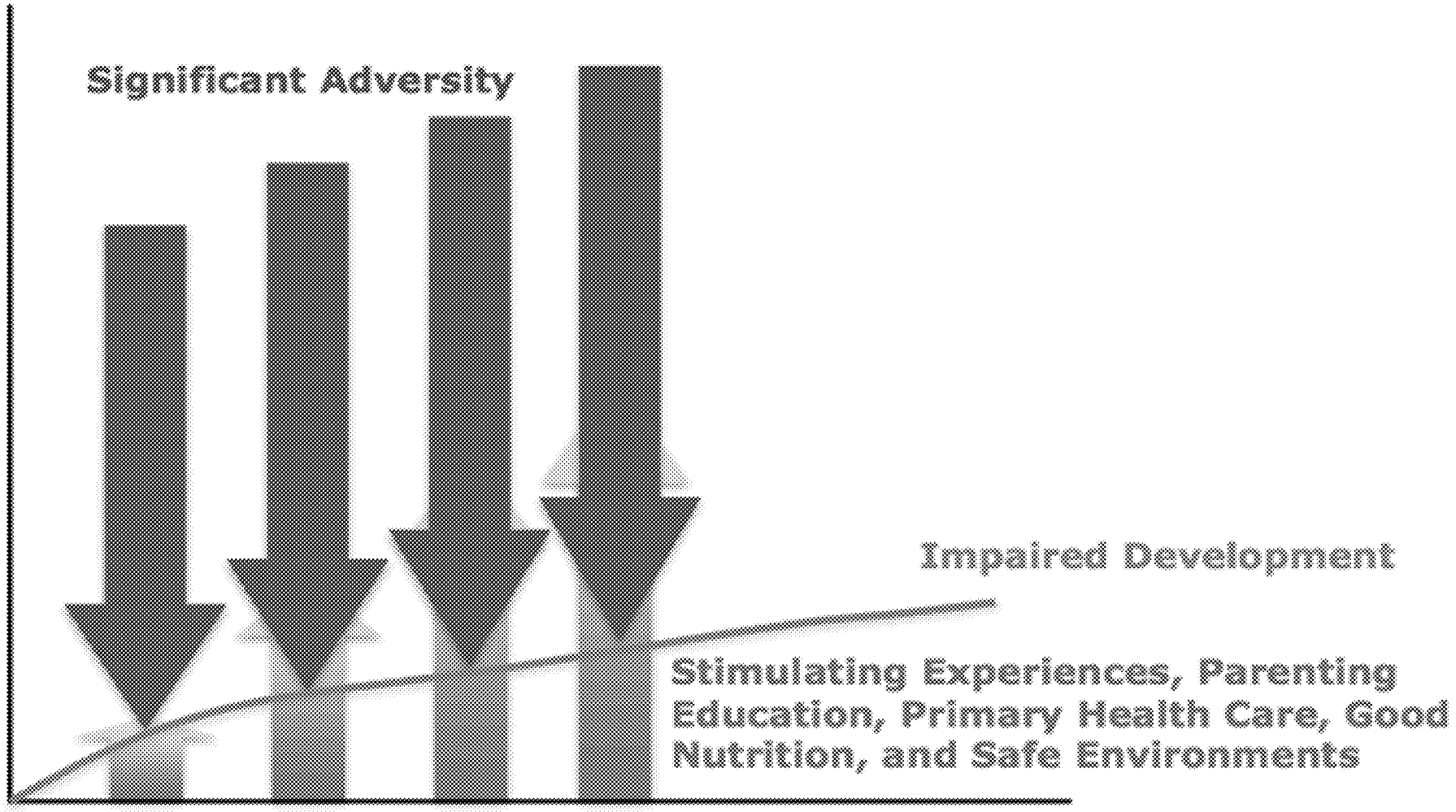
We know what works....



https://www.aap.org/en-us/advocacy-and-policy/federal-advocacy/Documents/Panel%201%20-%20Shonkoff%20Center%20on%20the%20Developing%20Child%20Presentation.pdf

And we know what hurts...



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Evidence Based Interventions

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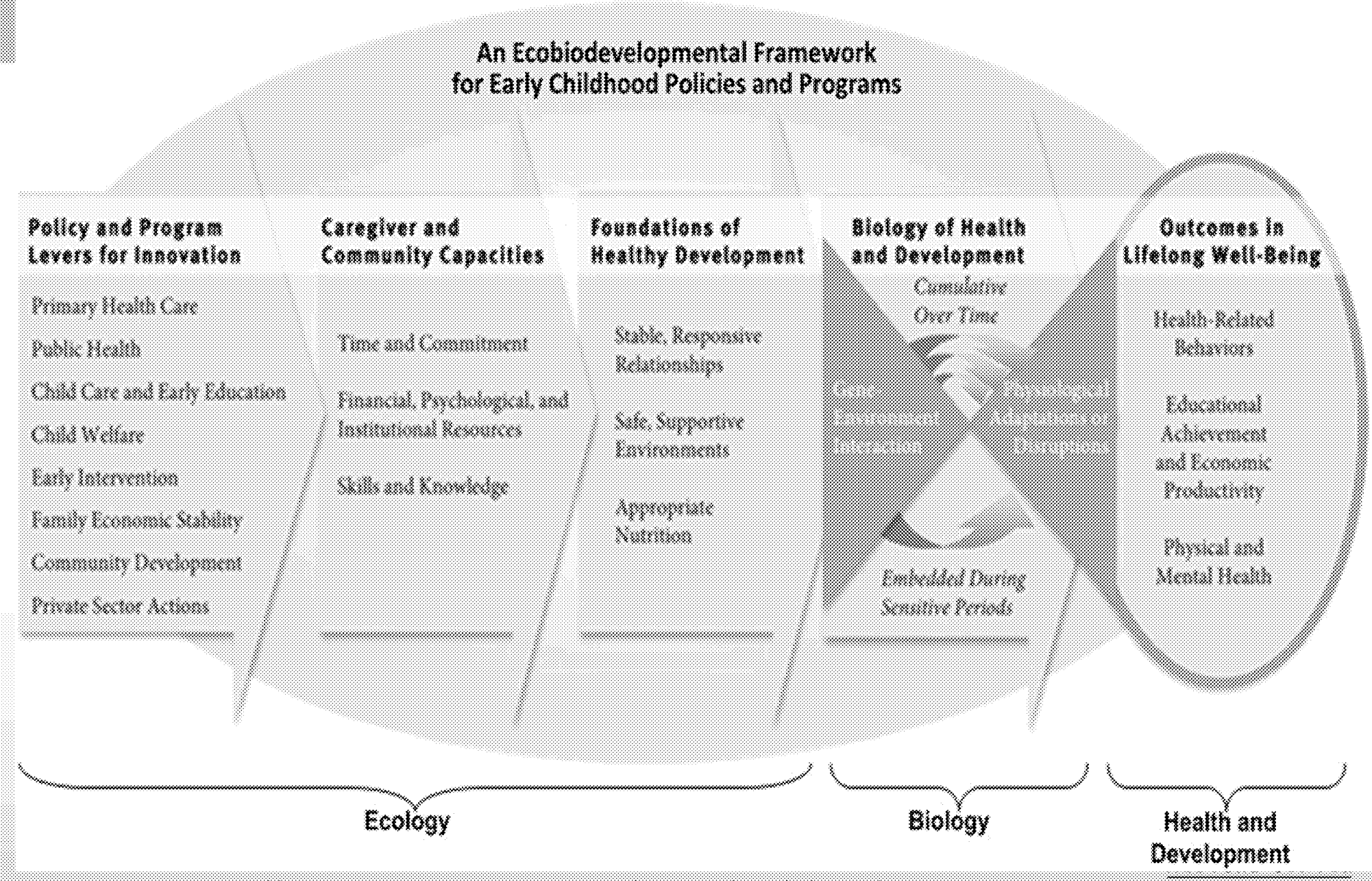

http://pediatrics.aappublications.org/content/129/1/e232/F2.expansion.html

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Secondary Prevention

- Medical/Health
- Nutrition
- Education
- Caregiver capacity
- Water quality

Secondary Prevention
Medical/Health

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- Support and education for primary care providers regarding aggressive long-term neurodevelopmental screening & testing
- Improve access to Developmental and Behavioral (DBP) specialists, pediatric psychologists, pediatric psychiatrists
  - Preemptive referral to mental health/toxic stress screening
  - Support capacity buliding and/or incentivize recruitment to allow Gensee Health System (CMH) to buil this capacity which is currently needed and lacking
- Increase recognition and education regarding trauma informed care, social determinants of health (SDOH)
- Consider health fund/enrollment in Children's Special Health Care Services (CSHCS) for exposed kids to cover long-term needs

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Secondary Prevention Medical/Health

- Expand state-funded Genesee Health System (CMH) services
  - Infant Mental Health (30 capacity)
  - Child case management
  - Home-based services
  - Trauma informed care – trauma focused CBT

Secondary Prevention
Medical/Health

- Role of Medicaid HMO plans:
  - Support to drive patients to medical home: enhanced transportation, case management, HEDIS monitoring, pt incentives, mental health access, etc
  - Reimbursement for integrated social work, registered dietician, mental health services, OT/PT services
  - Encourage collaboration/mandate support of Genesee Children's Healthcare Access Program (CHAP)

Hurley Children's Clinic

Thinking Outside The Box

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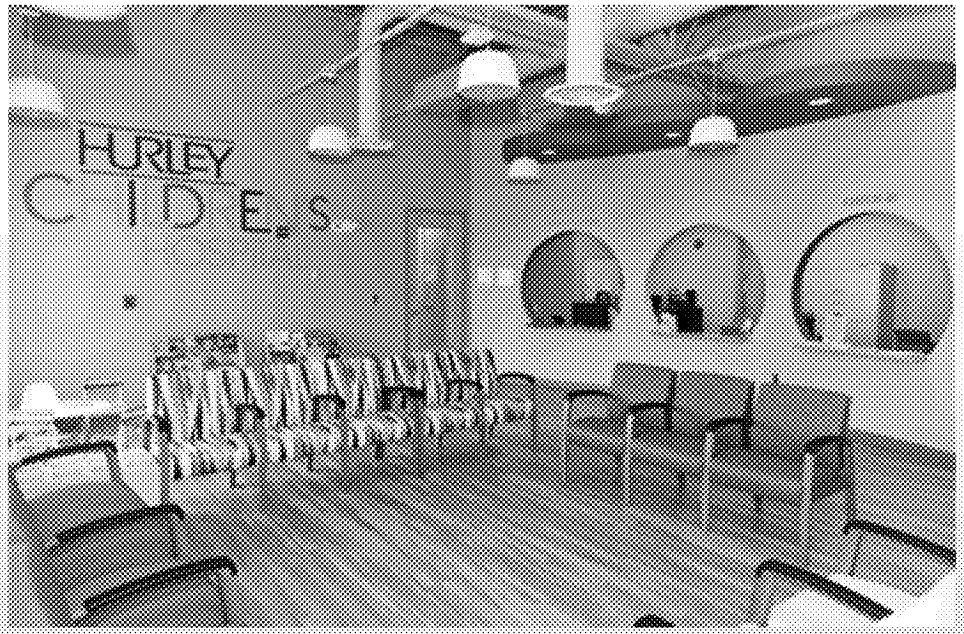

- Transportation
- Social work
- WIC RD/Nutrition
- Peds Psychology
- Training site

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Secondary Prevention
Nutrition

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- Short-term mitigation/protection
  - Promotion/education of Iron, Calcium, Vit C diets
- Promote enrollment and participation in pre-existing nutrition resources (WIC, SNAP, DUFB, MTA)
- Expand WIC eligibility, access (co-locate with PMD), benefits

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Secondary Prevention
Nutrition

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- Improve food access/security efforts via subsidies, pilots – grocery stores, mobile groceries, urban farming, etc
  - Buy/limit liquor licenses
- Invest in breastfeeding promotion, education, and support services

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Secondary Prevention
Education

- Subsidize quality childcare options
- Automatic referral/assessment by Early Intervention (Early On)
- Enroll all in early head start, head start
  - Universal Pre-school/Flint Pre-Promise
- Strengthen special education capacity/trained personnel

Secondary Prevention
Education

- Invest in school health/wellness/behavioral health
  - School nurse:student ratio – MI ranked worst in country
  - 1:750 recommended
  - 1:6,500 Flint
- Place MDHHS employee at every school
- Model lead safe school campaigns
  - Proactive water testing, lead plumbing investigations
  - Lead mitigating school nutrition

Investing in Children: Younger The Better

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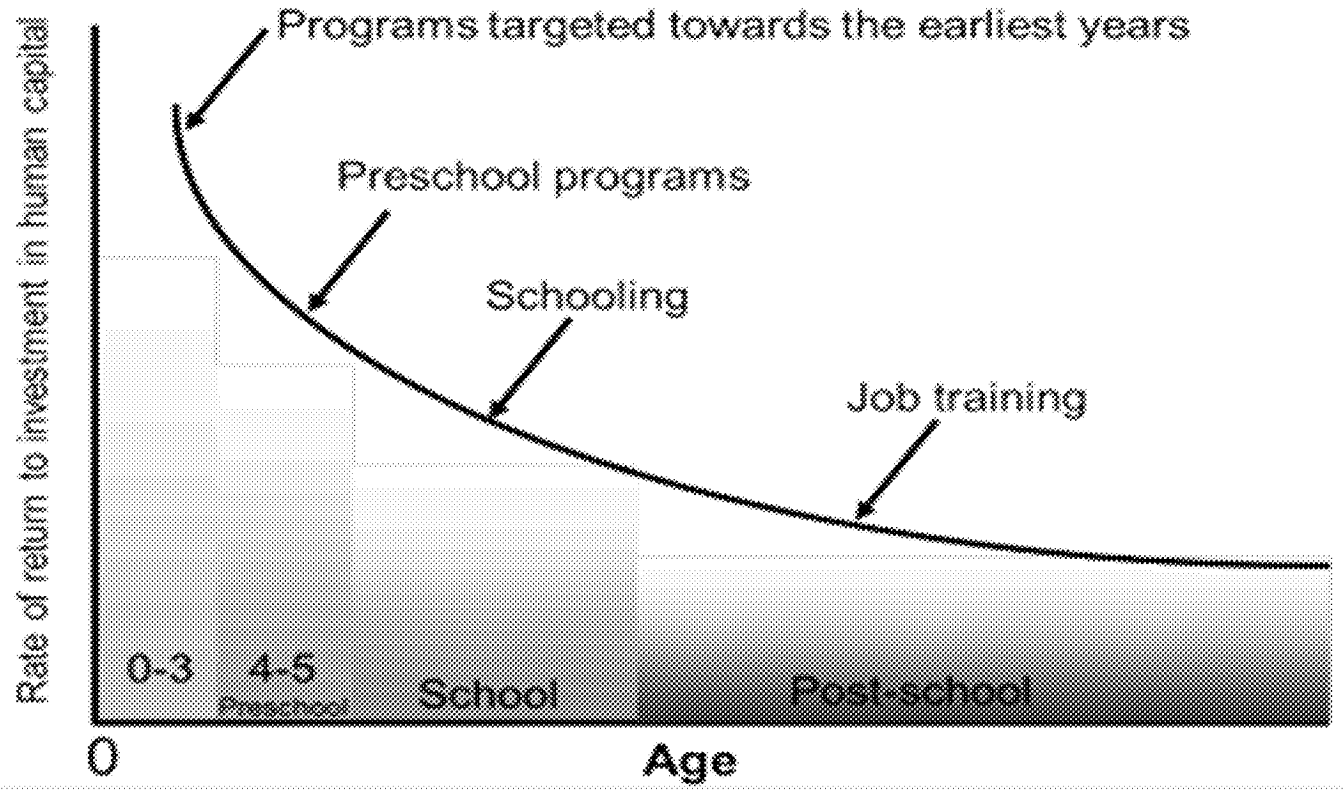
Rates of Return to Human Capital Investment at Different Ages: Return to an Extra Dollar at Various Ages



https://www.aap.org/en-us/advocacy-and-policy/federal-advocacy/Documents/Panel%202%20-%20Marks%20RWJF%20Presentation.pdf

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Secondary Prevention
Caregiver capacity

- Toxic stress and resilience
  - "Strong, frequent, and/or prolonged activation of the body's stress-response system in the absence of the **buffering protection of a supportive, adult relationship**."

Shonkoff, J & Garner, A. (2012) The lifelong effects of early childhood adversity and toxic stress. Pediatrics, 129(1). 232-246.

Secondary Prevention
Caregiver capacity

- Need to support parents and programs to improve parenting skills
- Evidence-based parenting programs
  - Incredible Years (HCH AAP Grant)
  - Triple P
  - Everyday Parenting
  - Adventures in Parenting
  - Home visiting programs
  - Strengthening Families Framework
  - Maternal Infant Health Program (MIHP)
  - Healthy Start
  - Nurse Family Partnership (NFP)

Nurse Family Partnership

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- 56% reduction in emergency room visits for accidents and poisonings in the second year of the child's life
- 50% reduction in behavioral problems when the children enter school.
- 48% reduction in state-verified reports of child abuse and neglect by child age 15
- 39% fewer healthcare encounters for injuries or ingesions in the first two years of life
- Increase in language scores

"Nurse-Family Partnership", Early Childhood, Social Programs That Work, Coalition for Evidence-Based Policy
hVp://evidencebasedprograms.org/wordpress/?page_id=57

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Secondary Prevention
Caregiver capacity

- Increase support for state-funded NFP, Healthy Start and MIHP
  - Hurley-run NFP capacity for 100

Secondary Prevention
Water Safety/Infrastructure

- Opportunity to model best practices for lead in water monitoring to protect public health rather than a focus on minimum compliance
  - EPA Flint Safe Drinking Water Taskforce
- Flint will change water source and treat water again once connected to KWA (2016), should not be rushed
- Full lead plumbing replacement (can be targeted)

Next Steps

- Primary prevention failed
  - Preventable population-wide exposure
- Secondary prevention must be priority

- Invest and prioritize in evidence based interventions that mitigate exposure and build childhood resilience
  - Ages 0 to 6 years critical for life course trajectory

Top Five Interventions

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1. Support for emergency response
2. Increase funding/capacity for home visiting maternal-infant support programs
3. Guarantee Flint Pre-Promise (3-5 year quality early education)
4. Fund RN in every Flint school
5. Encourage innovative Medicaid HMO plan and medical home initiatives (ie: CHAP)

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It's easier to build strong children than to repair broken men.

Frederick Douglass, 1855

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Additional Resources

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- Harvard Center for Developing Child
  - http://developingchild.harvard.edu/
- AAP Toxic Stress Resources
  - https://www.aap.org/en-us/advocacy-and-policy/aap-health-initiatives/EBCD/Pages/Public-Health-Approach.aspx
- Strengthening Families: A Protective Factors Framework
  - http://www.cssp.org/reform/strengtheningfamilies
- CDC ACE Study
  - http://www.cdc.gov/violenceprevention/acestudy/
- *Pediatrics* articles
  - AAP Policy Statement: Early Childhood Adversity, Toxic Stress, and the Role of the Pediatrician: Translating Developmental Science Into Lifelong Health
  - AAP Technical Report: The Lifelong Effects of Early Childhood Adversity and Toxic Stress

HURLEY MEDICAL CENTER

#flintwatercrisis

HURLEY CHILDREN'S HOSPITAL

Thank you!

HURLEY MEDICAL CENTER

From: Krause, Kurt (DHHS)
Sent: Monday, December 21, 2015 12:19 PM
To: Lyon, Nick (DHHS)
Subject: Fwd: Email from Dave Murray
Attachments: mime-attachment; ATT00001.htm

Sent from my iPhone

Begin forwarded message:

> **From:** "Rick, Matthew (DHHS)" <RickM@michigan.gov>
> **Date:** December 21, 2015 at 12:15:28 PM EST
> **To:** "Krause, Kurt (DHHS)" <KrauseK2@michigan.gov>, "Frost, Erik (DHHS)" <FrostE@michigan.gov>
> **Subject: FW: Email from Dave Murray**
>
> Here's the e-mail message that we had some concern with.
>
> ---
>
> **From:** Garcia, Deborah (DHHS)
> **Sent:** Monday, December 21, 2015 11:14 AM
> **Subject:** Email from Dave Murray
> **Importance:** High
>
> Matthew,
>
> See attached email which reads:
>
> "Team,
>
> Here's the data that will be presented at the Hurley Hospital press conference at 3 p.m. As you'll see, they are pointing to individual children, a very emotional approach. Our challenge will be to show how our state data is different from what the hospital and the coalition members are presenting today.
>
> Dave"
>
> Deborah R. Garcia, JD, MAHS
> Public Health Administrative Law Specialist
> Michigan Department of Health and Human Services
> Office of Legal Affairs
> Capitol View Building, 7th FL
> 201 Townsend Street
> Lansing, MI 48913
> Direct Line: 517-241-3374
> Fax: 517-241-1200
> GarciaD2@michigan.gov
>
> "Confidentiality Notice: This message, including any attachments, is intended solely for the use of the above named recipient(s) and may contain confidential and/or privileged information. Any unauthorized review, use, disclosure, or distribution of any

confidential and/or privileged information contained in this e-mail is expressly prohibited. If you are not the intended recipient, please contact the sender by reply e-mail and destroy any and all copies of the original message."

From: Robinson, Mikelle (DHHS)
Sent: Thursday, September 24, 2015 2:27 PM
To: Minicuci, Angela (DHHS)
Cc: Peeler, Nancy (DHHS);Scott, Robert L. (DHHS);Lasher, Geralyn (DHHS);Eisner, Jennifer (DHHS);Hertel, Elizabeth (DHHS);Moran, Susan (DHHS);Miller, Mark (DHHS)
Subject: RE: Flint lead data

Mark Valacak (health officer) informed me that he sent some recommended revisions to the city water department for the advisory and will forward it to me when it is available. So, I assume an advisory is still being planned.

From: Minicuci, Angela (DCH)
Sent: Thursday, September 24, 2015 2:07 PM
To: Peeler, Nancy (DCH); Scott, Robert L. (DCH); Lasher, Geralyn (DCH); Eisner, Jennifer (DCH); Robinson, Mikelle (DCH); Moran, Susan (DCH); Hertel, Elizabeth (DCH)
Subject: FW: Flint lead data

The Next Steps slide no longer recommends that the city declare a health advisory. It now says 'support city's health advisory'. If Flint will be issuing a health advisory, will Genesee County support this?

Angela

From: Murray, David (GOV)
Sent: Thursday, September 24, 2015 1:56 PM
To: Hollins, Harvey (GOV) <hollinsh@michigan.gov>; Lasher, Geralyn (DCH) <lasherg@michigan.gov>; Minicuci, Angela (DCH) <MinicuciA@michigan.gov>; Eisner, Jennifer (DCH) <EisnerJ@michigan.gov>; Clement, Elizabeth (GOV) <clemente@michigan.gov>; Muchmore, Dennis (GOV) <muchmored@michigan.gov>; Agen, Jarrod (GOV) <AgenJ@michigan.gov>; Wurfel, Sara (GOV) <WurfelS@michigan.gov>; Wurfel, Brad (DEQ) <WurfelB@michigan.gov>; Tommasulo, Karen (DEQ) <TommasuloK@michigan.gov>
Cc: Biehl, Laura (GOV) <BiehlL@michigan.gov>; Brown, Jessica (GOV) <BrownJ53@michigan.gov>; Heaton, Anna (GOV) <HeatonA@michigan.gov>
Subject: Flint lead data

Team,

Here's the data that will be presented at the Hurley Hospital press conference at 3 p.m. As you'll see, they are pointing to individual children, a very emotional approach. Our challenge will be to show how our state data is different from what the hospital and the coalition members are presenting today.

Dave

---------- Forwarded message ----------
From: **Andy Leavitt** <aleavitt@senatedems.org>
Date: Thu, Sep 24, 2015 at 1:41 PM
Subject: Data
To: Angela Wittrock <awittrock@senatedems.org>

Hey Angela,

Sorry for the delay. Dr. Mona Hanna-Attisha wanted to make a few changes to one of her slides.

Andy

From: Grijalva, Nancy (DHHS)
Sent: Monday, December 21, 2015 12:19 PM
To: Lyon, Nick (DHHS)
Subject: article

Michigan Health Department Hid Evidence of Health Harm Due to Lead Contaminated Water: Allowed False Public Assurances by MDEQ and Stonewalled Outside Researchers

December 21, 2015 Siddhartha Roy Articles

After missing warning signs of spiking childhood lead poisoning that occurred a few months after switching to a corrosive river water source in 2014, outside pressure forced officials at the Michigan Department of Health and Human Services (DHHS) to closely scrutinize their data in July 2015. They discovered scientifically conclusive evidence of an anomalous increase in childhood lead poisoning summer 2014 immediately after the switch in water sources, but stood by silently as MDEQ officials repeatedly and falsely stated that no spike in blood lead levels (BLL) of children had occurred. DHHS employees later stonewalled efforts by outside researchers who questioned MDEQs statements, withheld damning documents but released incomplete data suggesting that there were no problems—DHHS officials ultimately fessed up only after incidence of childhood lead poisoning skyrocketed **above 10% in the two Flint zip codes with highest water lead risk during summer 2015**!

DHHS Pressured to Examine Data in mid-July 2015

DHHS' engagement in the Flint water crisis, started in early 2015 with two phone calls from Lee-Anne Walters to a state lead poisoning nurse in Lansing identified only as "Karen." When asked about the phone call last night, Walters said she was at first expressing concern over high water lead measurements in Flint, but on the second call she was in tears because her son's blood lead had increased to 6.5 ug/dL.

According to Walters, "Karen" stated that ***"He is barely lead poisoned. If CDC had not changed their lead poisoning standard from 10 down to 5, we would not be having this conversation."*** Angry, Walters protested that Karen was minimizing the problem, at which point "Karen" cut her off and

said ***"I am working with kids in their 40's and 50's. It is just a few IQ points…it is not the end of the world."*** FOIA e-mails demonstrate that Karen Lishinski (DHHS) acknowledged receiving phone calls on the dates Walters called (the caller's name is redacted in the FOIA), but elsewhere Lishinski acknowledges to colleagues that the last time she actually worked with a child who had blood lead above 45 ug/dL was in 2009.

The next time the Flint water issue was apparently raised at DHHS, was July 23rd, when Linda Dkykema (DCH) sent out an e-mail titled "***R.E.Director's Office Assignment- Flint- need update ASAP***" on the heels of the memo written by EPA's Miguel Del Toral.

Misinformed from the Outset: MDEQ Garbage-in All but Ensures DHHS Garbage-out

The Director's Office update was tainted and probably doomed from the start, because Dykema logically reached out to MDEQ's Steve Busch for background who provided her the following insights:

"The city of Flint recently conducted drinking water testing throughout the city with special attention to those areas known to have old service lines. The city water supply is in compliance with the lead rule….DEQ has not seen a change in the city's compliance with the lead rule since switching to the Flint River source….Regarding the home with high drinking water lead levels: some years ago the supply line that serves the neighborhood was replaced, but somehow this house was not connected to the new line, such that the family's drinking water supply was coming from the old corroded lead pipe. None of the neighbors water had elevated lead level… Regarding the EPA drinking water official quoted in the press articles: the report that he issued was a result of his own research and was not reviewed or approved by EPA management. He has essentially acted outside his authority."

In other words, Dykema and DHHS started out their investigation with demonstrably false MDEQ talking points as assumptions. Nonetheless, a team of researchers proceeded to examine their data for possible increased incidence of lead poisoning in Flint's children after the water switch.

Anomalous Increase in Lead Poisoning Noted—But False Conclusion Provided Publicly by MDEQ

The DHHS team immediately found evidence of a problem. Specifically, in the summer months of July, August and September of 2014 immediately after the

switch, blood lead levels in Flint had been much higher than normal. On July 27th of 2015, an e-mail asked "can you quickly run any tests to see if the difference in the first graph is statistically significant," and the result quickly came back that it was. The team tried to re-run the data adding extra years to see if it changed the conclusions, but it did not because "there does appear to be a higher proportion of EBLL <lead poisoning> last summer than usual."

A July 28th e-mail summarized the exercise by noting "***This doesn't say anything about causality, but it does warrant further investigation***" and a two page memo was created for the Director's Office (see excerpt Figure 1). The "***quick detection of abnormal variation***" in July, warranting further investigation, does not seem to have gone any further, and the study results did not seen the light of day until this FOIA request.

However, MDEQ's Brad Wurfel did publicly begin stating that study had been done, and using the results for public relations purposes as early as September 6th, 2015. Ironically, it was used to discredit data on high lead in water collected by Virginia Tech:

"....state officials are questioning the Virginia Tech findings. "The samples don't match the testing that we've been doing in the same kind of neighborhoods all over the city for the past year," says Brad Wurfel, a state Department of Environmental Quality spokesman. Wurfel says DEQ has conducted two rounds of testing in the past year. He adds that the Department of Community Health conducts its own blood level lead testing in Flint. "With these kind of numbers," Wurfel says, "we would have expected to be seeing a spike somewhere else in the other lead monitoring that goes on in the community."

In other words, Wurfel was completely misrepresenting the conclusions of the DHHS July 2015 blood lead study—to claim there was no spike in children's blood lead when there was one. The FOIA does not reveal precisely where, or how, Wurfel was so misinformed. But the record is also perfectly clear that DHHS sat silently by as Wurfel repeated the false statements throughout the month of September.

RESULTS:

- Figure 2 shows that—on average—there appears to be a higher p
  EBLL during the summer months of July, August, and September.
- However, even compared to the previous three years, the propor
  highest during summer 2014 (Figure 2).
- Based on the control chart for proportions (Figure 3), only the su
  August, and September had proportions of EBLL higher than that
  variation over time.
- Further, the summer months of 2014 were the only data points b
  April 2015 with EBLL proportions above the average (mean) of th
  (Figure 3).

CONCLUSION:

- Based on the results depicted in Figure 3, positive tests for EBLL v
  for children under age 16 living in the City of Flint during the mor
  September, 2014.
- However, it's important to note that the purpose of control chart
  the quick detection of abnormal variation—not to construct a cas

Figure 3. Control Chart of Proportion of Children T
Poisoning with Elevated Blood Lead Levels, May 2(

Figure 1 – Excerpt from a two page memo in July 205 indicating Summer months of 2014 when lead levels in Flint kids spiked

Outside Researchers Asking to Analyze Flint's Blood Lead Data Were Stonewalled: "Yikes!"

On September 2nd 2015, Professor Marc Edwards of Virginia Tech (primary author of this article and source of the Freedom of Information Act documents cited herein) made a simple data request of DHHS. Edwards had previously made an identical request in November 2006 for a blood lead study in Lansing, and that data was provided without any problems. Edwards did not expect problems this time.

His request sat without response until a reminder e-mail was sent, at which point DHHS employee Robert Scott apologized for the delay, and provided the information needed to process the request, acknowledging:

Yes, I think this <study> sounds great. There has been some concern about the water source change in Flint, and in fact we had a call about it today.

The request then sat another 3 days, at which point Edwards inquired again and DHHS said that they were busy and if Edwards wanted the data in ***"a week rather than a month or so-then please send me a paragraph explaining why."*** Edwards wrote:

Yes, I think there is clearly some urgency to the situation. MDEQ has publicly stated that your blood lead records, are showing that there is no public health concern for residents in Flint. The levels of lead in Flint water, that we are finding in our water sampling, are certainly in a range that can cause childhood lead poisoning. Indeed, one child has already, likely been lead poisoned from exposure to high lead in water. I think the fact that you already have other teams working on these records, indicates a high level of interest, and urgency. Congressional interest in the safety of the water is also very high, and this will be an important issue in deciding options for treating the water, in the weeks and months ahead.

If red flags about the data request had not already gone up, the e-mails clearly show alarms were raised immediately throughout all of DHHS after Scott wrote to colleges at 1:09 pm on September 11, 2015 that:

"The attached was submitted to me along with a request for de-identified data, which should be no problem. When you have a few

minutes you might want to take a look at it. Sounds like there might be more to this than what we learned previously. Yikes!."

A flurry of e-mails followed, and within the hour, Edwards request that Scott had just said "***should be no problem,***" was in fact encountering all kinds of problems. Specifically, a privacy specialist immediately asked for (amongst other things):

"I want to know more about the study..Saying that the researcher wants to verify the claim of MDEQ is not sufficient.... It does not have to be a great deal longer, but it should explain what the intended use of the blood lead data is. It is also important to know exactly how it will be used for research in order to justify the release...."

The next few weeks were an exercise in frustration, during which it became perfectly apparent to Edwards that DHHS had no interest in fulfilling the routine data request.

In the meantime, emails during the same time period indicate that the state had plenty of time scrutinizing the Virginia Tech data (e.g., "The issue has been ongoing on for awhile now, but picked up steam in July when the Virginia Tech folks got involved."). Moreover, Dr. Mona Hanna-Attisha of Hurley Medical Center had made her own data request in mid-September, and she was having trouble getting it processed as well. Edwards wrote to DHHS on September 24th:

I just spoke to this young researcher at Hurley, and apparently, she has been unable to get access to the state blood lead records. I have to say, it is very disturbing that the state keeps issuing these blood lead reports and statements in their press releases, and refuses to share the data backing them up with outside researchers. Even worse, state reps are running around claiming that these reports are proof that Flint water is safe to drink. Can you tell me why it is so difficult to get this data, and why your agency is raising so many obstacles to sharing it with everyone who asks? I note that I have been asking to see your data since MDEQ first sent it to reporters back in August, and I count 10 e-mails that I sent responding to all your questions. As of yet, you have given me nothing in response. Yet you have been sending reporters one report after another. It seems your agency is more interested in public relations than sound science.

DHHS Scott immediately wrote to colleagues claiming "***I'm not very happy with him <Edwards> right now,"*** and drafted a response that apologized for delays, his vacation, and acknowledging "***my time has been largely***

taken up with my Department's response to the current situation in Flint." Hence, the FOIA reveals that DHHS had created their own catch-22: because they had stood and said nothing while MDEQ made false claims about what the blood lead data showed, they had no time to provide data to researchers that wanted to test the truthfulness of the claim.

Scott's DHHS colleague Nancy Peeler asserted that Edwards e-mail had "***intent to escalate and spin things***," and that he (Scott) should not get "caught up in that." After reading the response, Edwards withdrew his request with a plea to let Hanna-Attisha have access to the state's data, and within an hour the two DHHS employees were congratulating one another on their success:

DHHS Peeler to DHHS Robert Scott: ***"Really nice email, thanks."***

DHHS Scott to DHHS Peeler: ***"Thanks-he sent a couple of responses that I'll share on Monday.*** ☺ ***"***

An Agency "more interested in public relations than sound science."

Three sets of e-mails involving Peeler and Scott, sent within a day of the above exchange, illustrate the unethical behavior occurring within DHHS at the time—all in the name of public relations and at the expense of sound science.

1) "I'm Sure This One Is Not for the Public." Unbeknownst to Edwards, the day before he asserted in writing that DHHS was behaving unethically by hiding results to help cover up the problem and discredit the findings of Hurley's Mona Hanna-Attisha–they were doing just that. At 3:45 pm on September 24th, Scott wrote an e-mail entitled "***One more attempt to recreate Hurley.***" The e-mail confirmed that Mona-Hanna Attisha's analysis showing that blood lead had spiked after the switch to Flint River was verified with the DHHS data. But he also noted that ***"I'm sure this one is not for the public."*** When informed that DHHS had knowledge supporting her analysis late last night, Hanna-Attisha confirmed that the state never did share those results with her–rather, the record shows DHHS was working full time to attack the idea there was any problem with childhood lead poisoning in Flint.

2) DHHS Sends Scrubbed Data to Edwards, Hanna-Attisha and Dr. Reynolds (Mott Children's Health Center): But Withholds Damning July Report. In response to Edwards request for the final data that supporting Brad Wurfel's months of assertions that blood lead was not increase, Scott provided both Edwards and Hanna-Attisha with documentation. Unfortunately, it was not the final DHHS memo from late July—that report demonstrated that DHHS knew of a serious lead spike that occurred in summer of 2014. Instead,

Scott sent a revised version of the data that had been created just two days before, which had no mention of the statistically significant spike in childhood lead poisoning. Likewise, responding to an earlier request from Dr. Reynolds, DHHS considered sending the July report sent to the Directors Office and Governor, but instead sent a revised version of the data with no hint of problems with blood lead in Flint's children.

3) Peeler's "Secret Hope" is Granted to Handle Free Press Reporter. Reporter Kristi Tanner from the Detroit Free Press was doing her own analysis of the Flint blood lead trends. Repeating the approach of Hanna-Attisha using DHSS data, comparing incidence of lead poisoning before to after the water switch, Tanner demonstrated a statistically significant increase in childhood lead poisoning. A flurry of DHHS e-mails to handle her analysis, went back and forth in DHSS–none of it considered acknowledging that she was correct. After all, Scott's analysis showing the same thing, was surely "***not for the public***." Instead, the following exchange occurred between Peeler, Scott and DHHS public relations.

DHSS Peeler to DHSS Scott (September 25, 2015 1:20 pm):

"***I think Bob is the best person to speak to them about the lead data, if you are comfortable with that Bob. My secret hope is that we can work in the fact that this pattern is similar to recent past.*** ☺"

DHHS Scott promptly delivered a quote (9/25/2015 1:19 pm):

"While the trend for Michigan as a whole has shown a steady decrease in lead poisoning year by year, smaller areas such as the city of Flint have their bumps from year to year while still trending downwards overall. Does that sound reasonable?"

Public Relations to Robert Scott (DHSS) (9/25/2015 1:36 pm):

"I like what you had to say. That's basically what I told her, but she wants to hear it from someone other than a spokesperson. ☺ ***Are you available for a call with her."***

The smiley and happy faces inserted in the above e-mails, are indeed part of the original documents. To her credit, Tanner did not buy the states arguments, but did note the DHHS conclusion that the increase was "***seasonal and not related to the water supply***."

Also "Not for the Public:" Data That Caused the State to Admit They Were Wrong.

By October 2nd, the DHHS finally acknowledged that there was a serious problem in Flint. It confirmed that children living in the two zip codes (48503 and 48504) identified by Virginia Tech has having highest lead in water risks , also had increased incidence of childhood lead poisoning after the switch to Flint River. Just as Hurely's Mona—Hanna Attisha had asserted. But they have never, to date, publicly released their in-house data demonstrating the extent of the problem.

Our FOIA reveals a shocking DHHS graph created in October 2015. It shows the statistically significant spike in blood lead that occurred in summer 2014– the scientific result that DHHS has never publicly acknowledged. Even more horrifying, it also shows blood lead skyrocketing in summer of 2015, to the point where 9.5-12.5 percent of children in Flint's two high risk zip codes were lead poisoned. This is in the range of Hurley's more recent estimate that incidence of childhood lead poisoning in some neighborhoods was as high as 15%. It goes without saying, surely, that this data was also "not for the public."

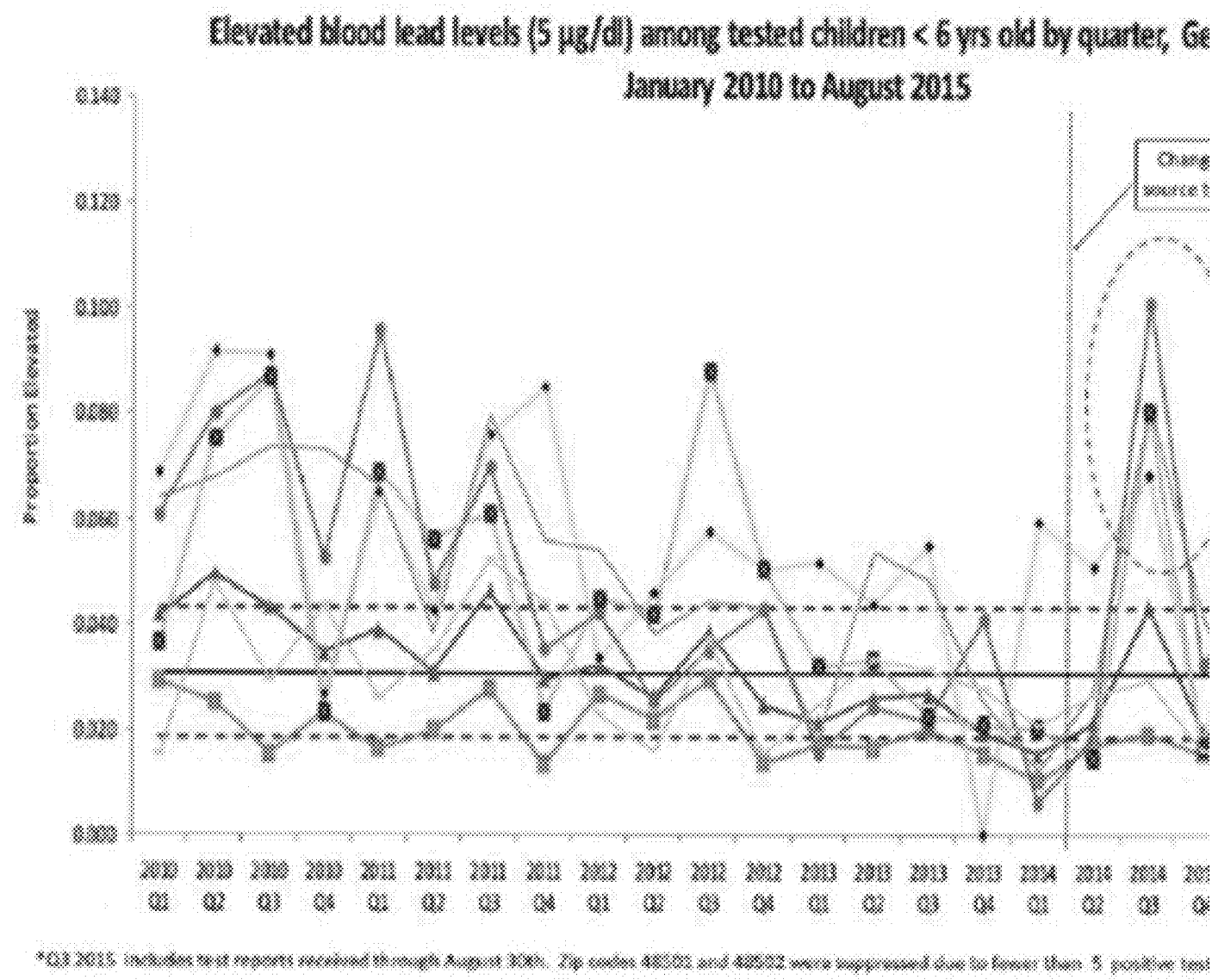


Figure 2: DHHS graph showing skyrocketing blood lead in 2nd and 3rd quarter of 2015, in two Flint zip codes identified by Virginia Tech as having highest water lead risk

FOIA Response Delayed by False Claims of "Litigation Hold" and "Attorney Client Privilege."

DHHS fought hard to delay release of these documents. After the legal time allowed for FOIA elapsed, and Edwards had paid for the request, DHSS fabricated claims of a "Litigation Hold" and "Attorney Client Privilege" as cause for further delays. We want to publicly thank Nancy Kaffer for pointing out the absurdity of these claims. We are also deeply indebted to Senator Ananich and his staff, who fought for release of these documents to us late Friday night.

MDHHS emails obtained via FOIA requests regarding blood lead levels of kids in Michigan, specifically in Flint

Download (PDF, 8.94MB)

These are the first batch of emails. We will possibly be releasing a second set sometime in January.

Primary Author: Dr. Marc Edwards

Acknowledgements: Siddhartha Roy

Nancy

Nancy Grijalva
Assistant to Nick Lyon, Director
Michigan Department of Health and Human Services

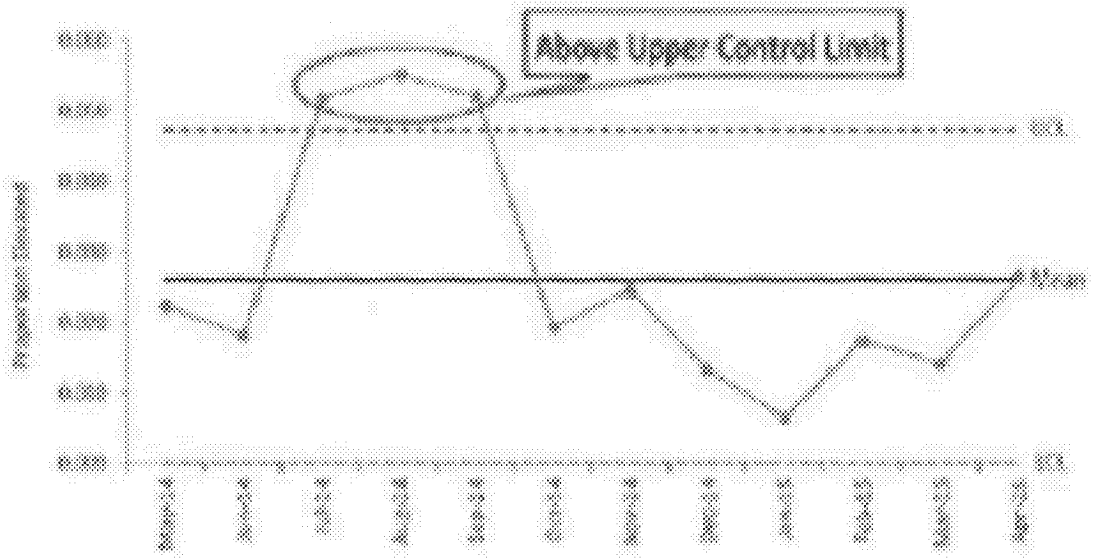
RESULTS:

- Figure 2 shows that—on average—there appears to be a higher proportion of first-time EBLL during the summer months of July, August, and September.
- However, even compared to the previous three years, the proportion of first-time EBLL is highest during summer 2014 (Figure 2).
- Based on the control chart for proportions (Figure 3), only the summer months of July, August, and September had proportions of EBLL higher than that expected from random variation over time.
- Further, the summer months of 2014 were the only data points between May 2014 and April 2015 with EBLL proportions above the average (mean) of the previous three years (Figure 3).

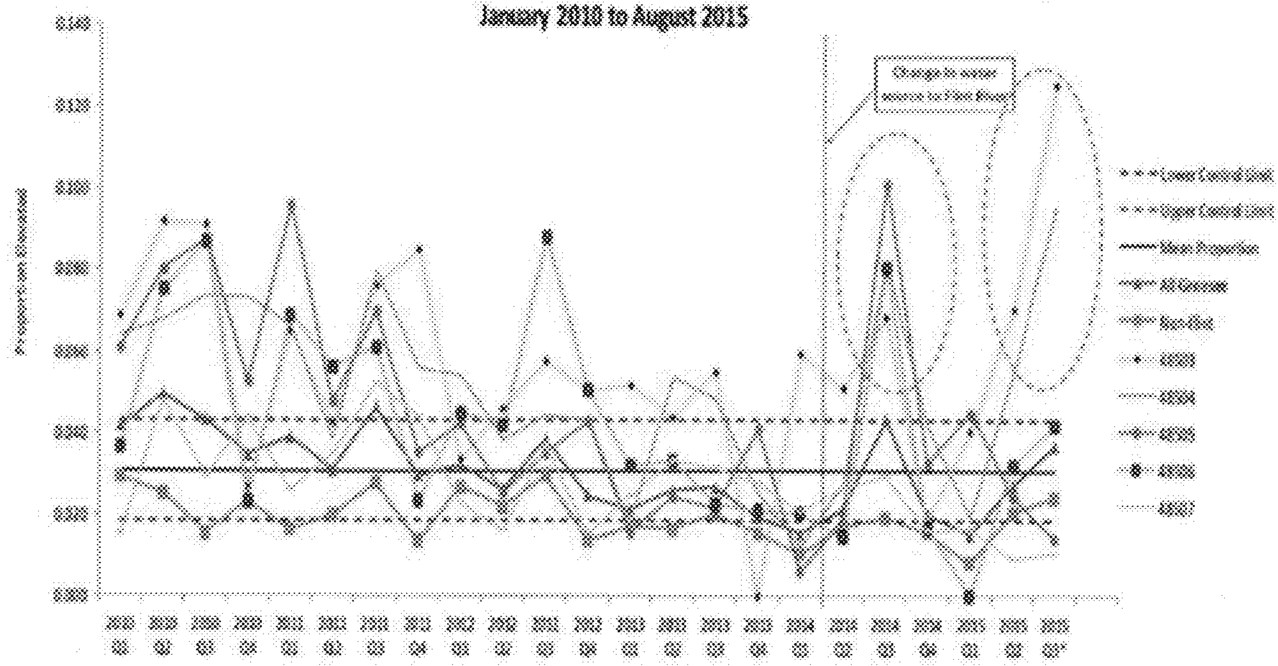
CONCLUSION:

- Based on the results depicted in Figure 3, positive tests for EBLL were higher than usual for children under age 16 living in the City of Flint during the months of July, August, and September, 2014.
- However, it's important to note that the purpose of control charts is to monitor data for the quick detection of abnormal variation—not to construct a case for causality.

Figure 3. Control Chart of Proportion of Children Tested for Lead Poisoning with Elevated Blood Lead Levels, May 2014—April 2015



Elevated blood lead levels (5 µg/dl) among tested children < 6 yrs old by quarter, Genesee County, January 2010 to August 2015



From: Baird, Richard (GOV)
Sent: Monday, December 21, 2015 7:52 PM
To: Lyon, Nick (DHHS)
Subject: Fwd: DHHS

Sent from my Verizon Wireless 4G LTE DROID
---------- Forwarded message ----------
From: Ken Sikkema <ksikkema@pscinc.com>
Date: Dec 21, 2015 7:39 PM
Subject: Fwd: DHHS
To: "Baird, Richard (GOV)" <bairdr@michigan.gov>
Cc:

FYI...

---------- Forwarded message ----------
From: <chris@environmentalcouncil.org>
Date: Monday, December 21, 2015
Subject: DHHS
To: Ken Sikkema <ksikkema@pscinc.com>

Virginia Tech Researcher Claims Stonewalling On Lead Data

The Department of Health and Human Services had data that showed there were elevated lead levels in Flint's water, but delayed in releasing that data to others for review, Virginia Tech professor Marc Edwards said in an article posted to his website documenting the city's water crisis.

Department officials agreed and said the experience led to changes in how they examine data.

Mr. Edwards said the department had data from shortly after Flint changed its water source that showed a spike in blood lead levels in children in two at-risk neighborhoods, but did not disclose that data until September 2015.

"They discovered scientifically conclusive evidence of an anomalous increase in childhood lead poisoning in summer 2014 immediately after the switch in water sources, but stood by silently as Michigan Department of Environmental Quality (MDEQ) officials repeatedly and falsely stated that no spike in blood lead levels (BLL) of children had occurred," he said in the post.

DHHS spokesperson Jennifer Eisner agreed the department had data that showed the spike, but said its analysis at the time overlooked factors that, in retrospect, would have shown there was a water quality problem.

"When initially looking at the citywide and county elevated blood lead level numbers, the increase appeared to be consistent with the seasonal fluctuation seen in the summer months," Ms. Eisner said. "It wasn't until the Hurley report came out that our epidemiologists took a more in-depth look at the data by ZIP code, controlling for seasonal variation, and confirmed an increase outside of normal trends. As a result of this process, we have determined that the way we analyze data collected needs to be thoroughly reviewed."

Mr. Edwards said DHHS officials also stonewalled him on getting access to that data.

He said data he had gotten easily in 2006 documents for a similar review took several weeks to receive after his request sent September 2. When he did finally receive the data, he said it was a version that omitted the lead level spike from summer 2014 that the department had created in July.

He said a series of emails he received under a recent Freedom of Information Act request showed and intention by DHHS officials to keep the reports from the public.
"Our FOIA reveals a shocking DHHS graph created in October 2015. It shows the statistically significant spike in blood lead that occurred in summer 2014 - the scientific result that DHHS has never publicly acknowledged," Mr. Edwards said in his post.
Ms. Eisner said the department has worked to make the data available. "Summary reports outlining blood lead level testing are posted online on a bi-weekly basis, and we work closely with local partners to fulfill data requests as we receive them," she said.

- See more at:
http://www.gongwer.com/programming/news.cfm?article_id=542490102#sthash.o7NcxHOQ.dpuf

Sent from my iPad

--

Ken Sikkema
Senior Policy Fellow
Public Sector Consultants
PH: 517-484-4954
ksikkema@pscinc.com

From: Grijalva, Nancy (DHHS)
Sent: Monday, January 04, 2016 5:38 PM
To: Becker, Timothy (DHHS);Lyon, Nick (DHHS)
Subject: Letter to Gov
Attachments: fwatf-snyder_letter_12-29-15.pdf

This is what the press is reporting on.. final report not out yet.

Nancy

Nancy Grijalva
Assistant to Nick Lyon, Director
Michigan Department of Health and Human Services

December 29, 2015

Dear Governor Snyder:

The Flint Water Advisory Task Force, which you appointed on October 21, 2015, has devoted considerable effort and countless hours to our review of the contamination of the Flint water supply: what happened, why it occurred, and what is needed to prevent a recurrence in Flint or elsewhere in the state. We have also been assessing ongoing mitigation efforts to help assure that short- and long-term public health issues and water management concerns will be properly addressed to safeguard the health and well being of the Flint community.

Shortly after we began our work, we recognized the immediate need for better coordination of the state's response to the ongoing public health issues in Flint, and for assignment of a single person to provide this coordination. We addressed these concerns in a letter to you on December 7, 2015, and you responded with immediate adoption of these recommendations. We thank you for the commitment your response demonstrates.

In our continuing efforts, we have now interviewed numerous individuals at state and local levels; reviewed many documents, articles, and emails; and deliberated repeatedly as a group. Both individually and as a group, we have visited Flint several times during the past several weeks to meet with citizens, public health officials and healthcare providers, individuals who have water management responsibilities at the city and county levels, and other public officials.

It is clear to us, particularly as we listen to the people of Flint, that it is both critical and urgent to establish responsibility for what happened in their community and to ensure accountability. This is a first step in a long process to re-establish the trust they no longer have in their government and the agencies whose responsibility it is to protect their health. It is urgent because this deep distrust of government continues to compromise the effective delivery of protective services designed to address ongoing public health issues. It is for these reasons that we are sending this letter at this time.

We believe the primary responsibility for what happened in Flint rests with the Michigan Department of Environmental Quality (MDEQ). Although many individuals and entities at state and local levels contributed to creating and prolonging the problem, MDEQ is the government agency that has responsibility to ensure safe drinking water in Michigan. It failed in that responsibility and must be held accountable for that failure.

The Safe Drinking Water Act (SDWA) places responsibility for compliance with its requirements on the public water system. In this instance, the City of Flint had the responsibility to operate its water system within SDWA requirements, under the jurisdiction of the MDEQ. The role of the MDEQ is to **ensure** compliance with the SDWA through its regulatory oversight as the primary agency having enforcement responsibility for the Flint water system.

The MDEQ failed in three fundamental ways.

<u>Regulatory Failure</u>

We believe that in the Office of Drinking Water and Municipal Assistance (ODWMA) at MDEQ, a culture exists in which "technical compliance" is considered sufficient to ensure safe drinking water in Michigan.

This minimalist approach to regulatory and oversight responsibility is unacceptable and simply insufficient to the task of public protection. It led to MDEQ's failure to recognize a number of indications that switching the water source in Flint would—and did—compromise both water safety and water quality. The MDEQ made a number of decisions that were, and continue to be, justified on the basis that federal rules "allowed" those decisions to be made. ODWMA must adopt a posture that is driven not by this minimalist technical compliance approach, but rather by one that is founded on *what needs to be done to assure drinking water safety.*

A culture change must occur within ODWMA. It must be driven by a mission that is aspirational regarding the role of the MDEQ in ensuring the safety and the quality of Michigan's drinking water. We believe, and have expressed to MDEQ Director Dan Wyant, that as a Great Lakes State, Michigan should aspire to have the safest drinking water in the nation, rather than merely aiming for technical compliance with regulatory requirements.

Failure in Substance and Tone of MDEQ Response to the Public

Throughout 2015, as the public raised concerns and as independent studies and testing were conducted and brought to the attention of MDEQ, the agency's response was often one of aggressive dismissal, belittlement, and attempts to discredit these efforts and the individuals involved. We find both the tone and substance of many MDEQ public statements to be completely unacceptable. In a real way, the MDEQ represents the public, including the very individuals it treated dismissively and disrespectfully in public statements. We recognize that the agency might disagree with the opinions of others on a variety of issues, including testing protocol, interpretation of testing results, the requirements of federal law and rules, and other matters. What is disturbing about MDEQ's responses, however, is their persistent tone of scorn and derision. In fact, the MDEQ seems to have been more determined to discredit the work of others—who ultimately proved to be right—than to pursue its own oversight responsibility.

Failure in MDEQ Interpretation of the Lead and Copper Rule

The federal Lead and Copper Rule (LCR) is central to what happened in Flint, because that rule, at least theoretically, is designed to prevent lead and copper contamination of drinking water. The federal LCR calls for "optimized corrosion control treatment," which the MDEQ did not require in the switch to the Flint River. Prior to the switch, MDEQ staff instructed City of Flint water treatment staff that corrosion control treatment (CCT) was not necessary until two six-month monitoring periods had been conducted. The need for CCT would be evaluated after the results from those two monitoring periods were reviewed. The decision not to require CCT, made at the direction of the MDEQ, led directly to the contamination of the Flint water system.

The MDEQ seems to have taken different positions on whether it faithfully followed the LCR in the Flint situation. It first maintained that it followed the LCR, then stated that it did not follow the rule properly, and most recently claimed that a federal memorandum issued by the US EPA in early November 2015 suggests that the original MDEQ interpretation was possibly correct.

We are not convinced. Even the MDEQ's latest interpretation of the US EPA's November memorandum is overly legalistic and misunderstands the intent of the LCR, which is to minimize risks of lead and copper exposure for human health.

We believe ODWMA's single-minded legalistic focus is the heart of the problem, and it is part of the "technical compliance" culture described above. ODWMA should not be basing its actions solely on a

legally possible interpretation of the LCR. It should be focusing on how to protect Michigan's citizens from lead in drinking water.

We met with MDEQ Director Wyant on December 16, 2015, to discuss these issues, as well as many others. We note his substantial agreement with many of our conclusions, particularly as it relates to the regulatory failure and the abysmal public response of his agency. It is our understanding that he has drawn similar conclusions in his own evaluation of the MDEQ's role in the Flint water crisis. At the same time, it was disappointing to hear his weak defense of the CCT decision based on the EPA's November 2015 memorandum.

We are not finished with our work. Other individuals and entities made poor decisions, contributing to and prolonging the contamination of the drinking water supply in Flint. As an example, we are particularly concerned by recent revelations of MDHHS's apparent early knowledge of, yet silence about, elevated blood lead levels detected among Flint's children. We also feel it important to further review local government decision processes under emergency management. Our final report will highlight and discuss those concerns, among many others, to provide some context to a comprehensive series of recommendations. **As stated earlier in this letter, however, we believe that establishing responsibility is a critical and urgent need, and one that should not wait for our final report in 2016. Individuals and agencies responsible must be held accountable in a timely fashion.**

It is our hope that the heightened awareness of the dangers of lead poisoning can be an opportunity to make Michigan safer, particularly for its children. Drinking water must be recognized as a potential source of health risk exposure when water lines and fixtures containing lead are disturbed or compromised. Proper testing, not only in high-risk areas but also in facilities serving children (e.g., schools), must be considered. Facilitating long-term financing of a model public health program, and also replacement of lead-containing water service lines and fixtures, would enable Michigan to realize a positive lasting legacy from the tragedy of the Flint water crisis. Our final report will address some of these issues.

The City of Flint's water customers—fellow Michigan citizens—were needlessly and tragically exposed to toxic levels of lead through their drinking water supply. They deserve a commitment to properly assess responsibility and ensure accountability. They also deserve a commitment to needed mitigation in both the short and long term. The Flint water crisis never should have happened. Having failed to prevent it, state government should coordinate a sustained, public-health-focused response to remedy, to the fullest extent possible, the impacts on the Flint community.

Respectfully yours,

Flint Water Advisory Task Force:

Matt Davis
Chris Kolb
Larry Reynolds
Eric Rothstein
Ken Sikkema

From: Jim Ananich
Sent: Monday, September 21, 2015 11:39 AM
To: Lyon, Nick (DCH);Nick Lyon
Subject: Fwd: IRBNet Board Action
Attachments: IRBNetDocument (33).pdf; ATT00001.htm

Follow Up Flag: Flag for follow up
Flag Status: Flagged

Hi Nick,

Attached is a request from a local pediatrician who is trying to identify some lead level trends in Flint. She said there was a delay in getting a response because a DHHS employee was out of the office. Because of the ongoing lead issues in Flint I am doing everything I can to ensure we are helping citizens. Any assistance you can give to move this issue quickly I would really appreciate it.

Thank you,

Andy

Sent from my iPhone

Begin forwarded message:

> **From:** Mona Hanna-Attisha <MHanna1@hurleymc.com>
> **Date:** September 18, 2015 at 2:40:48 PM EDT
> **To:** "aleavitt@senatedems.org" <aleavitt@senatedems.org>,
>
> **Subject: FW: IRBNet Board Action**
>
> Below is the data requested from MCIR with attached IRB approval.
> Looking for all blood lead levels for kids 5 years and under living in 48501-48507 from 1/1/13 to current with the below fields.
>
> ---
> From: Mona Hanna-Attisha
> Sent: Wednesday, September 16, 2015 3:10 PM
> To: 'Scott, Robert L. (DCH)'
> Cc: Lawrence Reynolds
> Subject: FW: IRBNet Board Action
>
> Bob, I just received IRB approval to look at the City of Flint blood lead levels. I would love to get the raw data if that is possible. Attached is my study proposal and the IRB approval.
>
> Specific fields that we are looking for include:
> MCIR ID or some sort of identifier

Zip code
Date of Birth
Date of Blood lead level
Lead level

Would greatly appreciate your assistance! Thanks!

Mona Hanna-Attisha MD MPH FAAP
Program Director Pediatric Residency
Hurley Children's Hospital at Hurley Medical Center
Michigan State University College of Human Medicine
Department of Pediatrics and Human Development
Mhanna1@hurleymc.com

-----Original Message-----
From: Nicolas Lecea [mailto:no-reply@irbnet.org]
Sent: Wednesday, September 16, 2015 2:09 PM
To: Jenny LaChance; Mona Hanna-Attisha
Subject: IRBNet Board Action

Please note that Hurley Medical Center Institutional Review Board has taken the following action on IRBNet:

Project Title: [807433-1] Analysis of Pediatric Blood Lead Levels Principal Investigator: Mona Hanna-Attisha, MD MPH

Submission Type: New Project
Date Submitted: September 15, 2015

Action: APPROVED
Effective Date: September 16, 2015
Review Type: Expedited Review

Should you have any questions you may contact Nicolas Lecea at nlecea1@hurleymc.com.

Thank you,
The IRBNet Support Team

www.irbnet.org

HURLEY
MEDICAL CENTER

One Hurley Plaza
Flint, Michigan 48503

DATE:	September 16, 2015
TO:	Mona Hanna-Attisha, MD MPH
FROM:	Hurley Medical Center Institutional Review Board
STUDY TITLE:	[807433-1] Analysis of Pediatric Blood Lead Levels
VERSION #:	*Version 1*
SUBMISSION TYPE:	New Project
ACTION:	APPROVED
APPROVAL DATE:	September 16, 2015
EXPIRATION DATE:	September 15, 2016
REVIEW TYPE:	Expedited Review

Dear Dr. Hanna-Attisha:

As Chair of the Hurley Medical Institutional Review Board, an **Expedited Review** was conducted to review and consider for approval the following documents submitted with the above-referenced research study:

- Application Form - Hurley IRB Application.doc (UPDATED: 09/14/2015)
- HIPAA Waiver - Waiver_of_Authorization[1].doc (UPDATED: 09/14/2015)
- Other - List of variables in excel (in place of a data collection sheet) (UPDATED: 09/16/2015)
- Other - SRC letter (UPDATED: 09/15/2015)
- Other - Expedited approval form (UPDATED: 09/14/2015)
- Proposal - Study Proposal IRB BLL MHA 9 15 15.docx (UPDATED: 09/16/2015)

It was determined that the proposed research activities involve no more than minimal risk to human subjects. This expedited approval was based on its applicability to 45 CFR 46.110, *[5]*:

Research involving materials (data, documents, records, or specimens) that have been collected, or will be collected solely for nonresearch purposes (such as medical treatment or diagnosis). (NOTE: Some research in this category may be exempt from the HHS regulations for the protection of human subjects. 45 CFR 46.101(b)(4). This listing refers only to research that is not exempt.)

This study's approval will expire on September 15, 2016. Should you require an extension beyond the approval period, you must submit a request to the IRB by ***July 15, 2016***. If approval expires, research activities must stop, and no new subjects may be enrolled in the study. Study Status Report forms can be obtained in IRBNet via the Forms and Templates library.

Before any publications are published, you must submit a copy or report of your finding to the IRB Chairperson.

Generated on IRBNet

This preliminary determination will be reviewed at the next full IRB meeting. Your attendance is not required.

Thank you for submitting your protocol to the HMCIRB. The Board wishes you well in your investigational endeavors.

Sincerely,

Harland Verrill Ph.D.

Chair, Institutional Review Board

This letter has been electronically signed in accordance with all applicable regulations, and a copy is retained within Hurley Medical Center's records.

Generated on IRBNet

From: Lyon, Nick (DCH)
Sent: Wednesday, September 23, 2015 5:13 PM
To: Jim Ananich
Subject: RE: IRBNet Board Action

Senator Ananich/Andy,

Bob was out of the office last week but is in now and he has committed to finishing his part for the Hurley study and sending it on to the State Institutional Review Board (IRB) for action as quickly as possible (assuming no further information is needed from the researcher). Protecting the rights and welfare of those who participate in research is the responsibility of the State IRB, housed within MDHHS. If living humans are involved in a systematic collection or analysis of data with the intent to generate new knowledge state IRB approval is required. The researcher indicates they have the Hospital IRB approval and I do believe the state IRB will approve as well.

We have communicated with the MDHHS IRB to ensure a quick response on their part as well. We anticipate the completion of both processes by mid to late next week.

I will call you on our conversation at the Opioid Task Force meeting. As you can imagine, this is also a priority for us.

Nick

From: Jim Ananich [mailto:jananich@att.net]
Sent: Monday, September 21, 2015 11:39 AM
To: Lyon, Nick (DCH); Nick Lyon
Subject: Fwd: IRBNet Board Action

Hi Nick,

Attached is a request from a local pediatrician who is trying to identify some lead level trends in Flint. She said there was a delay in getting a response because a DHHS employee was out of the office. Because of the ongoing lead issues in Flint I am doing everything I can to ensure we are helping citizens. Any assistance you can give to move this issue quickly I would really appreciate it.

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Andy

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> **To:** "aleavitt@senatedems.org" <aleavitt@senatedems.org>, "jananich@att.net" <jananich@att.net>
> **Subject: FW: IRBNet Board Action**

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Specific fields that we are looking for include:
MCIR ID or some sort of identifier
Zip code
Date of Birth
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Lead level

Would greatly appreciate your assistance! Thanks!

Mona Hanna-Attisha MD MPH FAAP
Program Director Pediatric Residency
Hurley Children's Hospital at Hurley Medical Center
Michigan State University College of Human Medicine
Department of Pediatrics and Human Development
Mhanna1@hurleymc.com

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From: Nicolas Lecea [mailto:no-reply@irbnet.org]
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To: Jenny LaChance; Mona Hanna-Attisha
Subject: IRBNet Board Action

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Submission Type: New Project
Date Submitted: September 15, 2015

Action: APPROVED

Effective Date: September 16, 2015
Review Type: Expedited Review

Should you have any questions you may contact Nicolas Lecea at nlecea1@hurleymc.com.

Thank you,
The IRBNet Support Team

www.irbnet.org

From: Danieli, Sharon (DHHS)
Sent: Friday, December 04, 2015 9:07 AM
To: Lyon, Nick (DHHS)
Cc: Grijalva, Nancy (DHHS)
Subject: News Articles - Morning of 12/4/15

GONGWER:

Flint Blood Lead Survey Results Released By State

Since October 1, data indicates that 30 adults and children of 1,361 tested in Flint had elevated blood lead levels, the state said Thursday in releasing its first report as part of the state's efforts to assist in resolving the Flint water crisis.

The state called on helping the city deal with health issues as part of its efforts to restore safer drinking water to the city.

In October, after more than a year of the city getting its drinking water from the Flint River - it ended a contract with the Detroit Water and Sewerage System largely over cost issues and is working on a new water system that will draw from Lake Huron - and after more than a year of complaints on taste, smell and safety of the water, the city switched back to Detroit water when it was discovered lead levels in some children were elevated because of the water system.

In the report, the Department of Health and Human Services said 969 children were tested and 21 showed elevated lead levels. Another 392 adults were tested and nine had elevated levels.

The report also showed the number of Flint children with higher lead levels declined during the summer months this year - lead levels tend to be higher in the summer, the report said - to 6.4 percent from 7.5 percent a year ago.

However, in 2013, before the city switched from Detroit water to the Flint River, the percentage stood at 4.1 percent. That was down from percentages as high as 8.3 percent in 2010.

House Republicans Sign Letter Urging Disapproval Of Planned Parenthood Grant

About 30 House Republicans on Thursday signed a letter asking the State Administrative Board not to approve a $1.2 million grant increase to Planned Parenthood because it goes against the "spirit" of a budget amendment adopted this year.

On December 8, the Finance and Claims Committee of the State Administrative Board will take up a grant increase for Planned Parenthood of Mid and South Michigan. The increase will come from the restricted dollars in the Maternal Children's Health Fund (8 percent); federal funding (35 percent); fees generating through the clinic (49 percent) and local dollars (8 percent).

Rep. Gary Glenn (R-Midland), joined by Rep. Thomas Hooker (R-Byron Center), who sponsored the budget amendment saying the state will not allocate funding to Planned Parenthood, Rep. Tom Barrett (R-Potterville), Rep. Lee Chatfield(R-Levering) and Rep. Laura Cox (R-Livonia), among others, are urging the grant to not be increased.

"We believe this is a clear violation of the spirit of the budget amendment that was voted on and passed by the Legislature during the last appropriations process," the letter reads.

Rep. Al Pscholka (R-Stevensville), chair of the House Appropriations Committee, said the grant increase does not go against the budget.

When the amendment was adopted, House Speaker Kevin Cotter (R-Mount Pleasant) said no clinics would lose money because of the amendment. He said during the last two budgets Planned Parenthood had not received any state dollars (See Gongwer Michigan Report, April 28, 2015).

The committee is scheduled to meet at 11 a.m. on December 8.

Appointments By The Governor

GOVERNOR'S TASK FORCE ON CHILD ABUSE AND NEGLECT: Tana Bridges of Canton succeeds Gary Anderson to represent health and mental health professionals; John Hohman Jr. of Saline succeeds Kenneth Tacoma to represent judges and attorneys; and Veda Thompkins of Detroit succeeds Larry Watkins, who resigned, to represent the law enforcement community.

Robinjit Eagleson of East Lansing, Fred Gruber of Riverview and Nick Lyon of Lansing are reappointed. Ms. Thompkins will serve the remainder of a term expiring December 31, 2016. The remaining terms, which are not subject to the advice and consent of the Senate, expire December 31, 2018.

MENTAL HEALTH DIVERSION COUNCIL: Milton Mack of Wayne succeeds John Hohman Jr., who resigned, to represent the State Court Administrative Office for the remainder of a term expiring January 30, 2016. The appointment is not subject to the advice and consent of the Senate.

Flint water still unsafe without lead filters, professor says (Flint Journal, 12/4/2015)

MIRS:

Group Of House R's Object To Planned Parenthood Grant Increase

Conservatives opposed to government funding for Planned Parenthood could see a test in Michigan this month as the state considers a proposed grant increase for the organization.

Already, 29 House Republicans have signed a letter asking a state administrative committee to reject a $1.2 million increase.

The proposed increase is on the agenda for the Dec. 8 meeting of Finance and Claims Committee, which makes recommendations on large grants to the State Administrative Board.

According to the agenda, the committee will consider a $1.2 million increase to a one-year grant agreement with Planned Parenthood of Mid and South Michigan to provide family planning services.

The grant is under the Department of Health and Human Services (DHHS). The new total for the grant would be $10.0 million.

According to Jennifer **EISNER**, spokesperson for DHHS, the contract amendment involves family planning services funded by federal dollars.

Because of that, she said the agreement doesn't go against language put in the current year budget that bans the department from contracting with abortion providers for services funded by state dollars.

However, a group of House Republicans doesn't see it the same way.

"We believe this is a clear violation of the spirit of the budget amendment that was voted on and passed by the Legislature during the last appropriation process," reads a letter signed by Rep. Gary GLENN (R-Midland).

Of the increase in question, 8 percent of the dollars is restricted funds from the Maternal Children's Health Fund, Glenn said. That money comes from restricted federal funds.

But Glenn noted that the state still has the discretion in this instance on whether to spend them.

Frequently a topic of political debate, Planned Parenthood has been under increased scrutiny this year, after a series of covert videos taken of Planned Parenthood employees allegedly discussing the sale of aborted baby parts. A top Planned Parenthood official has said the videos in question have been edited to "shock and deceive" the public.

According to the agenda, the Finance and Claims Committee will meet at 11 a.m. Dec. 8 inside the Michigan Library and Historical Center.

2% Of Flint Adults, Children Have Elevated Blood Lead Levels

Preliminary data indicates that 30 of 1,361 adults and children tested in Flint since Oct. 1 had elevated blood lead levels, according to a report issued today by the Michigan Department of Health and Human Services.

This marks the first summary report on lead testing called for in the state's action plan related to health concerns about Flint's water infrastructure.

"Our goal is to help families reduce their exposure to lead sources," said Dr. Eden **WELLS**, MDHHS chief medical executive. "We have made progress in testing and identifying those with elevated blood lead levels, and the department will continue to work closely with the Genesee County Health Department to reach these families. We will remain diligent in our ongoing outreach and education efforts."

Tests showed that 21 of 969 children age 17 or younger and nine of 392 adults over the age 18 were identified with elevated blood lead levels.

Rep. Sheldon NEELEY (D-Flint) said he believes the numbers would be higher, but it's likely the lead-laced water had already been soaked into the brains and bones of some of those tested.

Gubernatorial Appointments

Gov. Rick SNYDER today announced the following appointments and reappointments:

Governor's Task Force On Child Abuse And Neglect

- Tana BRIDGE, of Canton, was appointed to a three-year term expiring Dec. 31, 2018. She is a professor of social work, as well as director of the master's program at Eastern Michigan University, represents health and mental health professionals and replaces Gary ANDERSON.

- John HOHMAN Jr., of Saline, was appointed to a three-year term expiring Dec. 31, 2018. He is the owner of Hohman ADR, an alternative dispute resolution service, represents judges and attorneys and replaces Kenneth TACOMA. Hohman will serve as chair.

- Veda THOMPKINS, of Detroit, was appointed to the remainder of a three-year term expiring Dec. 31, 2016. She is the president of Families On The Move, Inc., represents the law enforcement community and fills the vacancy created by the resignation of Larry WATKINS.

- Robinjit EAGLESON, of East Lansing, was reappointed to a three-year term expiring Dec. 31, 2018. She is a management analyst for the state court administrative office and continues to represent judges and attorneys.

- Fred GRUBER, of Riverview, was reappointed to a three-year term expiring Dec. 31, 2018. He is the co-founder and executive director of Michigan Children's Law Center and continues to represent child advocates.

- Nick LYON, of Lansing, was reappointed to a three-year term expiring Dec. 31, 2018. He is the director of the Department of Health and Human Services.

Mental Health Diversion Council

- Milton MACK, of Wayne, was appointed to the remainder of a four-year term expiring Jan. 30, 2016. He is the state court administrator of the Michigan Supreme Court, represents the State Court Administrative Office and fills the

vacancy created by the resignation of John HOHMAN Jr.

New tests show toxic lead in plumbing at Flint elementary schools

"FLINT, MI – Recent water tests at a Flint elementary found toxic lead levels at faucets and drinking fountains, a problem state officials largely attribute to the type of fixtures in the school building."

Source: *Flint Journal* **Date:** *12-04-2015* **Link:** *http://www.mlive.com/news/flint/index.ssf/2015/12/18_faucets_at_flints_eisenhowe.html#incart_2box_news_flint*

State: 30 Flint residents have elevated lead levels

"Thirty Flint children and adults have tested positive for elevated levels of lead in their blood, according to preliminary data released Thursday by the Michigan Department of Health and Human Services."

Source: *Detroit News* **Date:** *12-04-2015* **Link:** *http://www.detroitnews.com/story/news/politics/2015/12/03/state-flint-residents-elevated-lead-levels/76739392/*

GOP lawmakers oppose state aid for Planned Parenthood

"Lansing — More than two dozen House Republicans want a state panel to reject a proposed $1.2 million increase in funding for Planned Parenthood to provide family planning services for low-income Detroit women that do not include abortions."

Source: *Detroit News* **Date:** *12-04-2015* **Link:** *http://www.detroitnews.com/story/news/politics/2015/12/03/gop-lawmakers-oppose-state-aid-planned-parenthood/76753536/*

State says blood-lead levels in Flint kids have dropped

"Fewer of Flint's children have tested positive for elevated blood-lead levels since Oct. 1, with the rate falling to 3% of children under 6, according to new state data."

Source: *Detroit Free Press* **Date:** *12-04-2015* **Link:** *http://www.freep.com/story/news/local/michigan/2015/12/03/flint-kids-lead-levels/76746474/*

Secretary of State Ruth Johnson, state and private sector officials to unveil resource for aging dri

"News conference to announce the unveiling of the Safe Drivers Smart Options website, which provides information and resources for aging drivers, their family and friends, and the professionals who care for them."

Source: *Secretary of State Ruth Johnson* **Date:** *12-04-2015* **Link:** *http://mirsnews.com/pdfs/Press_Releases/1449172691_sos.pdf*

MDHHS releases latest data outlining blood lead levels in Flint; Follow-up care, case management res

"LANSING, Mich. – Preliminary data indicates that 30 of 1,361 adults and children tested in Flint since October 1 had elevated blood lead levels, according to a report issued today by the Michigan Department of Health and Human Services."

Source: *Department of Health and Human Services* **Date:** *12-04-2015* **Link:** *http://mirsnews.com/pdfs/Press_Releases/1449171241_dhhs.pdf*

Michigan announces the MI Health Link Ombudsman Program

"LANSING, Mich. – The Michigan Department of Health and Human Services today announced that MI Health Link beneficiaries now have an additional resource for information and support through the MI Health Link Ombudsman Program which was officially operational December 1. As a requirement of Centers for Medicare and Medicaid Services (CMS), MDHHS must provide an ombudsman program for the project. "

Source: *Department of Health and Human Services* **Date:** *12-04-2015* **Link:**
http://mirsnews.com/pdfs/Press_Releases/1449159375_dhhs.pdf

Thanks,

Sharon

From: Moran, Susan (DHHS)
Sent: Wednesday, December 09, 2015 2:08 PM
To: Lyon, Nick (DHHS)
Subject: FW: Flint Briefing 7Dec15

From: Dykema, Linda D. (DHHS)
Sent: Wednesday, December 09, 2015 12:47 PM
To: Moran, Susan (DHHS); Priem, Wesley F. (DHHS)
Cc: Miller, Corinne (DHHS)
Subject: RE: Flint Briefing 7Dec15

Wes is away from his desk but I asked staff. We do not have the final reports from the 5 completed EBLs from ETC as yet. It takes several days to get analytical results from the lab on the dust, soil and water samples. But field staff are definitely finding lead paint and other lead-containing hazards at the homes. Will have to wait and see on the water samples, but I'll get back to you when we have more results.

We do have a completed report for the Flint home where the dogs were lead poisoned: water samples were 4 ppb unfiltered kitchen tap, 8 ppb main bathroom, 100-300 ppb in outside faucet, and over 7000 ppb in an indoor basement tap. There was also lead paint and dust hazards.

From: Moran, Susan (DHHS)
Sent: Wednesday, December 09, 2015 12:33 PM
To: Dykema, Linda D. (DHHS) <DykemaL@michigan.gov>; Priem, Wesley F. (DHHS) <priemw@michigan.gov>
Cc: Miller, Corinne (DHHS) <MillerC39@michigan.gov>
Subject: Fwd: Flint Briefing 7Dec15

See Nicks question

Sent from my iPhone

Begin forwarded message:

> **From:** "Lyon, Nick (DHHS)" <LyonN2@michigan.gov>
> **Date:** December 9, 2015 at 11:11:40 AM EST
> **To:** "Moran, Susan (DHHS)" <MoranS@michigan.gov>
> **Subject: FW: Flint Briefing 7Dec15**
>
> Can you ask Wes if they have determined the lead source in the EBL investigations that have been completed?
>
> **From:** Bouters, Janese (DHHS)
> **Sent:** Tuesday, December 08, 2015 5:00 PM
> **To:** Anderson, Paula (DHHS) <AndersonP3@michigan.gov>; Barr, Jacqui (DHHS) <BarrJ3@michigan.gov>; Becker, Timothy (DHHS) <beckert1@michigan.gov>; Bruneau, Michelle (DHHS)

<BruneauM@michigan.gov>; Colston, Leslie (DHHS) <ColstonL@michigan.gov>; DeMyers, Deborah (DHHS) <DeMyersD@michigan.gov>; Dykema, Linda D. (DHHS) <DykemaL@michigan.gov>; Eggleston, Debbie (DHHS) <egglestond@michigan.gov>; Eisner, Jennifer (DHHS) <EisnerJ@michigan.gov>; Granger, Patricia (DHHS) <GrangerP@michigan.gov>; Grijalva, Nancy (DHHS) <GrijalvaN@michigan.gov>; Groetsch, Kory J. (DHHS) <GroetschK@michigan.gov>; Harvey, Janice (DHHS) <HarveyJ1@michigan.gov>; Hertel, Elizabeth (DHHS) <HertelE@michigan.gov>; Kaiser Van Dam, Paula (DHHS) <KaiserP@michigan.gov>; Lasher, Geralyn (DHHS) <lasherg@michigan.gov>; Lyon, Nick (DHHS) <LyonN2@michigan.gov>; McKane, Patricia (DHHS) <McKaneP@michigan.gov>; Miller, Corinne (DHHS) <MillerC39@michigan.gov>; Minicuci, Angela (DHHS) <MinicuciA@michigan.gov>; Moran, Susan (DHHS) <MoranS@michigan.gov>; Peeler, Nancy (DHHS) <PeelerN@michigan.gov>; Priem, Wesley F. (DHHS) <priemw@michigan.gov>; Priest, Chris (DHHS) <PriestC1@michigan.gov>; Ridley, Nancy (DHHS) <RidleyN@michigan.gov>; Robinson, Mikelle (DHHS) <RobinsonM18@michigan.gov>; Rockefeller, Cheryl (DHHS) <RockefellerC@michigan.gov>; Scott, Jackie (DHHS) <ScottJ14@michigan.gov>; Shah, Sandip (DHHS) <shahs@michigan.gov>; Sims, Teri (DHHS) <SimsT2@michigan.gov>; Stanbury, Martha (DHHS) <stanburym@michigan.gov>; Stiffler, Kathleen A. (DHHS) <StifflerK@michigan.gov>; Taylor, Kerri (DHHS) <TaylorK10@michigan.gov>; Thompson, Sheryl D. (DHHS) <ThompsonS2@michigan.gov>; Titus, Laura (DHHS) <TitusL@michigan.gov>; Travis, Rashmi (DHHS) <TravisR@michigan.gov>; Wells, Eden (DHHS) <WellsE3@michigan.gov>
Subject: Flint Briefing 7Dec15

Sending on behalf of the PHCSA:

Attached is the MDHHS daily situation report for the Flint water lead project.

Thanks,

Janese Bouters
Executive Secretary to Corinne Miller
Bureau of Disease Control, Prevention and Epidemiology
Michigan Department of Health & Human Services
201 Townsend Street
Lansing, Michigan 48913
Phone: (517) 335-8731
Fax: (517) 335-8263

Modified: Wed 7/22/2015 4:11 PM

Flint

1 Galvanizing is creating a problem.
More than 80 tests from DEQ-lead. Result of galvanizing copper and solder in the pipes. (DM checking with Wyant.)

Lead is probably a result of the pipes from street to house.

Pictures.

2 Incidents of a compromised system. Decreased oxygen in water. Increased anemia and other health issues. (Update on legionnaires (hospital).

3 Copper in the water. Risk?

4. Talk to Dan about potential increase lead testing....we care.

Higher levels of Chlorine. Gam won't use. Pipes replaced for GM

Why does the letter we send out talk about not using the water. (Only sent to certain groups). Letter came from the state.

Modified: Fri 11/20/2015 8:40 AM

For Friday

Plusses and Minuses for CHECC Activation

Chart of all lead tests by zip code (preferably disclosing all data even when number is small) and date.

EBL results by range, as specific as possible, by zip code as well - If not at least what we are seeing on the high range. I am presuming that no one has recently tested at a level where chelation is the recommended treatment.

Actual written protocol/practice guideline of what the medical community or the LPHD is supposed to do for ebl's above 5. If I recall correctly the recommended action doesn't change even if the levels are in the next range up.

The actual numbers we used for the "association" of the increase in our original press conference for the two zip codes.

The numbers that support the "doubling" quotes that I see in the newspaper, if we know. (i.e. Did the number of children who tested positive increase from 10 to 20 in one zipcode over one quarter.)

How many lead environmental tests do we do in homes each year, and how many are ongoing at any one time. How do we prioritize?

How many will we be able to do in Flint? How many are attributable to the supplemental?

When do we expect our first results?

What are we doing with the health plans?

Nancy - Emails on testing.

Sent: Tuesday, January 05, 2016 11:21 AM
Subject: FW: Numbered Letter L 15-73
Attachments: L 15-73.pdf

Mark – Here's the L Letter we sent last week to Medicaid providers.

The approach we discussed would be beneficial to those you cover in Flint. We have stepped up our testing, outreach, and education efforts with the local public health department in a very significant way since it became apparent that there was an increase in children testing above the 5 micrograms level. As we discussed we have also begun doing home blood lead investigations with the supplemental funding approved late last year. I think a critical component going forward will be care coordination with children (and adults) who test above the threshold,

Below are examples of what some of our Medicaid Health Plans have been doing:

Encouraging testing of all children 0-6 who had not been tested since April, 2014.
Initiating lead poisoining awareness campaigns.
Dedicating a n

Per your request during our call last week, I am forwarding a more detailed update on our community, member, and provider outreach efforts in Flint to encourage lead testing for all children between the ages of 0-6 that have not received a test since April 2014. Molina has identified approximately 3,500 enrolled children that require a lead test. Molina has committed to a minimum of 10-15 lead poisoning awareness and testing campaign events in partnership with local elementary schools and community agencies over the next 90 days. Molina will support these events by arranging for a nurse to administer lead tests. The health department will also provide nurses for testing, nutritional, and environmental awareness education for certain partnered events. We will send a member invitation via direct mail to targeted Molina households in surrounding zip codes for each event to encourage participation. Our case managers and community connectors (e.g. community health workers) have also been trained and engaged to develop care coordination and nutrition counseling interventions for children with blood lead levels >5. Here is a more detailed snapshot of planned community/provider activities:

Ø Community Engagement and Awareness

Four Confirmed Events in January
ü Freeman Elementary lead testing event (1/12) ü Hurley Hospital w/ Genesee schools (Mid-January) ü Collaboration on lead screening education with Genesee Health Department at GPHO - Attend January Practice Managers meetings AM/PM sessions ü Genesys Residency Clinic event-Downtown Flint (1/21) - (GHPO represents 853 Providers, 21, 350 MHM Members) ü Eisenhower Elementary lead testing event (1/21-1/26)

Events in February - TBD
ü Carriage Town Ministries Lead Testing Focused Family fun Night (2/4 & 2/8)
ü Hamilton FQHC (TBD)
ü Joint events with Hurley Hospital staffed by PMC physicians to provide Lead Screenings and Patient education
ü Flint Public Schools – 3-4 events
ü Boys and Girls Club
ü YWCA and YMCA
ü Flint Children's Museum

Events in March - TBD

ü Flint Public Schools - 2 -3 elementary school events ü Northwestern High School- Family night event ü Genesee Chamber of Commerce 1-2 events ü Grace Emmanuel Church ü Hamilton FQHC family fun and health fair event 1-2 events ü Close in on children ages 0-6 who have not yet been tested- announce innovative testing methods (mobile unit? Sponsor/Fund Traveling Nurse to elementary school) to close the gap; quotes from MHM leadership and Health Department Leaders included.

Four targeted press releases:
ü December 22 - Molina –Genesee County Health Department – Joint Press Release 1: Addressing Lead Poisoning Awareness and Prevention campaign-will include quotes from MHM and Health Department leaders; Will include details of the first four lead testing events to be hosted by MHM and Genesee County Health Department
ü Press Release 1 will be distributed to media by 12/22/15; draft for review ready for MHM leaders 12/21/15
ü February 1 -4 Carriage Town Ministries Lead Testing Event- Joint Media Advisory Joint Media Advisories to all Flint media detailing lead testing event at Carriage Town Ministries 2/4
ü February 10-13 Molina –Genesee County Health Department – Joint Press Release 2: Highlight results to date including amount of lead tests performed since campaign launch, engage the public and remind them the campaign continues and that children still have many options to get a free lead test. Detail MHM- Genesee Health Department Feb 10- March 31 Lead testing events schedule; quotes from Molina and Health Department Leaders
ü March 31- Press Release 3: Close in on children ages 0-6 who have not yet been tested- announce innovative testing methods (explore deploying traveling Nurse to elementary school) to close the gap;

Ø Provider Engagement and Awareness
ü 12/23/15 - Fax blast to all Genesee County PCPs about Lead Awareness and specific steps to ensure testing and treatment ü 12/29/15 – Fax blast to Genesys PHO ü Adding several Lead education articles and MDHHS links to additional provider/patient materials to our provider portal ü There are approximately 165 physicians serving the children of Flint – Molina has identified the top 16 providers serving at least 100 Molina children in the Flint area, which include Hurley and Hamilton FQHC. We have developed a workplan to aggressively engage these providers ü Key provider Lead awareness partners – Scheduling underway for additional January-March events:
- Genesee Health Department
- Genesee Health Plan (GHP)
- Genesys PHO
- Hurley/PMC
- Hamilton FQHC

Ø Molina HealthCare of Michigan is also working to partner/coordinate efforts with three other payers (BCBSM, United, McLaren) who also have members in Flint to ensure the entire community is included in the awareness and testing efforts

From: MSAPolicy
Sent: Wednesday, December 30, 2015 4:35 PM

Subject: Numbered Letter L 15-73

Attached for your information is letter L 15-73, dated December 30, 2015.

L 15-73 – Blood Lead Guidelines to Address the City of Flint Residents' Potential Exposure to Lead.

This letter was sent to Practitioners, Clinics, Laboratories and Maternal Infant Health Program (MIHP) Providers in the City of Flint.

Medicaid Letters can be accessed on the web at www.michigan.gov/medicaidproviders >> Communication and Training >> Click 2015 under Numbered Letters.

Michigan Department of Health and Human Services
PO Box 30479
Lansing MI 48909

December 30, 2015

<Provider Name>
<Provider Address1>
<Provider Address2>
<Provider City> <state> <zipcode5-zip4>

Dear Provider:

RE: Blood Lead Guidelines to Address the City of Flint Residents' Potential Exposure to Lead

Michigan Medicaid Early Periodic Screening, Diagnosis and Treatment (EPSDT) guidelines require children to be tested for blood lead poisoning at 12 and 24 months of age, and between 36 and 72 months of age if the child has not been previously tested as indicated by the Medicaid Provider Manual. The Manual is located at: www.michigan.gov/medicaidproviders >> Policy and Forms.

Due to the enhanced public health issue of an increased risk for lead exposure in the City of Flint, providers have been advised to follow enhanced guidelines for lead testing in children:

- Providers should screen ALL children (regardless of Medicaid/insurance status) between 0 and 6 years of age that may have been exposed to the City of Flint drinking water after April 2014. Note: This includes all children less than 1 year of age and children between 3 and 6 years of age.

- If the child has already been screened since April 2014 by a capillary test, providers should follow-up on any elevated levels greater than 5 mcg/dl to ensure confirmatory venous testing is conducted.

- Providers should utilize the standard Blood Lead Level (BLL) Quick Reference for Primary Care Providers located at: www.mi.gov/documents/deq/ProviderQuickReference_Sept2015_501831_7.pdf?20151204122739.

- All clients with blood lead levels greater than 5 mcg/dl should be referred for case management coordinated through the Genesee County Health Department.

- Providers should inquire about the use of a drinking water filter and/or bottled water by all clients residing within the Flint city limits.

- Providers should inquire about other potential sources of lead within the household per the current recommendations of the Childhood Lead Poisoning Prevention Program's Statewide Lead Testing/Lead Screening Plan. The Statewide Lead Testing/Lead Screening Plan is located at: www.michigan.gov/documents/mdch/testing-screening071009_287511_7.pdf.

Lead testing performed using these enhanced testing guidelines is covered as a Medicaid EPSDT service. Providers should contact the beneficiary's Medicaid health plan for additional assistance if needed. Any questions regarding this letter should be directed to Provider Inquiry, Department of Health and Human Services, P.O. Box 30731, Lansing, Michigan 48909-8231, or e-mail at ProviderSupport@michigan.gov. When you submit an e-mail, be sure to include your name, affiliation, and phone number so you may be contacted if necessary. Providers may phone toll-free 1-800-292-2550.

Sincerely,

Chris Priest, Director
Medical Services Administration

From: LyonN2@michigan.gov
Sent: Thursday, December 31, 2015 1:11 PM
To: Becker, Timothy (DHHS);Lasher, Geralyn (DHHS);Grijalva, Nancy (DHHS);Hertel, Elizabeth (DHHS)
Subject: Fwd: Attorney Client Work Product (Draft), Privileged and Confidential

Not Responsive

From: "Holland, Meegan (GOV)" <HollandM2@michigan.gov>
Date: December 30, 2015 at 8:00:47 PM CST
To: "Baird, Richard (GOV)" <bairdr@michigan.gov>, "Agen, Jarrod (GOV)" <AgenJ@michigan.gov>, "Clement, Elizabeth (GOV)" <clemente@michigan.gov>, "Hollins, Harvey (GOV)" <hollinsh@michigan.gov>, "Kelenske, Chris (MSP)" <KelenskeC@michigan.gov>, "Murray, David (GOV)" <MurrayD1@michigan.gov>, "Redford, James (GOV)" <RedfordJ@michigan.gov>, "Becker, Timothy (DHHS)" <beckert1@michigan.gov>, "Creagh, Keith (DNR)" <creaghk@michigan.gov>, "Roberts, John (DTMB)" <RobertsJ9@michigan.gov>
Cc: "Etue, Kriste (MSP)" <EtueK@michigan.gov>, "Lyon, Nick (DHHS)" <LyonN2@michigan.gov>
Subject: RE: Attorney Client Work Product (Draft), Privileged and Confidential

Not Responsive

The goal: Assess the extent of the elevated blood lead levels – the number of those affected and the degree to which they're affected <!--[if !supportLists]-->n <!--[endif]-->Get as many people in the affected zip codes tested as possible – can the Red Cross or some other agency with a bus or mobile unit set up for folks to give blood convert over to blood level testing and go into neighborhoods that have low testing rates?
<!--[if !supportLists]-->n <!--[endif]-->A public health friend of mine said that Genesee County Health workers are stressed to the max. Can we deploy appropriate personnel from other county health agencies to help with inspecting

homes for possible other causes? In other words, it won't do any good to invest more in water infrastructure if we're finding window sills with teeth marks. I say this NOT to downplay the role that water lead levels may have played. But can we get Habitat for Humanity, for example, to do a massive volunteer effort to eradicate lead paint in homes … or is that beyond their expertise?
<!--[if !supportLists]-->n <!--[endif]-->Gather experts to assess exactly how extensive the problem is and potential causes. And then convey this in a much more accessible ways. If you want blood level data, you have to scroll down on the DHHS web site, find the headline and then read a long press release. Maybe we're conveying this information better on the ground, but if not, we need to communicate conclusive findings in multiple ways– graphics, video, informational photo galleries and maybe even a "test" that residents can take to see if their home is at risk in other ways. I know that sounds awfully MLive-ish, but it can be effective.

From: Baird, Richard (GOV)
Sent: Wednesday, December 30, 2015 6:57 PM
To: Agen, Jarrod (GOV) <AgenJ@michigan.gov>; Clement, Elizabeth (GOV) <clemente@michigan.gov>; Hollins, Harvey (GOV) <hollinsh@michigan.gov>; Kelenske, Chris (MSP) <KelenskeC@michigan.gov>; Holland, Meegan (GOV) <HollandM2@michigan.gov>; Murray, David (GOV) <MurrayD1@michigan.gov>; Redford, James (GOV) <RedfordJ@michigan.gov>; Becker, Timothy (DHHS) <beckert1@michigan.gov>; Creagh, Keith (DNR) <creaghk@michigan.gov>; Roberts, John (DTMB) <RobertsJ9@michigan.gov>
Cc: Etue, Kriste (MSP) <EtueK@michigan.gov>; Lyon, Nick (DHHS) <LyonN2@michigan.gov>
Subject: Attorney Client Work Product (Draft), Privileged and Confidential

Team:

Today Harvey and I met with the Flint Water Task Force. It was a good meeting. People were pleased with the G's statement from the prior day. Captain Kelenske joined us and we had a very good discussion about moving forward with the creation of the Flint Water Crisis Agency Coordinating Committee (FIACC). Tim Becker and Captain Kelenske provided me with a fair amount of input. I also read the City of Flint Incident Action Plan for a State of Emergency which Chris received today (enclosed for those who wish to read it as well). I have distilled all of this into a two page plan that I want your edits and comments on and a one page organizational chart (now presented in the "governor's colors" according to our fine people in Communications). Spoiler alert—I made Captain Kelenske Vice Chair of the whole shebang (with the Colonel's blessing) so Harvey wouldn't get lonely.

Here is my ask of you:

<!--[if !supportLists]-->1) <!--[endif]-->Within 24 (sooner if you can) hours give me your comments and input
<!--[if !supportLists]-->2) <!--[endif]-->Tomorrow I will turn around a final document for Jarrod to review with the Governor either New Year's Day or Saturday
<!--[if !supportLists]-->3) <!--[endif]-->Ideally, Governor will approve Harvey sending it to Mayor Weaver Saturday (Sunday latest)
<!--[if !supportLists]-->4) <!--[endif]-->Mayor needs to know that this is what the Governor wishes to discuss at the meeting January 7 along with financial resources that we still need some estimates on cost from DHHS for
<!--[if !supportLists]-->5) <!--[endif]-->Meegan and Dave need to noodle how best to get out front with this and change the narrative focus on Monday's Genesee County declaration of emergency
I know we are all working way too hard for what should be a rest and recharge period but I do appreciate everyone's efforts and I know the Boss really does as well.

Regards,

Rich

From:	LyonN2@michigan.gov
Sent:	Thursday, December 31, 2015 1:18 PM
To:	Becker, Timothy (DHHS);Grijalva, Nancy (DHHS);Lasher, Geralyn (DHHS);Hertel, Elizabeth (DHHS)
Subject:	Fwd: Attorney Client Work Product (Draft), Privileged and Confidential
Attachments:	A Proposal to Create the Flint Water Inter.docx; ATT00001.htm; IA Coord Com Org Chart.jpg; ATT00002.htm; IAP Flint Water 2015-12-29.pdf; ATT00003.htm

Not Responsive

From: "Baird, Richard (GOV)" <bairdr@michigan.gov>
To: "Agen, Jarrod (GOV)" <AgenJ@michigan.gov>, "Clement, Elizabeth (GOV)" <clemente@michigan.gov>, "Hollins, Harvey (GOV)" <hollinsh@michigan.gov>, "Kelenske, Chris (MSP)" <KelenskeC@michigan.gov>, "Holland, Meegan (GOV)" <HollandM2@michigan.gov>, "Murray, David (GOV)" <MurrayD1@michigan.gov>, "Redford, James (GOV)" <RedfordJ@michigan.gov>, "Becker, Timothy (DHHS)" <beckert1@michigan.gov>, "Creagh, Keith (DNR)" <creaghk@michigan.gov>, "Roberts, John (DTMB)" <RobertsJ9@michigan.gov>
Cc: "Etue, Kriste (MSP)" <EtueK@michigan.gov>, "Lyon, Nick (DHHS)" <LyonN2@michigan.gov>
Subject: Attorney Client Work Product (Draft), Privileged and Confidential

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Regards,

Rich

A Proposal to Create the Flint Water Inter-Agency Coordinating Committee (FIACC)

In collaboration with the Flint After-Action Task Force, MSP Captain Chris Kelenske, DHHS Chief Deputy Tim Becker and DHHS Director Nick Lyon, Harvey Hollins and Rich Baird are recommending the immediate creation of the above referenced entity, with its sustained role and responsibility enabled under the Governor's Executive Order.

Statement of Need

Due to a combination of resource constraints, inexperienced personnel, "silo" bureaucratic processes and reactionary approaches to immediate problems, there is a nearly complete lack of coordination, communication, and connected management amongst all the departments and stakeholders who must work together to ensure Flint's return to clean, safe water and to coordinate mid and long term efforts to mitigate and address future health and behavioral consequences from lead ingestion. This group MUST be stood up regardless of whether (or when) the conditions required for a declaration of emergency are met by the City, County, State or Federal authorizers. This coordinating body must include:

- The creation of a routine information process between all parties.
- Pursuit of other avenues of funding including federal grants and legislative appropriations.
- While the Emergency Management Act or the Stafford Disaster Relief and Emergency Assistance Act may be mechanisms to fix the issues in Flint, portions of the Emergency Management Act outlining management of events are applicable and should be implemented without delay (e.g. Local emergency operations plans/emergency operations guides as well as emergency operations support plans).

Action Plan and Establishing the FIACCC

It appears that a request for a Governor's declaration may be from the county as soon as January 4, 2016. The state's Emergency Coordinator (Capt. Kelenske) will evaluate the request and provide a recommendation whether to issue a declaration, following established protocol and due diligence. But immediately, we will:

1. Establish an interagency workgroup Chaired and Vice-Chaired by Harvey Hollins and Chris Kelenske, respectively, and be comprised of DHHS, MDEQ, MSP, Treasury, Genesee County, City of Flint, MDE, LARA and external Subject Matter Experts (SMEs). Civil Rights may be added at a later time. If additional agencies/stakeholders who can assist with accomplishing the action plan are needed, they will be added. Personnel must be goal oriented, transparent with findings and measures of progress, and able to work toward accomplishing the Incident Action Plan created by the state in a timely manner. A draft Organization Chart is attached under separate cover.
2. This body should be created by Executive Order and it must complement and not replace the current system under the Emergency Management Act. In fact, it should demonstrate how to best leverage support where existing laws fall short under a man-made emergency.
3. Utilize the National Incident Management System and Unified/Incident Command as appropriate.
4. Establish routine communications protocols at the operational, executive, and legislative levels as determined appropriate.
5. Establish interagency workgroup objectives using the following as a starting point.

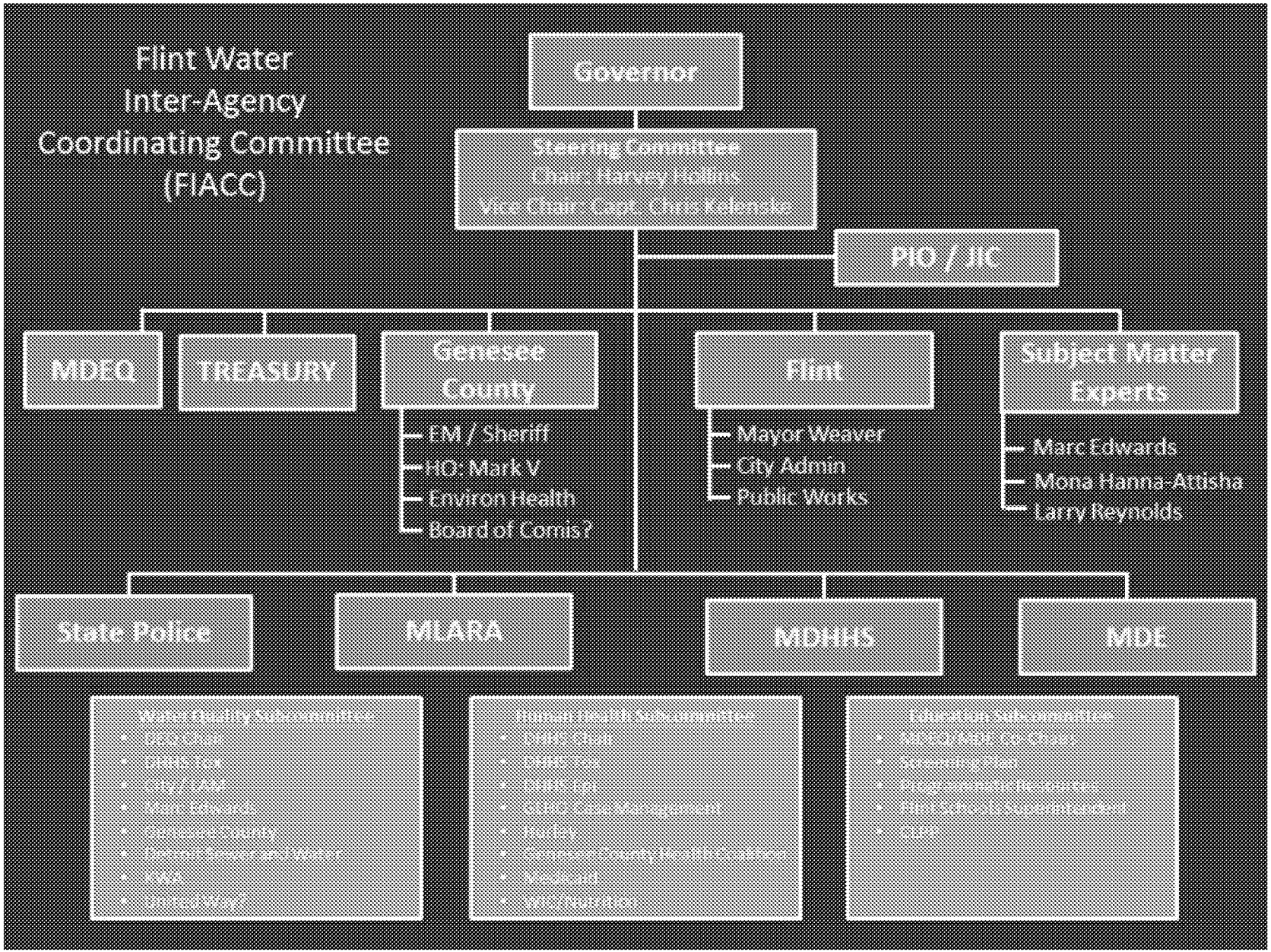
Interagency Workgroup Objectives

1. Determine and convey acceptable standards for potable water.
    - Identify needed remediation.
    - Convey the remediation plan objectives to all stakeholders and interested parties.
    - Logistics plan for distribution and serving homebound citizens with water and filtration
    - Implement the plan.
2. Determine health impacts for the impacted population.
    - Identify treatment methods.
    - Nutrition education and support
    - Coping with lead exposure (care, monitoring, neurodevelopmental screening, access to DBP specialists, psychologists/psychiatrists, expanded county services, etc.)
    - Convey the treatment plan objectives to interested parties.
    - Implement the plan.
3. Establish a public information protocol to effectively inform the community of the situation and actions taken.
    - Identify existing Public Information outlets within the city, county, and state.
    - Establish a Joint Information Center
    - Provide for Emergency Alerts and Updates
    - Leverage public and private education schools
    - Determine official information flow and approval of information.
    - Convey to interested parties.
4. Assess the status of the infrastructure and determine feasible actions to upgrade the water system.
    - Determine current state of the infrastructure.
    - Develop priorities, costs, and potential funding sources for infrastructure upgrades as part of a long term recovery plan.
    - Seek partners to assist (NGOs, Foundations, Business, etc.)
    - Implement the plan.

Final Thoughts

After the team provides input to this document, I would ask that Governor Snyder review and approve the approach, authorize Harvey Hollins to get the plan to Mayor Weaver no later than this weekend, and then proactively communicate the plan regardless of whether we get an Emergency declaration or not.

Also, we do believe setting up an Emergency Command Center which requires 24/7 staffing is sensible until AFTER Genesee County has demonstrated they did all they could and couldn't solve the problem. That is what is required under the law.


Flint Water Inter-Agency Coordinating Committee (FIACC)
Governor
Steering Committee
Chair: Harvey Hollins
Vice Chair: Capt. Chris Kelenske
PIO / JIC
MDEQ
TREASURY
Genesee County
FM / Sheriff
HO: Mark V
Environ Health
Board of Comis?
Flint
Mayor Weaver
City Admin
Public Works
Subject Matter Experts
Marc Edwards
Mona Hanna-Attisha
Larry Reynolds
State Police
MLARA
MDHHS
MDE

CITY OF FLINT

INCIDENT ACTION PLAN

STATE OF EMERGENCY

Objectives:

To provide short term relief and long term solutions in addressing the man-made emergency of increased lead levels in the City of Flint (the "City") water system resulting from the switch to Flint River as the City's water source as well as the threat to public health related to elevated blood lead levels in Flint residents, without interruption of the provision of public safety and other essential public services. Due to the fluidic nature of emergencies and the complexity of the City of Flint's declared emergency, this plan serves as a framework and may be altered as the emergency develops.

The Response Framework

The purpose of this plan is to organize efforts on behalf of the city to assess the extent of the City's infrastructure needs and risks to public health, provide immediate relief to those who are at risk, and establish long term solutions. In addition, the city must ascertain what immediate relief and long term solutions the City is capable of implementing based on what resources are available. For any activities that are beyond the resource capacity of the City, external sources of funding, supplies, and manpower must be sought.

There are a number of steps that must be taken in accordance with the Flint Emergency Support Operations Plan (SEOP), in order for the City to be compliant with the Genesee County Emergency Action Guidelines. These include the activation of the Incident Management Team, the Emergency Operation Center, and the sharing of essential documents with the County, including this plan. Information must also be shared by the City's Public Information Officer on a regular basis, as required by the SEOP.

This plan calls for the provision of immediate relief to those at risk in our community. Special consideration must be given to residents who belong to underserved groups, such as those who are homebound, undocumented, in poverty, etc. Additional consideration must also be given to the equitable provision of services throughout our community in order to equally protect the health and safety of every member of our community.

Implementation of this plan is to be conducted by the Incident Management Team, which will monitor the effective delivery of goods and services in order to address the conditions of the emergency.

Understanding the Issue:

October 1, 2015, the Genesee County Health Department issued a Public Health Emergency after elevated blood-lead levels were found among children in the City of Flint. This incident correlates with elevated levels of lead found in the City's drinking water after the City switched water sources in April of

2014 to the Flint River. The scope of this problem appears to be limited to Flint City Water Customers and their dependents. Public agencies from several levels of government, as well as charitable, nonprofit organizations have partnered with the City to provide immediate relief to Flint residents, including the expansion of health services, the provision of bottled water and NSF rated water filters. The city is also seeking long term infrastructure improvements to eliminate lead and other contaminants from the water system.

Gov. Rick Snyder appointed a task force to review "actions regarding water use and testing in Flint" and to make recommendations for future guidelines: Members of the state task force are Ken Sikkema of Public Sector Consultants, Chris Kolb of the Michigan Environmental Council, Dr. Matthew Davis of the University of Michigan Health System, Eric Rothstein of the Galardi Rothstein Group and Dr. Lawrence Reynolds of Mott Children's Health Center.

In an effort to halt the further escalation of this crisis, the City returned to receiving its water from the Detroit Water and Sewerage Department (DWSD) on October 16, 2015. Since that time, additional corrosion control program has started, estimating a reduction of lead levels over the next six months. In light of these efforts, concerns surrounding the quality of water and health of the residents persist to the point that Mayor Karen Weaver declared a State of Emergency on December 14, 2015 so as to resolve this crisis once and for all.

The current challenge facing the City is providing immediate relief and long term solutions of the quality of the water and health of residents while the City remains in a financially critical condition. It is hoped and expected that higher levels of government recognize this emergency as it pertains to the condition of the City's infrastructure and health of its residents, and do all things necessary to assist the City in the provision of relief and the execution of capital improvement projects that will eliminate the causes of this emergency.

Enhancing Understanding:

Information Collection

Essential Elements of Information (EEIs) can be qualified as the City's water tests containing lead results, the verification of lead water lines (both public and private), and health information. Water testing is performed by the City's water plant in cooperation with the MDEQ. The verification of lead water lines is being handled by University of Michigan Flint, who is currently digitizing the City's water line information and PSI Engineering, who is initiating the effort to verify lead lines by excavating an initial 150 residential lines. This information allows the Incident Management Team to assess the current condition of the emergency by way of determining the water quality and the condition of the water distribution infrastructure.

Information Analysis

The City has sought partners to assist in the analysis and attenuation of complex data. Wayne State University's center for Urban Studies has agreed to assist the City in its efforts to document and track lead water lines, water test results, and filter distribution with geographic information system (GIS) technology. This allows for easily updateable, digestible information to be presented to officials.

Assessment of Impacts

The City will need assistance in determining the total cost of damage done to the public health and infrastructure. As of now, only portions of this damage are visible.

PSI is providing some assistance by excavating 150 residential water lines to verify that they are comprised of lead. This is an initial step, but not enough. More resources will be needed to continue this process.

Continuous Situational Awareness

It is important that the Emergency Management Team receive continuous information regarding water testing results, lead water line numbers, and filter distribution information in order to gain a realistic and current perspective. Much of his information is currently available on the City's website (cityofflint.com) and more is added each week by the PIO team.

Actions taken in Response to the Emergency

Activation of the Incident Management Team

Upon the declaration of Emergency by Mayor Weaver, the Support Emergency Operations Plan (SEOP) was activated. The SEOP calls upon the Incident Management Team to generate the Incident Action Plan (IAP. Each member of this team serves a specific function as it relates to addressing the causes and effects of the emergency. The Emergency Management Team roster can be found in the SEOP on page 3, with a list of alternates on page 4 in case the need for succession arises.

Emergency Operations Center

The Emergency Operations Center (EOC) must be activated upon the declaration of a State of Emergency by the Mayor. This center is required by the SEOP and serves as a nerve center for the Incident Management Team. Here, emergency relief efforts are coordinated by key members of the Incident Management Team. In this case, these relief efforts consist of the distribution of water filters at

City Hall and community events, the distribution of bottled water throughout the city in conjunction with the efforts of community partners, and assisting with the circulation of water testing kits throughout the community. The EOC will also be monitoring and managing the inventory of relief supplies, such as water filters and bottled water.

According to the SEOP, the EOC must establish an incident tracking system. This system will serve as a work plan for the management of the emergency. In addition, it is essential that the IMT record water testing results, lead water line location information, and information about the distribution of water filters and bottled water all in one place so that information is readily available for the Incident Management Team. This information will also be sent out to the public and media in the form of daily regular updates by the City's PIO.

Communication

The EOC maintains a telephone system that exists to intake questions about relief efforts and to organize relief logistics. It is open from 8am to 5pm, Monday through Friday. A voicemail system and eventual email system will exist to handle requests and inquiries that occur outside of the normal operating hours. This system will be constructed by the City's IS department.

Public Awareness and Education

1. **Emergency Alerts and Updates:**
   The City's Public Information Officer will make available information as it relates to the emergency in the form of press releases, emails, and physical documents. Daily updates containing information on the distribution of water filters, bottled water, water testing, blood lead testing, and other relief efforts will be available on the City's website for the public to view. Information will be available at City Hall for residents.

2. **Joint Information Center:**
   The City's PIO will establish a joint Information Center that is organized to coordinate the efforts of multiple agencies to communicate with the public. This includes the circulation of joint press releases, public health information, educational materials, and updates relating to the State of Emergency. This committee is comprised of public information officers and public relations personnel to coordinate efforts to keep the public updated and informed. Regular updates to the media regarding events and progress will be made as news develops.

   The US EPA has offered assistance in the form of Public Information support. Additional support in this area has been provided by the Michigan State Police.

3. **Education:**
   Many government agencies and philanthropic organizations are already distributing information regarding the effects of lead on public health. It is important that the City assist in these efforts so vital information and knowledge is presented to all members of the community. The goal is to continue to eliminate misunderstandings and incorrect information as it relates to reducing lead in drinking water, pursuing medical help, and maintaining a healthy diet to reduce lead absorption in the body. Lead education is currently being performed by the Genesee County Health Department, the Michigan Department of Health and Human Services and Medical community at-large.

Assessment of Social Needs

In order to effectively and equitably provide immediate relief to Flint water customers, the City must take into account many of the socio-economic needs and limitations of the community. Some residents cannot get to City Hall for a water filter. Some residents do not have internet access. Literacy or a language barrier may also pose significant obstacles to the effective distribution of educational information and relief to those in need. These will be continuing challenges facing the community. At present these are the resources the City has available to mitigate some of those challenges.

Logistics

Logistics are being coordinated by the City Emergency Management Team's City's *Chief Logistics Officer*, who is the City Administrator. The CLO is responsible for the coordination, procurement, and transportation of goods and services, which is essential for effective implementation of the response plan.

Fixed Distribution Points

There are several locations throughout the city where residents may acquire a water filter. These locations are:

Flint City Hall
1101 South Saginaw, Flint MI 48502

Genesee County Community Action Resource Department (GCCARD)
601 North Saginaw, Flint MI 48502
and
2727 Lippencott Blvd, Flint MI 48507

Michigan Department of Health and Human Services
4809 Clio Road, Flint MI 48504
and
125 E. Union Street, Flint, MI 48502

Activation of Ward Distribution Centers

Each of the nine wards will have activated distribution centers that are primarily managed by City Council Members or their designees.

Flint City Council – Water Distribution Sites

WARD	COUNCILPERSON	LOCATION	ADDRESS
1	Eric Mays	Hasselbring Senior Center	1002 W. Home Avenue
2	Jackie Poplar	Joy Tabernacle Church	2505 N. Chevrolet Avenue
3	Kerry Nelson	Antioch Baptist Church	1083 E. Stewart Avenue
4	Joshua Freeman	Flint Fire Station No. 5	3402 Western Road
5	Wantwaz Davis	Doyle/Ryder Elementary School	1040 N. Saginaw Street
6	Herbert Winfrey	New Community Baptist Church	1375 Lavender Avenue
7	Monica Galloway	Brennan Community Center	1301 Pingree Avenue
8	Vicki VanBuren	Flint Southwestern Academy	1420 W. 12th Street
9	Scott Kincaid	Dort Mall Police Service Station	3600 S. Dort Highway

Mobile Distribution Centers

With the help of transportation agencies, like the Metro Transit Authority (MTA), meals on wheels, and GCCARD, the city can help establish mobile distribution centers and delivery systems that can provide water filters, bottled water, and nutritious foods, among other types of relief accompanied by educational materials to neighborhoods and to homes of people who experience limited mobility.

- Mass Transportation Authority-MTA bus passes: Assisting residents with bus passes to improve their mobility will increase their chances of receiving help. Transportation services will also improve residents' access to medical care.
- MTA-Your Ride mobile distribution:
    - Estimated Costs: $25 per hour to deliver water and filters to homes throughout the City.

Problem 1. Public Health Emergency

The first objective in addressing this emergency is reducing, and eventually eliminating, the danger to public health. As City water coming out of faucets continue to contain lead, and copper and other

harmful contaminants exceeding government guidelines and regulations, it poses a risk to the people of our community. Preventative measures must be taken to avoid the effects of toxicosis that are difficult if not impossible to completely reverse.

As far as preventative measures are concerned, education, water filters, and bottled water must be provided to every household in the City in order to reduce the chances of lead exposure, especially to our most vulnerable members of the community. If lead exposure has occurred, resulting in elevated blood lead levels, immediate and sustained medical attention must be available to those affected. Health services must be expanded in the area to accommodate increased numbers of case loads and specialized care regarding lead poisoning and its effects.

Immediate Relief for Public Health:

1. Prevention: Education, water filters and replacement cartridges, free water testing, and bottled water must be available to everyone.
2. Access to nutritious food that reduces the risks of lead absorption by the body. The City can coordinate activities with the County Health Department

Long Term Solutions: Maintaining Public Health and Coping with Lead Exposure

1. Work closely with the Genesee County Health Department and Michigan Department of Health and Human Services in order to provide sustainable care and monitoring of children exposed to lead. This care must be available for them for several years-preferably several decades.
2. Support and education for primary care providers regarding aggressive long-term neurodevelopmental screening and testing.
3. Improved access to developmental and behavioral (DBP) specialists, pediatric psychologists, pediatric psychiatrists.
    a. Pre-emptive referral to mental health/ toxic stress screenings.
    b. Support capacity building and or incentivize recruitment to allow Genesee health system (CMH) to build this capacity which is currently needed and lacking.
4. Increase recognition and education regarding trauma informed care, social determinants of health (SDOH).
5. Expand State funded Genesee Health System (CMH) services.
    a. Infant mental health (30 day capacity)
    b. Child case management
    c. Home based services
    d. Trauma informed care- trauma focused CBT

Problem 2. Lead Contamination in the Water

Immediate Relief:

1. Education, water filters and replacement cartridges, free water testing for water customers, and bottled water must be available to everyone. Water filters can be obtained at any of the fixed distribution points throughout the City.
2. Identification and verification of lead water service lines throughout the city- both public and private.
3. Assistance to identify lead pipes within buildings and homes.

Distribution of Bottled Water:
At this point, we are directing all offers for donations to the Food Bank of Eastern Michigan. It is imperative that water be accessible to all members of the community through a variety of distribution channels. These channels are explained in the Logistics Section of this plan.

Distribution of Test Bottles:
Water testing kits can be picked up at City Hall with instructions. Test results are posted on the City's website to raise public awareness and encourage more participation.

Long term Solutions: Capital Improvements Needs
The distribution of filters, water, and food to counter the effects of lead are essential response efforts to keep people safe. However, long term solutions are required to keep people healthy, to eliminate lead from the public and private water distribution system distribution, and to provide affordable clean water. Our public infrastructure and utilities must be reliable, sustainable, and equitable in order for this community to rebound after this emergency. The following long term solutions must be implemented in order to set the City of Flint on a course for recovery. These solutions come at a heavy cost for a City that is currently in receivership. The City has experienced financial distress due to this Emergency, in addition to a two million dollar loss from switching back to DWSD. The City has diligently applied for Fiscally Distressed Cities, Villages, and Townships, Grant in order to supplement funding for capital improvement projects. It is essential that these grants be awarded in order to achieve long term solutions.

1. COMPLETE **Transition to a Temporary Safe Water Source until the Completion of KWA:**
   This has already occurred. On October 16, 2015, Flint returned to receiving its water from DWSD on a 9 month agreement. This agreement will expire in June 2016, when the KWA is projected to be complete. The City had to pay $2 million out of its general fund to make this switch.

2. IN PROGRESS **Additional Corrosion Control added to the Water System:**

This is already occurring. In early December, 2015, Flint began to add additional corrosion control to the water coming in from DWSD in attempts to rebuild the protective scale inside its pipes. This is estimated to reduce lead levels in two to six months.

3. **Faucet Replacement:**
   Replacement of Water faucets, and drinking fountains in the school system. It has been determined after state inspections that many sources of lead contamination in the School System's water were the faucets themselves. These faucets need to be replaced.

4. **Water Line Replacement:**
   Water Line Replacement to reduce antiquated infrastructure and lead service lines. These lines must be identified, verified, and replaced. Residents who are facing financial hardships must have access to assistance to cover the costs of these replacements through access to grants and (forgivable) loans made available through State and Federal agencies. The corrosion damage to public and private lines that Flint River water caused is still being determined.
   - Replacement of an estimated fifteen thousand (15,000) lead service lines at an estimated cost of three thousand dollars ($3,000) per line. Total costs forty –five million dollars ($45,000,000). This project is estimated to be one of the most cost-intensive endeavors related to ameliorating water contaminants.

5. **Reimbursement of Critical Expenditures:**
   Seeking reimbursement of two million dollar cost of returning to DWSD and forgiveness of Water Revolving Loan Debt from the State of Michigan.

6. **KWA Capital Improvements**: The City has reconnected to Detroit temporarily until a water line from Port Huron is developed. The new water line known as the KWA pipeline or Karegnondi Water Authority is expected to bring water to the City from Lake Huron by July. The current cost agreement between Flint and DWSD is for nine months, therefore it is imperative that KWA be completed as soon as possible. Assistance relating to capital improvements to expedite this process will help to achieve long term goals.

KWA Capital Improvements:	**Estimated Costs:**
a. Transfer Station to Dort Reservoir	*$4,500,000*
b. Raw water line to pump station #4	*$636,000*
c. Phosphoric acid feed system	*$186,000*
d. Alum Feed system	*$40,000*
e. Post filtration system	*$387,289*

f.	*SCADA Upgrades*	*$424,000*
g.	*Sewer Relining*	*$100,000*
	Total	***$6,273,289***

Ancillary Considerations: Public Safety during an Emergency

During a time of emergency public safety agencies need to be prepared to respond to threats to public safety and critical infrastructure. The City is facing a man-made emergency that is threatening the public health. Resentment and hostility toward local institutions and municipal government is at a significant level.

Critical infrastructure should be safeguarded if the need arises. This includes increasing security at City Hall to reduce potential for public safety risks. In the case of credible threats to public infrastructure, it may be required to hire private security company for first line of defense. Private Security is lower cost, thereby making it the first option. The minimum response is acted upon first, elevating only if the need arises. Credible or imminent threats of damage or destruction to critical infrastructure requires an elevated response. Such needs may require over-time police officers to address critical situations. Mutual aid from surrounding communities can be requested if Flint public safety is overextended.

Implementation:

Community Partners

Financial limitations of the city persist while it confronts this emergency. Many community partners have offered their assistance to perform various needed functions. The city is heavily reliant on the assistance that government agencies and nonprofit organizations have provided.

The Mott Foundation

The Mott Foundation has provided financial assistance, especially in their generous contribution of $4 million. In addition, the Mott Foundation has recently pledged an additional

United Way

The Genesee County United Way has provided significant financial assistance in the way of purchasing and helping to distribute water filters since the public health emergency began on October 1st, 2015.

Genesee County Community Action Resources Department (GCCARD)

GCCARD is organized to fight poverty and has been a primary partner in the distribution of water filters. It has also regularly supported the city with the logistics and availability of water filters at City Hall.

Genesee County Health Department

Has provided educational information to Flint Water customers

Genesee County Board of Commissioners

The Board of Commissioners have pledged their support to help Flint seek solutions to this crisis. The Board has already assisted in making health and nutrition information available to the public.

Assistance from Wayne State University

Wayne State University's Center for Urban Studies will be providing technical GIS support to assist in the documentation of emergency relief efforts.

The US Environmental Protection Agency

Region 5 EPA has offered assistance with Public Information distribution during the emergency.

Outside Help is still needed…

The City of Flint is forever thankful to our community partners who have given so much to help so many people. However the magnitude of this emergency calls for more resources that are beyond the capacity of the combined local organizations and government agencies. Long term solutions will require a heavy investment in health care and capital improvement projects to upgrade the city's antiquated water distribution system.

- Help with Immediate Relief in terms of assuring allocative efficiency. Distribution should be equitable- assistance from other governments required to assure this.
- Reaching communities for the distribution of water filters, water, and educational materials.
- Help with Water Testing to increase participation and lead education.
- Increasing the rate of water testing
- Assistance is required to fund essential capital improvement projects to guarantee clean and safe water.

From: LyonN2@michigan.gov
Sent: Thursday, December 31, 2015 1:53 PM
To: Priest, Chris (DHHS);Lasher, Geralyn (DHHS);Minicuci, Angela (DHHS)
Subject: Fwd: Numbered Letter L 15-73
Attachments: L 15-73.pdf; ATT00001.htm

Very good Chris. Thank you. We should include on our update and put on the website.

Begin forwarded message:

From: MSAPolicy <MSAPolicy@michigan.gov>
Date: December 30, 2015 at 3:34:58 PM CST
To: "Embry, Sheila (DHHS)" <EmbryS@michigan.gov>, "Gigliotti, Lisa (LARA)" <GigliottiL@michigan.gov>, "Neff, David (DHHS)" <NeffD2@michigan.gov>, "Reid, Catherine (DHHS)" <ReidC2@michigan.gov>, "Stork-Phillips, Denise (DHHS)" <Stork-PhillipsD@michigan.gov>, "Edwards, Cynthia (DHHS)" <EdwardsC@michigan.gov>, "Eggleston, Debbie (DHHS)" <egglestond@michigan.gov>, "Elliott-Egan, Lorna (DHHS)" <Elliott-EganL@michigan.gov>, "Keisling, Brian (DHHS)" <KeislingB@michigan.gov>, "Klein, Susie (DHHS)" <KleinS4@michigan.gov>, "Lyon, Nick (DHHS)" <LyonN2@michigan.gov>, "Miles, Richard C. (DHHS)" <MilesR6@michigan.gov>, "Minicuci, Angela (DHHS)" <MinicuciA@michigan.gov>, "Moran, Susan (DHHS)" <MoranS@michigan.gov>, "Parker, Karen (DHHS)" <ParkerK7@michigan.gov>, "Prokop, Jackie (DHHS)" <prokopj@michigan.gov>, "Rutledge-Wolf, Samantha (DHHS)" <RutledgeWolfS@michigan.gov>, "Tribble, Mary Anne (DHHS)" <TribbleM1@michigan.gov>, "Barnett, Lonnie D. (DHHS)" <BarnettL@michigan.gov>, "Bendele, Steven (DHHS)" <BendeleS@michigan.gov>, "Dunbar, Paulette Dobynes (DHHS)" <dunbarp@michigan.gov>, "Embry, Sheila (DHHS)" <EmbryS@michigan.gov>, "Fink, Brenda (DHHS)" <FinkB@michigan.gov>, "Gensterblum, Sherri (DHHS)" <gensterblums@michigan.gov>, "Hinkle, Lori (DHHS)" <HinkleL@michigan.gov>, "Holcomb, Linda (DHHS)" <holcombl@michigan.gov>, "Hollis, Deborah J. (DHHS)" <HOLLISD@michigan.gov>, "Honsowitz, Keelie (DHHS)" <HonsowitzK@michigan.gov>, "Ireland, Steve (DHHS)" <irelands@michigan.gov>, "Kach, Laura (DHHS)" <kachl@michigan.gov>, "Keene, Robin (DHHS)" <KeeneR1@michigan.gov>, "Masterson, Cindy (DHHS)" <MastersonC@michigan.gov>, "Parker, Kaitlin (DHHS)" <ParkerK5@michigan.gov>, "Pastor, Kristie (DHHS)" <pastork@michigan.gov>, "Ridge, Dan (DHHS)" <RidgeD1@michigan.gov>, "Smith, Patricia A. (DHHS)" <smithp2@michigan.gov>, "Spitzley, John (DHHS)" <SpitzleyJ1@michigan.gov>, "Stiffler, Kathleen A. (DHHS)" <StifflerK@michigan.gov>, "Swanson, Robert (DHHS)" <swansonr@michigan.gov>, "Tate, Nancy (DHHS)" <taten@michigan.gov>, "Voss, Daniel (DHHS)" <VossD@michigan.gov>, "West, Mark (DHHS)" <WestM8@michigan.gov>, "Zavala, Rita (DHHS)" <ZavalaR@michigan.gov>, "Aastad, Mary (DHHS)" <AastadM@michigan.gov>, "Baker, Anne (DHHS)" <BakerA5@michigan.gov>, "Barrie, Brian (DHHS)" <BarrieB@michigan.gov>, "Barron, Brad (DHHS)" <BarronB@michigan.gov>, "Bauer, Kevin (DHHS)" <BauerK2@michigan.gov>, "Black, Erin (DHHS)" <blacke@michigan.gov>, "Callihan, Lola (DHHS)" <CallihanL@michigan.gov>, "Chamberlain, Teri (DHHS)" <ChamberlainT@michigan.gov>, "Chrysler, Amanda (DHHS)" <ChryslerA@michigan.gov>, "Cole, Brant (DHHS)" <ColeB3@michigan.gov>, "Coleman, Jacqueline (DHHS)" <colemanj@michigan.gov>, "Daeschlein, Michael (DHHS)" <daeschleinm@michigan.gov>, "Darling, Karen (DHHS)" <DarlingK@michigan.gov>, "Diebolt, Pamela J. (DHHS)" <DieboltP@michigan.gov>, "Dilernia, Lisa (DHHS)" <DilerniaL@michigan.gov>, "Dnyate, Rajita (DHHS)" <DnyateR@michigan.gov>, "Donaldson, John R. (DHHS)" <donaldsonj@michigan.gov>, "Dreasky, Logan (DHHS)" <dreaskyl@michigan.gov>, "DuPuis, Julie (DHHS)" <dupuisj@michigan.gov>, "Fuller, Diana (DHHS)" <FullerD10@michigan.gov>, "Green, Kellie (DHHS)" <GreenK6@michigan.gov>, "Grost, Lisa (DHHS)"

<grostl@michigan.gov>, "Gurzick, Nancy (DHHS)" <GurzickN@michigan.gov>, "Hadar, Sandy (DHHS)" <hadars@michigan.gov>, "Hambleton, Matthew (DHHS)" <HambletonM@michigan.gov>, "Heffron, Bridget (DHHS)" <HeffronB@michigan.gov>, "Hill, Heather (DHHS)" <HillH3@michigan.gov>, "Johnson, Penny A. (DHHS)" <JohnsonP29@michigan.gov>, "Keisling, Brian (DHHS)" <KeislingB@michigan.gov>, "Kennedy, Anne (DHHS)" <KennedyA@michigan.gov>, "Killingsworth, Marion (DHHS)" <KillingsworthM@michigan.gov>, "Kline, Crystal (DHHS)" <KlineC1@michigan.gov>, "LaPres, Marie (DHHS)" <LaPresM@michigan.gov>, "Linn, Cindy (DHHS)" <linnc@michigan.gov>, "Lipsey, Ashleigh (DHHS)" <LipseyA@michigan.gov>, "McCandless, Karla K. (DHHS)" <mccandlessk@michigan.gov>, "McCarty, Susan (DHHS)" <McCartyS@michigan.gov>, "Miller, David (DHHS)" <MillerD46@michigan.gov>, "Morrow, Denise (DHHS)" <MorrowD@michigan.gov>, "Norcross, Nick (DHHS)" <NorcrossN@michigan.gov>, "O'Keefe, Trish M. (DHHS)" <okeefet@michigan.gov>, "Pabst, Kathleen (DHHS)" <PabstK@michigan.gov>, "Perry, Roxanne R. (DHHS)" <PerryR1@michigan.gov>, "Pontius, Lori (DHHS)" <PontiusL@michigan.gov>, "Prichard, Steven (DHHS)" <PrichardS@michigan.gov>, "Prokop, Jackie (DHHS)" <prokopj@michigan.gov>, "Pung, Salli (DHHS)" <PungS@michigan.gov>, "Romelus, Tiffaney (DHHS)" <RomelusT@michigan.gov>, "Rutledge, Penny (DHHS)" <rutledgep1@michigan.gov>, "Severin, Christina (DHHS)" <SeverinC@michigan.gov>, "Sharp, Margo (DHHS)" <SharpM1@michigan.gov>, "Simon, Lori (DHHS)" <SimonL6@michigan.gov>, "Slawinski, Heather (DHHS)" <SlawinskiH@michigan.gov>, "Starkweather, Carmen (DHHS)" <StarkweatherC@michigan.gov>, "Stentoumis, Jennifer (DHHS)" <StentoumisJ@michigan.gov>, "Subhedar, Rita (DHHS)" <SubhedarR1@michigan.gov>, "Summers, Christine (DHHS)" <SummersC@michigan.gov>, "Taylor, Leslie (DHHS)" <TaylorL2@michigan.gov>, "Tisdale, Ryan (DHHS)" <TisdaleR1@michigan.gov>, "Titus, Laura (DHHS)" <TitusL@michigan.gov>, "Trumbell, Lisa (DHHS)" <TrumbellL@michigan.gov>, "Villasurda, Jon (DHHS)" <VillasurdaJ@michigan.gov>, "Warstler, Michele (DHHS)" <WarstlerM@michigan.gov>, "Wesorick, Matthew (DHHS)" <WesorickM@michigan.gov>, "Winstanley, Jill (DHHS)" <WinstanleyJ@michigan.gov>, "Rutledge-Wolf, Samantha (DHHS)" <RutledgeWolfS@michigan.gov>
Cc: ProviderSupport <ProviderSupport@michigan.gov>, ProviderOutreach <ProviderOutreach@michigan.gov>
Subject: Numbered Letter L 15-73

Attached for your information is letter L 15-73, dated December 30, 2015.

L 15-73 – Blood Lead Guidelines to Address the City of Flint Residents' Potential Exposure to Lead.

This letter was sent to Practitioners, Clinics, Laboratories and Maternal Infant Health Program (MIHP) Providers in the City of Flint.

Medicaid Letters can be accessed on the web at www.michigan.gov/medicaidproviders >> Communication and Training >> Click 2015 under Numbered Letters.

Michigan Department of Health and Human Services
PO Box 30479
Lansing MI 48909

December 30, 2015

<Provider Name>
<Provider Address1>
<Provider Address2>
<Provider City> <state> <zipcode5-zip4>

Dear Provider:

RE: Blood Lead Guidelines to Address the City of Flint Residents' Potential Exposure to Lead

Michigan Medicaid Early Periodic Screening, Diagnosis and Treatment (EPSDT) guidelines require children to be tested for blood lead poisoning at 12 and 24 months of age, and between 36 and 72 months of age if the child has not been previously tested as indicated by the Medicaid Provider Manual. The Manual is located at: www.michigan.gov/medicaidproviders >> Policy and Forms.

Due to the enhanced public health issue of an increased risk for lead exposure in the City of Flint, providers have been advised to follow enhanced guidelines for lead testing in children:

- Providers should screen ALL children (regardless of Medicaid/insurance status) between 0 and 6 years of age that may have been exposed to the City of Flint drinking water after April 2014. Note: This includes all children less than 1 year of age and children between 3 and 6 years of age.

- If the child has already been screened since April 2014 by a capillary test, providers should follow-up on any elevated levels greater than 5 mcg/dl to ensure confirmatory venous testing is conducted.

- Providers should utilize the standard Blood Lead Level (BLL) Quick Reference for Primary Care Providers located at: www.mi.gov/documents/deq/ProviderQuickReference_Sept2015_501831_7.pdf?20151204122739.

- All clients with blood lead levels greater than 5 mcg/dl should be referred for case management coordinated through the Genesee County Health Department.

- Providers should inquire about the use of a drinking water filter and/or bottled water by all clients residing within the Flint city limits.

- Providers should inquire about other potential sources of lead within the household per the current recommendations of the Childhood Lead Poisoning Prevention Program's Statewide Lead Testing/Lead Screening Plan. The Statewide Lead Testing/Lead Screening Plan is located at: www.michigan.gov/documents/mdch/testing-screening071009_287511_7.pdf.

Lead testing performed using these enhanced testing guidelines is covered as a Medicaid EPSDT service. Providers should contact the beneficiary's Medicaid health plan for additional assistance if needed. Any questions regarding this letter should be directed to Provider Inquiry, Department of Health and Human Services, P.O. Box 30731, Lansing, Michigan 48909-8231, or e-mail at ProviderSupport@michigan.gov. When you submit an e-mail, be sure to include your name, affiliation, and phone number so you may be contacted if necessary. Providers may phone toll-free 1-800-292-2550.

Sincerely,

Chris Priest, Director
Medical Services Administration

From: LyonN2@michigan.gov
Sent: Thursday, December 31, 2015 9:53 PM
To: Becker, Timothy (DHHS)
Subject: Fwd: Draft Documents Subject to Attorney Client Privilege (FIAAC)
Attachments: A Proposal to Create the Flint Water Inter [225139].docx; ATT00001.htm; IA Coord Com Org Chart [233264].pptx; ATT00002.htm; FY16 and FY17 Flint supplemental (233203).xls; ATT00003.htm

Begin forwarded message:

From: "Baird, Richard (GOV)" <bairdr@michigan.gov>
Date: December 31, 2015 at 2:37:23 PM CST
To: "Agen, Jarrod (GOV)" <AgenJ@michigan.gov>
Cc: "Baird, Richard (GOV)" <bairdr@michigan.gov>, "Kelenske, Chris (MSP)" <KelenskeC@michigan.gov>, "Holland, Meegan (GOV)" <HollandM2@michigan.gov>, "Creagh, Keith (DNR)" <creaghk@michigan.gov>, "Lyon, Nick (DHHS)" <LyonN2@michigan.gov>, "Redford, James (GOV)" <RedfordJ@michigan.gov>, "Murray, David (GOV)" <MurrayD1@michigan.gov>, "Scott, Allison (GOV)" <scotta12@michigan.gov>, "Clement, Elizabeth (GOV)" <clemente@michigan.gov>, "Hollins, Harvey (GOV)" <hollinsh@michigan.gov>
Subject: Draft Documents Subject to Attorney Client Privilege (FIAAC)

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In collaboration with the Flint After-Action Task Force, MSP Captain Chris Kelenske, DHHS Chief Deputy Tim Becker and DHHS Director Nick Lyon, Harvey Hollins and Rich Baird are recommending the immediate creation of the above referenced entity, with its sustained role and responsibility enabled under the Governor's Executive Order.

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It appears that a request for a Governor's declaration may be coming from Genesee County as quickly as January 4, 2016. The state's Emergency Coordinator (Capt. Kelenske) will evaluate the request and provide a recommendation whether to issue a declaration, following established protocol and due diligence. But immediately, we will:

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1. Determine and convey acceptable standards for potable water.
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    - Implement the plan.
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- Develop priorities, costs, and potential funding sources for infrastructure upgrades as part of a long term recovery plan.
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- Implement the plan.

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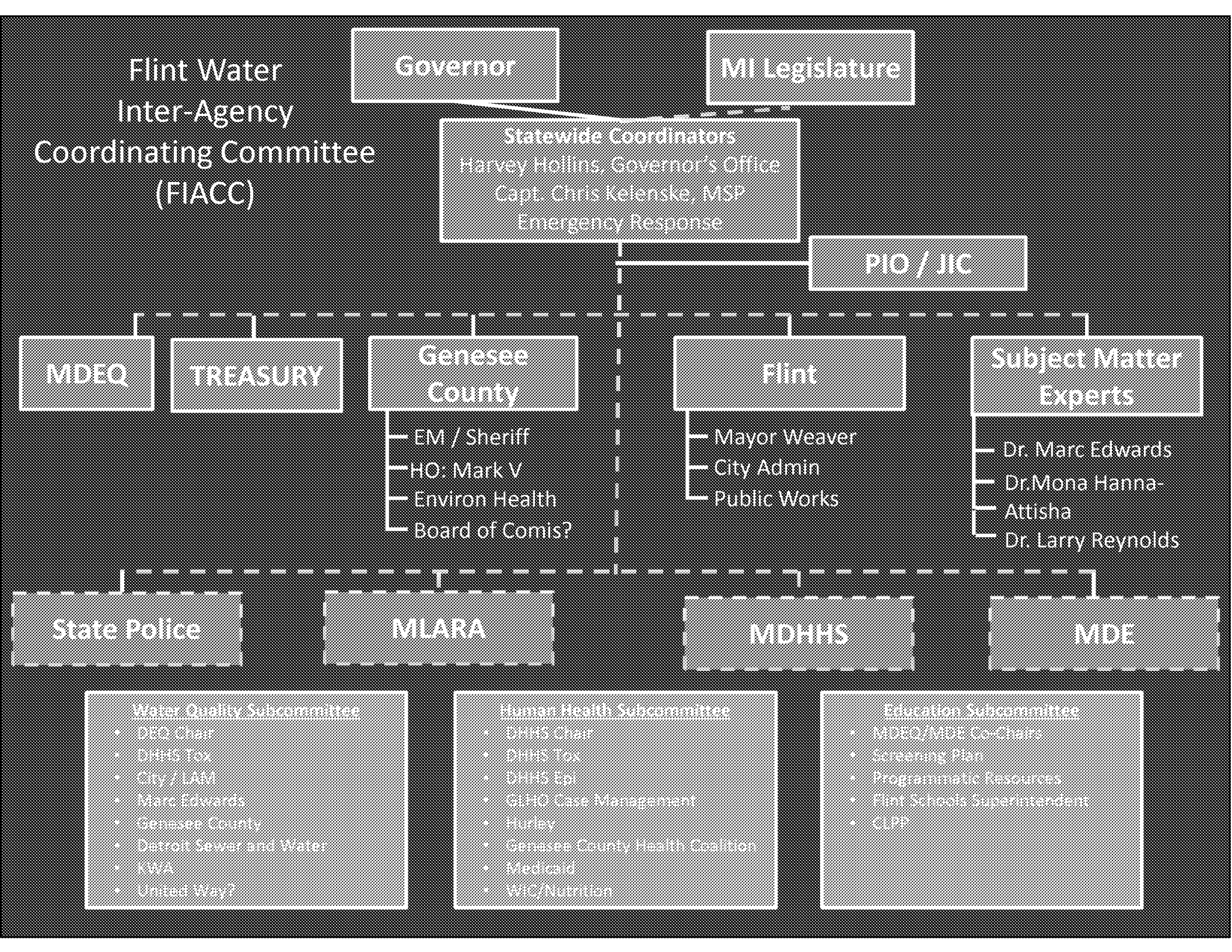
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Harvey Hollins, Governor's Office
Capt. Chris Kelenske, MSP Emergency Response
PIO / JIC
MDEQ
TREASURY
Genesee County
EM / Sheriff
HO: Mark V
Environ Health
Board of Comis?
Flint
Mayor Weaver
City Admin
Public Works
Subject Matter Experts
Dr. Marc Edwards
Dr.Mona Hanna-Attisha
Dr. Larry Reynolds
State Police
MLARA
MDHHS
MDE
Water Quality Subcommittee
DEQ Chair
DHHS Tox
City / LAN
Marc Edwards
Genesee County
Detroit Sewer and Water
KWA
United Way?
Human Health Subcommittee
DHHS Chair
DHHS Tox
DHHS Epi
GCHC Case Management
Hurley
Genesee County Health Coalition
Medicaid
WIC/Nutrition
Education Subcommittee
MDEQ/MDE Co-Chairs
Screening Plan
Programmatic Resources
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CUPP

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13	5	Increase community education	2	$ 120,000
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9	Support two epidemiologists to analyze blood lead levels based on zip codes in the City of Flint. Work conducted by the epidemiologists will be new functions not currently conducted. Positions will be supported through contracts with MPHI.
10	Costs reflect contractual and service costs to abate lead from homes in the City of Flint. Contractual funds will support 3.5 contractual staff - 2.5 field consultants to conduct abatement and one to assist with client application and form processing (total $187,500). Funds for the service include the cost to abate 100 homes @ $15,000 each ($1.5 million) which will include internal housing plumbing components where necessary. Current efforts financed in the previous FY16 supplemental did not support lead abatement activities.
11	Additional contractual efforts to support lead investigations in 100 additional homes in the City of Flint. Service will be provided by ETC Consulting.
12	Funds support the increased testing and follow up necessary with the new homes being investigated. Nurse case managers provide follow up with families, provide nutrition counseling, and coordination with Environmental Blood Level (EBL) investigations.
13	Contractual FTEs will work with the Genesee County Health Department (GCHD) to build educational efforts in that community to develop a more detailed education plan.
14	One contractual peer educator FTE at Genessee County Health Department to help increase WIC enrollment and retention to assist with lead testing, nutrition education, and overall health of pregnant moms and infants.
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19	Continue the funds from the original FY16 supplemental for existing nurse case management of EBL home investigations.
20	Continue the funds from the FY16 request above and support two epidemiologists to analyze blood lead levels and will address broader areas beyond the City of Flint. Work conducted by the epidemiologists will be new functions not currently conducted.
21	Continue the funds from the FY16 request above and finance contractual and service costs to abate lead from homes in the City of Flint. Contractual funds will support 4 contractual staff - 3 field consultants to conduct abatement and one to assist with client application and form processing (total $311,000). Funds for the service include the cost to abate an increase to 130 homes @ $15,000 each ($1.95 million) which will include internal housing plumbing components where necessary. Current efforts financed in the previous FY16 supplemental did not support lead abatement activities.

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9	Could be work beyond Flint if these positions conduct other lead zip code analysis in other cities.
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22	10	Additional lead investigations		$ 130,000
23	11	Increase nurse case management	1	$ 100,000
24	12	Increase community education	2	$ 180,000
25	13	WIC outreach and transportation	1	$ 90,000
26				
27		**Total FY17 Funding Request**	**18**	**$ 3,831,000**
28				
29		**Total FY16 and FY17 Funding Request**	**27.5**	**$ 5,988,500**
30				
31		Notes:		
32		(1) FY16 supplemental request reflects additional needs above the original supplemental level passed in November 2015.		
33		(2) FY16 levels support work to take place in the City of Flint only.		
34		(3) FY17 amounts are full year funding levels. Should the FY16 supplemental pass prior to the release of the FY17 Executive Recommendation, FY17 levels can be annualized to reflect the revised FY16 base.		

	E
22	Funds support additional lead environmental investigations. This is lead investigations in homes of children with high blood lead levels to determine all of the sources of lead exposure and plan for mitigation of lead. This does not include funding for lead abatement. This is done via contract with ETC Consulting. (No FTEs)
23	Continue the funds from the FY16 request above to support the increased testing and follow up necessary with the new homes being investigated. Nurse case managers provide follow up with families, nutrition counseling, and coordination with Environmental Blood Level (EBL) investigations.
24	Continue the contractual health educators at GCHD to work collaboratively with community agencies on awareness of lead hazards, increase lead testing, and nutrition education.
25	One contractual peer educator FTE at GCHD to help increase WIC enrollment and retention to assist with lead testing, nutrition education, and improve the overall health of pregnant moms and infants. Bus tokens (10,000 at $1 = $10,000), bus signs and other promotion materials for WIC at $5,000.
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From: LyonN2@michigan.gov
Sent: Monday, January 04, 2016 11:07 AM
To: Roberts, John (DTMB)
Subject: Fwd: Draft Documents Subject to Attorney Client Privilege (FIAAC)
Attachments: A Proposal to Create the Flint Water Inter [225139].docx; ATT00001.htm; IA Coord Com Org Chart [233264].pptx; ATT00002.htm; FY16 and FY17 Flint supplemental (233203).xls; ATT00003.htm

Begin forwarded message:

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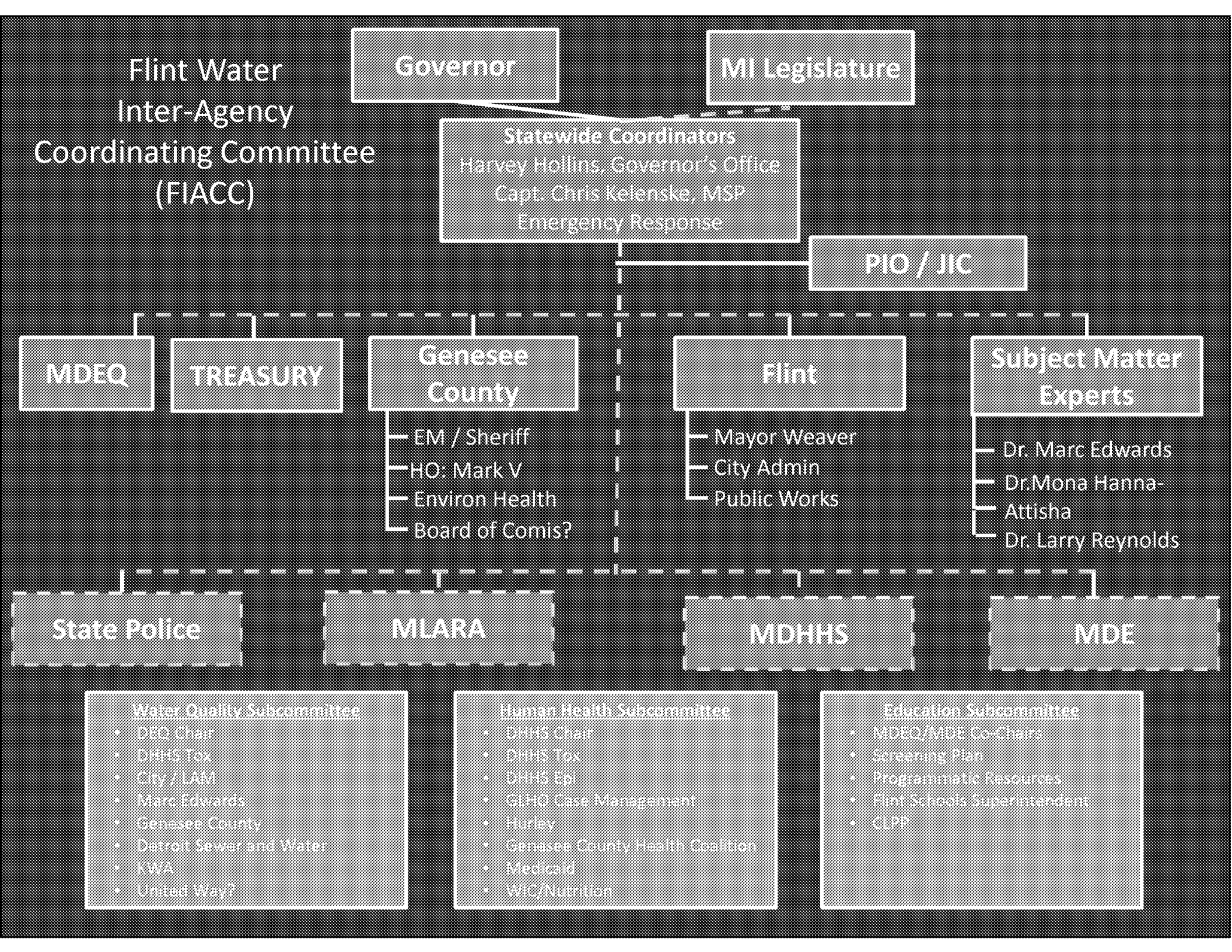
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19	Continue the funds from the original FY16 supplemental for existing nurse case management of EBL home investigations.
20	Continue the funds from the FY16 request above and support two epidemiologists to analyze blood lead levels and will address broader areas beyond the City of Flint. Work conducted by the epidemiologists will be new functions not currently conducted.
21	Continue the funds from the FY16 request above and finance contractual and service costs to abate lead from homes in the City of Flint. Contractual funds will support 4 contractual staff - 3 field consultants to conduct abatement and one to assist with client application and form processing (total $311,000). Funds for the service include the cost to abate an increase to 130 homes @ $15,000 each ($1.95 million) which will include internal housing plumbing components where necessary. Current efforts financed in the previous FY16 supplemental did not support lead abatement activities.

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9	Could be work beyond Flint if these positions conduct other lead zip code analysis in other cities.
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	A	B	C	D
22	10	Additional lead investigations		$ 130,000
23	11	Increase nurse case management	1	$ 100,000
24	12	Increase community education	2	$ 180,000
25	13	WIC outreach and transportation	1	$ 90,000
26				
27		**Total FY17 Funding Request**	**18**	**$ 3,831,000**
28				
29		**Total FY16 and FY17 Funding Request**	**27.5**	**$ 5,988,500**
30				
31		Notes:		
32		(1) FY16 supplemental request reflects additional needs above the original supplemental level passed in November 2015.		
33		(2) FY16 levels support work to take place in the City of Flint only.		
34		(3) FY17 amounts are full year funding levels. Should the FY16 supplemental pass prior to the release of the FY17 Executive Recommendation, FY17 levels can be annualized to reflect the revised FY16 base.		

	E
22	Funds support additional lead environmental investigations. This is lead investigations in homes of children with high blood lead levels to determine all of the sources of lead exposure and plan for mitigation of lead. This does not include funding for lead abatement. This is done via contract with ETC Consulting. (No FTEs)
23	Continue the funds from the FY16 request above to support the increased testing and follow up necessary with the new homes being investigated. Nurse case managers provide follow up with families, nutrition counseling, and coordination with Environmental Blood Level (EBL) investigations.
24	Continue the contractual health educators at GCHD to work collaboratively with community agencies on awareness of lead hazards, increase lead testing, and nutrition education.
25	One contractual peer educator FTE at GCHD to help increase WIC enrollment and retention to assist with lead testing, nutrition education, and improve the overall health of pregnant moms and infants. Bus tokens (10,000 at $1 = $10,000), bus signs and other promotion materials for WIC at $5,000.
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From: Lyon, Nick (DHHS)
Sent: Tuesday, November 03, 2015 9:01 PM
To: Moran, Susan (DHHS)
Subject: Re: FNS Correspondence to State: MI WIC - RTF Formula - Flint

Ok. Thank you!

On Nov 3, 2015, at 6:22 PM, Moran, Susan (DHHS) <MoranS@michigan.gov> wrote:

> Nick- we will provide you with a summary of actions to date, and draft a letter for your signature.
>
> ---
>
> **From:** Lyon, Nick (DHHS)
> **Sent:** Tuesday, November 03, 2015 6:18 PM
> **To:** Becker, Timothy (DHHS); Grijalva, Nancy (DHHS); Hertel, Elizabeth (DHHS); Lasher, Geralyn (DHHS); Minicuci, Angela (DHHS); Eden Wells; Moran, Susan (DHHS); Bien, Stan (DHHS); Robinson, Mikelle (DHHS)
> **Subject:** Fwd: FNS Correspondence to State: MI WIC - RTF Formula - Flint
>
> I need to what we are going to do and respond with a formal letter under my signature ASAP, even tomorrow if we can craft a reasonable response that includes our actions.
>
> Begin forwarded message:
>
> > **From:** "English, Tim - FNS" <TIM.ENGLISH@fns.usda.gov>
> > **Date:** November 3, 2015 at 6:09:27 PM EST
> > **To:** "Nick Lyon (LyonN2@michigan.gov)" <LyonN2@michigan.gov>
> > **Cc:** "Bien, Stan (DCH) (biens@michigan.gov)" <biens@michigan.gov>, "Mikkelson, Julie - FNS" <JULIE.MIKKELSON@fns.usda.gov>, "Hillman, Bruce - FNS" <bruce.hillman@fns.usda.gov>, "Whitford, Debbie - FNS" <Debbie.whitford@fns.usda.gov>, "Bartholomew, Anne - FNS" <Anne.Bartholomew@fns.usda.gov>, "Solis, Patricia - FNS" <PATRICIA.SOLIS@fns.usda.gov>
> > **Subject: FNS Correspondence to State: MI WIC - RTF Formula - Flint**
> >
> > Nick,
> >
> > Please find the attached correspondence signed November 3, 2015 requesting your assistance in broadly communicating the availability of Ready to Feed formula and other supportive services to WIC participants and families in Flint in response to the high levels of lead in the water supply.
> >
> > Please let me know if you have any questions.

Tim English
Regional Administrator
Midwest Region
USDA-FNS

From: Lyon, Nick (DHHS)
Sent: Tuesday, November 17, 2015 11:38 PM
To: Becker, Timothy (DHHS)
Subject: Fwd: Privileged Attorney-Client Communication - Outline of Flint Drinking Water Issues
Attachments: ATT00001.htm; image002.png; ATT00002.htm; DEQ's Outline of Flint Drinking Water Issues for Flint Water Task Force - Attorney Client Privilege Work Product -11-16-2015.pdf; ATT00003.htm

Begin forwarded message:

From: "Anderson, Madhu (DEQ)" <AndersonM30@michigan.gov>
Date: November 17, 2015 at 11:19:30 AM EST
To: "Ken Sikkema (ksikkema@pscinc.com)" <ksikkema@pscinc.com>
Cc: "Agen, Jarrod (GOV)" <AgenJ@michigan.gov>, "Baird, Richard (GOV)" <bairdr@michigan.gov>, "Muchmore, Dennis (GOV)" <muchmored@michigan.gov>, "webert7@michigan.gov" <webert7@michigan.gov>, "Hollins, Harvey (GOV)" <hollinsh@michigan.gov>, "Murray, David (GOV)" <MurrayD1@michigan.gov>, "Wurfel, Sara (GOV)" <Wurfels@michigan.gov>, "Lyon, Nick (DHHS)" <LyonN2@michigan.gov>
Subject: Privileged Attorney-Client Communication - Outline of Flint Drinking Water Issues

Ken – Attached is the outline of the Flint Drinking Water issue (in a question and answer format) we have prepared for you to share with your colleagues on the Governor's Flint Water Task Force. Please let me know if we can provide any other material in preparation for the meeting tomorrow.

City of Flint Drinking Water
Outline prepared by the
Michigan Department of Environmental Quality for the
Flint Water Task Force

I. INTRODUCTION

This document is intended to provide an overview of Michigan's implementation of the Safe Drinking Water Act, 1976 PA 399, as amended (Act 399), with respect to events in the city of Flint (City), Michigan.

II. BACKGROUND

1. How has Flint historically obtained its drinking water?

The water system in the City was organized and built under private ownership in 1883 as the Flint Water Works Company to pump raw water from the Flint River to their consumers. In 1903, the system was converted to a municipally-owned corporation which supplied drinking water to the City. In 1967, the City became a customer of the Detroit Water and Sewerage Department (DWSD) system.

After the switch to DWSD, the City operated its water treatment plant as a standby plant for purposes of reliability in the event of an emergency, such as an interruption in service of the single pipeline from DWSD. In the last ten years, the water treatment plant was used as an emergency backup during two weeks in 2009: June 18 through June 20 and September 10 through September 13.

As a backup emergency water treatment plant, the City was required to operate the water treatment plant quarterly to demonstrate the capability to produce drinking water in accordance with Act 399 and to keep mechanical equipment (such as valves, rubber seals, etc.) in good working order. Each quarter, the water treatment plant was test run and samples were taken of both raw water and finished water (post-filters). Since the water treatment plant was upgraded in the early 2000s, monitoring showed that the water treatment plant was performing as designed.

Contractual obligations with DWSD did not allow treated water to be put into the City's distribution system during these test runs. Treated water was discharged to the Flint River in accordance with a National Pollutant Discharge Elimination System (NPDES) Permit. The test runs were for demonstration purposes, to keep the water treatment plant operational, and staff familiar with operation in the event it was needed in an emergency.

2. What State and Federal laws or rules exist to ensure safe drinking water is provided to City residents?

The federal Safe Drinking Water Act (federal SDWA) is the primary law that ensures the quality of Americans' drinking water. Under the federal SDWA, the United States Environmental Protection Agency (USEPA) sets standards for drinking water quality and oversees the states, localities, and water suppliers who implement those standards.

The federal SDWA was originally passed by Congress in 1974 to protect public health by regulating the nation's public drinking water supply. The law was amended in 1986 and 1996 and requires many actions to protect drinking water and its sources: rivers, lakes, reservoirs, springs, and ground water wells. (The federal SDWA does not regulate private wells which serve fewer than 25 individuals.)

Originally, the federal SDWA focused primarily on treatment as the means of providing safe drinking water at the tap. The 1996 amendments greatly enhanced the existing law by recognizing source water protection, operator training, funding for water system improvements, and public information as important components of safe drinking water. This approach ensures the quality of drinking water by protecting it from source to tap.

The most direct oversight of water systems is conducted by state drinking water programs. States can apply to the USEPA for "primacy," - the authority to implement the federal SDWA within their jurisdictions - if they will adopt standards at least as stringent as the USEPA's and enforce those standards. Michigan adopted the Safe Drinking Water Act in 1976 through Act 399 and has maintained primacy for the program since that time.

3. What is the USEPA's role as a regulatory agency in implementing the SDWA?

Federal and state governments share responsibility for administering drinking water programs. Under the federal SDWA, the USEPA is given the responsibility for developing national standards and regulations that apply to the nation's public drinking water systems and enforcing those standards, by working with states.

Michigan's drinking water program is evaluated annually by the USEPA for compliance with the federal SDWA. Based upon these evaluations, the USEPA continues to find Michigan's drinking water program to be compliant with the federal SDWA.

4. What is the Michigan Department of Environmental Quality's (DEQ) role as a regulatory agency in implementing the SDWA?

The federal SDWA permits states to accept oversight of the drinking water program under an agreement with the USEPA giving states primary enforcement responsibilities (or primacy). In addition to this delegation of federal authority to the states, states also have the power to create additional regulations and programs governing drinking water suppliers through their own legislative and regulatory processes. Michigan has had regulatory authority of public water supplies since 1913 (Waterworks and Sewerage Systems, 1913 PA 98).

The DEQ has been granted primary enforcement authority in Michigan for the federal SDWA under the authority of Act 399. As such, the DEQ, Office of Drinking Water and Municipal Assistance, has regulatory oversight for all public water supplies, including approximately 1,400 community water supplies and 10,000 noncommunity water supplies. A community water supply provides year-round service to 15 or more living units (homes, apartments, dorm rooms, etc.) or 25 or more residents. A noncommunity water supply has 15 or more service connections or serves 25 or more individuals on an average daily basis for not less than 60 days per year.

The DEQ engages in a variety of activities to help water systems remain in, or return to, compliance. These activities include: conducting surveillance visits (inspections) at water systems and reviewing facilities, equipment, and operations; requiring the submission of plans and specifications for waterworks system improvements and issuing construction permits; providing for the training, examination, certification and regulation of persons operating water supplies; helping systems incorporate preventive measures; and since 1996, providing financial assistance for system improvements.

5. What is the City's role in implementing the federal SDWA and Act 399?

State and federal programs develop regulations and perform oversight and compliance activities, but do not treat or deliver water to customers. At the local level, public and private water utilities collect, treat, and deliver drinking water to consumers in compliance with state and federal regulations.

The federal SDWA and Act 399 set up multiple barriers against contamination. These barriers include: source water protection, multiple treatment components, distribution system integrity, proper operations oversight, and public information. As the owner of a public water system, the City is responsible for knowing and following all requirements under Act 399, such as ensuring proper design, construction, operations and maintenance, so that contaminants in tap water do not exceed the standards established by law. The City treats the water, and must test its water routinely for specified contaminants and report the results to the DEQ. If a water system is not meeting these standards, it is the water supplier's responsibility to notify its customers.

The federal SDWA and Act 399 recognize that customers have the right to know what is in their drinking water and where it comes from. The City, like all water suppliers, must notify consumers when there is a problem with water quality.

The City submits samples of its water for laboratory testing (monitoring) to verify the water it provides to residents meets all federal and state standards. How often and where samples are taken varies from system to system and from contaminant to contaminant. The DEQ provides an annual monitoring schedule to the City setting forth these requirements.

In addition, the City is required to employ properly certified water operators that are trained and experienced to operate the treatment and distribution systems associated with the City's water system.

6. What approvals were needed from the DEQ in order for the City to begin using its water treatment plant full time?

The City had long ago been issued construction permits for raw water pumps to withdraw water from the Flint River and the City was grandfathered under the water withdrawal program (Part 327, Great Lakes Preservation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended), as were all existing community public water systems at that time. There were no additional DEQ

permissions or authorizations required under Act 399 because the City already had approval to use the water treatment plant.

Under Act 399, there are no licenses or permits required to operate public water systems. The City did apply for and obtained two construction permits prior to the water treatment plant changing from an emergency backup plant to full-time operation. These permits were for new chemical feed equipment, changes to the electrical service, etc.

III. THE FLINT RIVER – IS IT A SAFE SOURCE OF DRINKING WATER?

Seventy-five percent of Michigan's population served by a public water supply receive their drinking water from surface water sources, the majority of which is withdrawn from the Great Lakes. However, several public water supplies in Michigan utilize water from inland rivers. All surface water sources require significant treatment in order to be safe for consumption.

While all surface water sources must receive a high level of treatment, inland river sources present a greater challenge than water withdrawn from one of the Great Lakes because of rapidly changing water quality conditions. Under most circumstances, rivers are prone to greater fluctuations in temperature, have higher amounts of organic material, greater turbidity (suspended solids), and are more vulnerable to microbiological and viral contamination than Lakes Huron, Erie, Michigan or Superior. While the water chemistry in the Flint River differs from that in Lake Huron, it can still be treated in accordance with the federal SDWA and Act 399. The waterworks industry has the technology to treat wide ranging source waters to provide potable and palatable drinking water, including direct reuse of treated wastewater. Regardless of source water quality, all public water systems must comply with the same drinking water standards in the finished water.

It is not the source water that reacts with the homeowners plumbing in the distribution system, but rather the finished water quality that is important. Treated water leaving the City's water treatment plant does not contain lead. In addition, the treatment process employed by the City includes lime softening to reduce the hardness in the river water. The City includes lime softening and pH adjustment primarily to improve aesthetic water quality associated with hardness. Lime softening is not a process that water supply professionals would expect to increase corrosivity of water. The City, however, does practice recarbonation to readjust pH at the end of the softening process.

pH levels of finished water leaving the City's water treatment plant averaged 7.7. Expanded water monitoring conducted quarterly at 25 sample sites located throughout the distribution system showed the following:

July – September 2014	average pH = 7.71	range: 7.56 – 7.86
October – December 2014	average pH = 7.88	range: 7.62 – 8.10
January – March 2015	average pH = 7.81	range: 7.60 – 7.99
April – June 2015	average pH = 7.63	range: 7.48 – 7.80

The data below was obtained at ten of the sampling locations throughout the City's distribution system, while they were still purchasing water from DWSD before the City switched to the Flint River as a source:

January – March 2014 (DWSD)	average pH = 7.47	range: 7.40 – 7.54
April 2014 (DWSD)	average pH = 7.49	range: 7.42 – 7.59

Note that the pH of the treated water produced while the City was using the Flint River did not differ significantly from pH values seen in the distribution system during the time the City purchased water from DWSD. Thus, pH monitoring provided no indication of a change in water corrosivity.

IV. *E. COLI* AND TOTAL COLIFORM BACTERIA VIOLATIONS

1. What caused the *E. coli* and total coliform bacteria violations experienced by the City in August and September 2014?

A number of factors, primarily related to distribution system operation and maintenance, likely contributed to the Boil Water Advisories in the City during August and September 2014 triggered by exceedances of bacteria standards in limited areas of the distribution system. In addition, the coliform detections were confined to less than 20 percent of the water system. Had the detections been the result of a failure in treatment, detections would have been expected throughout the City rather than in such a limited geographic area.

Instead, the violations seem to have been caused by other factors such as aging infrastructure. The City's water distribution system has suffered from a lack of infrastructure investment and asset management. Most of the City's over 550 miles of water mains are now over 75 years old, and constructed of unlined cast iron piping. This cast iron pipe is subject to tuberculation, which thins and weakens the pipe walls in some areas and causes a buildup of sediment and debris on the pipe walls in other areas. Tuberculation can lead to water quality issues as well as reduced flows and pressures. Tuberculation also encourages the development of biofilms. Biofilm growth may occur more frequently in areas where little or no disinfectant is maintained.

The City has also experienced decades of a declining customer base and water use, with vacant homes, commercial businesses, and industrial property. Declining water use leads to excess residence time (water age) within the City's distribution pipes and water storage facilities, accelerating tuberculation, biofilm growth, and reductions of disinfectant concentration in the distribution system. While the City has recently seen an infusion of funding for blight removal, contractors using fire hydrants to complete this work have been known to cause hydraulic disturbances that dislodge and suspend settled debris, which may contribute to the bacterial contamination. These hydraulic disturbances were also believed to be a source of the aesthetic water quality complaints both the City and the DEQ were receiving.

The winter of 2013-2014 was also one of the coldest experienced by the water system. The City, which historically has unaccounted water losses of over 30 percent, saw even greater losses since February 2014 due to an increase in cold weather-related water main breaks and leaks (City personnel reported 400 water

main breaks in calendar year 2014, with greater than 50 percent in the winter quarter). The City has also been lacking a formal maintenance program for its more than 7,250 valves, which are critical in limiting the areas impacted during water main repairs. As an example, two valves on the transmission line used to supply the area of the 2014 Boil Water Advisories were found to be closed during the City's investigation of possible sources, causing much longer residence times, reduced disinfectant concentrations, and reduced pressures – all potential avenues for contamination to enter a distribution system.

The Boil Water Advisories also occurred during the warmest and relatively wet periods of August and September 2014. Warm weather conditions are not only more conducive to bacterial growth but also degrade disinfectant concentrations more quickly. As already explained, longer residence times, biofilms, and tuberculation contribute to lowered disinfectant concentrations. Warm, wet weather conditions also allow water contaminated with bacteria to accumulate or pond around piping that leaks and breaks.

During the summer of 2014, the City was actively repairing the distribution system (City personnel reported 29 water main breaks in June through August 2014). After the switch to the Flint River, it was discovered that there were many broken or closed valves in the distribution system (City personnel reported 120 broken valves and 239 valves in an improper position). As the City began correcting these problems, they did detect the presence of coliform organisms in the distribution system in testing conducted as a result of the repairs. This sporadic detection is not an unusual occurrence. Many communities have experienced similar issues when significant repairs are made in the system and/or they suffer water main breaks and localized pressure losses.

2. How were the violations detected? What was the DEQ's response?

Federal SDWA regulations regarding monitoring and standards for bacteria in water distribution systems are incorporated into Act 399. There are a variety of bacteria, parasites, and viruses which can potentially cause health problems if humans ingest them in drinking water. Testing water for each of these potential pathogens would be difficult and expensive. Instead, community water systems are required to test monthly for total coliform and *E. coli*. Total coliform bacteria, while not pathogenic, often originate from the same sources as many pathogens. Therefore, the presence of total coliform in drinking water indicates there may be a pathway for pathogens or other contaminants to enter the system. The absence of total coliforms in the distribution system indicates a minimal likelihood that pathogens are present. *E. coli* is itself a pathogen and its detection is considered direct evidence of a health risk.

The Boil Water Advisories which occurred in the City were associated with bacteria monitoring detections and violations of bacteria standards. These advisories were issued by the City after consultation with the DEQ.

Upon receiving information indicating total coliform and *E. coli* bacteria had been detected, the DEQ advised the City to issue a Boil Water Advisory from August 15 through 20, 2014, for the affected portion of the City. Another Boil Water Advisory was issued from September 5 through 9, 2014, due to localized detections of total

coliform bacteria in the same and adjacent portions of the City. The advisories covered an area of less than 20 percent of the water department's service area.

Once a Boil Water Advisory has been issued, time is needed to investigate potential causes and implement corrective measures. The larger the water system, the more time this may take. Once corrective measures have been taken, samples must be collected and analyzed to confirm that bacteria are no longer present. Under approved analytical methods used by the City, samples must be incubated for 24 hours before results can be obtained. In situations where the bacterial contamination has been confirmed, two consecutive rounds of safe samples collected at least 24 hours apart are normally obtained before canceling a Boil Water Advisory. Adding each of these steps together, a normal response period to rescind a Boil Water Advisory under these circumstances would be expected to take 3 to 4 days.

V. TOTAL TRIHALOMETHANES (TTHM) VIOLATIONS

1. What caused the TTHM violations experienced by the City beginning in late summer 2014?

Disinfectants are an essential element of drinking water treatment because of the barrier they provide against waterborne disease-causing microorganisms. However, disinfection byproducts form when disinfectants used to treat drinking water react with naturally occurring organic materials in the water (e.g., decomposing plant material). The formation of disinfection byproducts continues to occur as water travels throughout water distribution systems.

A major challenge for water suppliers is how to provide protection from pathogens while simultaneously minimizing health risks to the population from disinfection byproducts. Total Trihalomethanes (TTHM – chloroform, bromoform, bromodichloromethane, and dibromochloromethane) and halogenated acetic acids (HAA5 – monochloro-, dichloro-, trichloro-, monobromo-, dibromo-) are widely occurring classes of disinfection byproducts. The amount of TTHM and HAA5 in drinking water can change depending on the season, water temperature, amount of chlorine added, the amount of plant material in the water, and a variety of other factors. All community water systems that chemically disinfect or purchase water that has been chemically disinfected are required to monitor for disinfection byproducts.

The Flint River has higher levels of organic material than water in the Great Lakes and as a result, the water produced by the City developed higher disinfection byproducts than the water purchased from DWSD. Because the water treatment plant was previously operating intermittently, it was not possible to predict disinfection byproduct levels at distribution system compliance points until the City began relying on its water treatment plant continuously.

As mentioned previously, the City became aware that there were numerous broken valves and closed valves that should have been open in the distribution system. At that time, the City also began a mapping effort to identify "water age" in the distribution system. The longer the residence time or "water age" the greater the opportunity for the formation of disinfection byproducts.

2. How were the violations detected? What was the DEQ's response?

Disinfection byproducts are monitored at eight sites throughout the distribution system. A locational running annual average is calculated for each individual site. Because TTHM and HAA5 maximum contaminant levels are calculated based on a running annual average at specific distribution system locations, the actual violation of the standard did not occur until the fall of 2014. However, because it was apparent in the summer of 2014 that the standard would eventually be exceeded; the DEQ asked the City to proactively implement measures to address the problem before the violation required them to do so.

As a result of maintenance efforts undertaken by the City to repair valves and correct improperly closed valves, the City was able to improve water flow in the distribution system and thereby reduce residence time or "water age" in the system. Operational changes made to reduce the amount of storage in the system also helped reduce residence time which contributed to a reduction in disinfection byproduct formation.

In addition to operational changes to minimize residence time in the distribution system, the City added granular activated carbon to its filters in July 2015. Levels of TTHMs and HAA5s were reduced and the City returned to compliance on September 1, 2015.

VI. THE TASTE, ODOR, AND COLOR COMPLAINTS RECEIVED BY FLINT

1. What caused the taste, odor, and color complaints received by the City from residents?

Taste, odor, and color issues are very personalized. While water leaving the water treatment plant did not have any unusual taste, odor or color; during the summer after the switch to the Flint River, customer complaints increased. Construction in the distribution system, hydrant flushing, and changes in flow characteristics are all known causes of disturbances within the distribution system that can cause an increase in taste, odor, and color complaints. Aesthetics, such as taste, odor, and color, while a concern, by themselves are not a threat to public health.

2. What was the DEQ's response?

The DEQ consulted with the City regarding these complaints. The City indicated that they were offering to investigate such complaints for anyone that had issues; but City personnel informed the DEQ that they were not able to recreate these situations in the field. In addition, as a result of the repair work that was underway and the increased flushing to reduce water age in the system to help control TTHMs, it was anticipated that there would be short-term disturbances in the system that would cause color and odor complaints. All water supplies are advised to provide notice to residents prior to undertaking a flushing program because flushing (even routine flushing) often causes temporary problems as described. Based on information from City personnel, it appeared that the complaints were related to such operational activities occurring in the distribution system.

VII. LEAD ISSUES IN THE FLINT DRINKING WATER

1. What causes lead in drinking water?

Lead is rarely found in source water. Lead enters tap water through corrosion of plumbing materials. Homes built before 1986 are more likely to have lead fixtures and solder. Older homes built prior to World War II are more likely to contain lead pipes. The most common problem with newer construction is with brass or chrome-plated brass faucets and fixtures which can leach significant amounts of lead into the water, especially hot water. The amount of lead in tap water also depends on the types and amounts of minerals in the water, how long the water stays in the pipes, the amount of wear in the pipes, the pH of the water, and its temperature.

2. What is the Lead and Copper Rule?

On June 7, 1991, the USEPA published a regulation to control lead and copper in drinking water. This regulation is known as the Lead and Copper Rule (also referred to as the LCR). The treatment technique for the rule requires systems to monitor drinking water at customer taps. If the 90th percentile for lead exceeds an action level of 15 parts per billion (ppb) or the 90th percentile for copper exceeds an action level of 1.3 parts per million (ppm), the system must undertake a number of additional actions to control corrosion. If the action level for lead is exceeded, the water supply must also inform the public about steps they should take to protect their health and the water supply may have to replace lead service lines under their control.

3. What is the lead action level?

For most contaminants, the USEPA sets an enforceable regulation called a maximum contaminant level based on the maximum contaminant level goal. Maximum contaminant levels are set as close to the maximum contaminant level goals as possible, considering cost, benefits, and the ability of public water systems to detect and remove contaminants at the water treatment plant using suitable treatment technologies. Because lead contamination of drinking water often results from corrosion of the plumbing materials belonging to water system customers, the USEPA established a treatment technique rather than a maximum contaminant level for lead. A treatment technique is an enforceable procedure or level of technological performance which water systems must follow to control a contaminant. Although the maximum contaminant level goal for lead is zero, based upon the above factors, the USEPA has established the action level for lead at 15 ppb.

The treatment technique regulation for lead requires water systems that produce drinking water to control the corrosivity of the water. The regulation also requires systems to collect customer tap samples from sites served by the system that are more likely to have plumbing materials containing lead. If the 90th percentile action level for lead is exceeded, then water systems are required to take additional actions including:

- Optimizing corrosion control treatment (for water systems serving greater than 50,000 people that have not fully optimized corrosion control).

- Educating the public about lead in drinking water and actions consumers can take to reduce their exposure to lead.
- Replacing the portions of lead service lines (lines that connect distribution mains to customers) under the water system's control.

4. Did DWSD have optimized corrosion control treatment?

After the LCR passed in 1991, DWSD and all of its consecutive customer systems conducted two rounds of monitoring for lead and copper. Copper levels were well below action level limits, but lead levels exceeded the action level of 15 ppb for DWSD and many of its customer communities. As a result, DWSD installed corrosion control treatment. DWSD performed a corrosion control study and concluded that they could reduce the corrosivity of the water by the addition of an orthophosphate, a corrosion inhibitor.

5. Did the DEQ require the City to have corrosion control in place when it switched to the Flint River as its source of drinking water?

No. There are two ways under the LCR to deem a water supply as providing "optimal corrosion control" – either by sampling and determining through a calculation that the supply is "optimal" or by installing treatment if it is needed. The DEQ requested that the City perform two 6-month rounds of monitoring to demonstrate if the City was practicing optimal corrosion control treatment. According to state regulations [R325.10604f(2)(b)(iii)], a system can demonstrate optimized corrosion controls by sampling in two, consecutive 6-month monitoring periods and comparing the results of this monitoring to the lead level in the source. Optimal corrosion control under this scenario would be defined as having the 90th percentile in each of these monitoring periods lower than the sum of the lead in the source and the practical quantification limit for lead of 5 ppb. Since the source water has 0 ppb lead, the City would have been deemed optimal if its 90th percentile of lead was 5 ppb or less in these two consecutive periods. However, once a system has installed treatment, it would also be considered optimized regardless of the 90th percentile level achieved, as long as it does not exceed the action level of 15 ppb.

In this case, the City had been purchasing water from DWSD that was treated for corrosion control. It was the DWSD water system that was considered as having optimized corrosion control at that point. Since the City water system had not been the supplier of water before, the DEQ did not require the City to maintain corrosion control for which it was not responsible [R325.10604f(2)(b)]. It could not "maintain" operations undertaken elsewhere by a different entity for a different source of water. The DEQ's instructions to the City were consistent with past practices afforded to all other large water systems. At the beginning of the LCR, all large systems were initially granted the option to demonstrate optimal corrosion control treatment through full-scale monitoring under the applicable rules. For these reasons, two 6-month rounds of monitoring, as required by the LCR, were the required means to determine whether or not optimal corrosion control was being achieved.

6. How does the DEQ calculate the 90th percentile?

To determine the 90th percentile of a list of lead or copper results, the procedure below is followed:

Step 1: Place lead or copper results in ascending order
Step 2: Assign each sample a number, 1 for lowest value
Step 3: Multiply the total number of samples by 0.9 – this yields the 90th percentile sample. For example: 20 samples x 0.9 = 18th sample. This is the 90th percentile level.

Calculating the 90th percentile is easiest when a supply collects 10 samples (or a multiple of 10). Note that the 90th percentile must be interpolated if the number of samples is not a multiple of 10.

7. What was the result of the first round of monitoring conducted by the City?

The first 6-month round of lead and copper monitoring conducted by the City ended on December 31, 2014. One hundred samples were submitted and the 90th percentile lead level was calculated to be 6 ppb. The next step required by the DEQ was for the City to collect a second round of monitoring.

8. What was the result of the second round of monitoring conducted by the City?

The second 6-month round of lead and copper monitoring conducted by the City ended on June 30, 2015. Sixty-nine samples that complied with the site selection criteria were submitted and the 90th percentile lead level was calculated to be 11 ppb. The conclusion from these results was that the City, while in compliance with the action level, exceeded the level required to be deemed as having optimized corrosion control.

9. Why was the City required to collect 100 compliance samples for lead and copper in the first 6-month monitoring period of July through December of 2014 and then only 60 compliance samples in the second 6-month period of January through June of 2015?

The number of compliance samples required for lead and copper is based upon the population served by the water system as identified in the table below, taken from Rule 325.10710a of Act 399.

Supply Size (Number of People Served)	Number of Sites (Standard Monitoring)	Number of Sites (Reduced Monitoring)
More than 100,000	100	50
10,001 to 100,000	60	30
3,301 to 10,000	40	20
501 to 3,300	20	10
101 to 500	10	5
Fewer than 101	5	5

The number of samples the City was required to collect in the first round of monitoring after they began relying on the Flint River was based on the 2010 census, which listed the City's population as more than 100,000 residents. In March of 2015, the City provided updated information that indicated the City's population had decreased to less than 100,000. Therefore, they were only required to collect 60 samples. There is no rule prohibiting the collection of additional compliance samples – only establishing a minimum number necessary.

10. What actions did the DEQ order the City to undertake after the second round of monitoring?

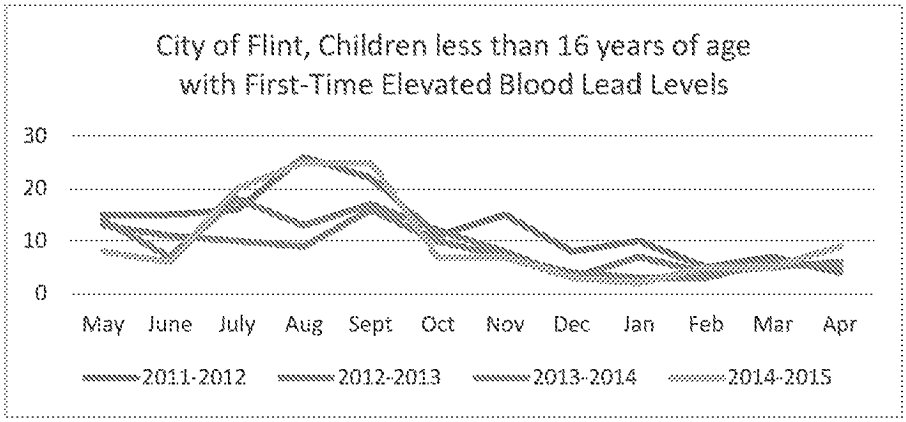
While the City's LCR compliance monitoring continued to meet action level requirements, the City exceeded the level required to be deemed as having optimized corrosion control. Following receipt of the City's compliance monitoring results, the DEQ sent a letter on August 17, 2015, requiring the City to install corrosion control treatment.

Under the LCR, the City has 6 months to let the DEQ know whether it intends to conduct a study, then 18 months to perform the study and make its recommendation, and 24 months to complete installation of the selected corrosion control. The DEQ requested the City accelerate this schedule. The City submitted plans and specifications to install corrosion control treatment and a construction permit was issued by the DEQ on October 28, 2015. The City is in the process of installing the necessary equipment and procuring the appropriate chemicals. Treatment is expected to be on-line by the end of November 2015. As of October 16, 2015, the City resumed purchasing water from DWSD that is already optimized and provides a corrosion inhibitor. The additional treatment by the City will further enhance the amount of inhibitor in the system.

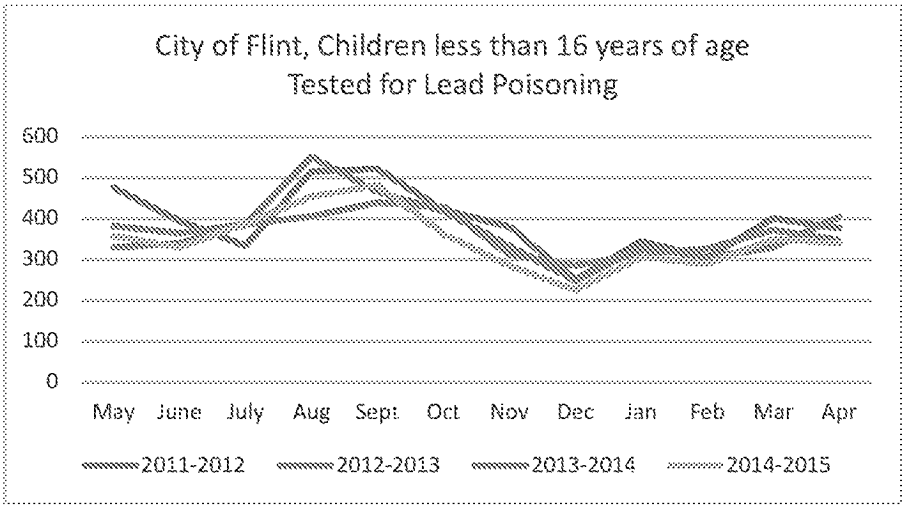
11. What had Michigan Department of Health and Human Services (DHHS) advised the DEQ regarding blood lead levels prior to the DEQ ordering the City to implement optimized corrosion control?

In an e-mail dated July 28, 2015, regarding blood lead testing, the Michigan DHHS indicated that they:

> "…compared lead testing rates and lead testing results to the same time frame for the previous 3 years, to see if there were any patterns that suggested that there were increased rates of lead poisoning after the water supply was switched. Per the attached charts –
>
> • Lead testing rates remained about the same from year-to-year…



- There was a spike in elevated blood lead tests from July-September 2014…



- However, that pattern was not terribly different from what we saw in the previous three years; especially in 2011-2012 (we are working with our Epidemiologist to statistically verify any significant differences).

- We commonly see a 'seasonal effect' with lead, related to people opening and closing windows more often in the summer, which disturbs old deteriorating paint on the windows, sills and sashes. Window fans frequently blow and spread the lead dust from the deteriorating paint to other parts of the room/house. We suspected that the summer data spike may be related to this effect.

- If the home water supply lines and/or river water were contributing to elevated blood lead tests, we expected that the increased rates would extend beyond the summer, but they drop quite a bit from September to October, stayed low over the winter, and are just starting to tail up again in the spring of 2015."

This e-mail from DHHS in concert with the completion of two 6-month rounds of lead compliance sampling data indicating that the City had not exceeded an action level for lead provided the basis for the DEQ to maintain that the water in the City continued to be in compliance with the federal SDWA and Act 399.

12. When did the DEQ first become aware of allegations of elevated blood levels being detected in certain children?

The DEQ was notified on August 23, 2015, by a professor from Virginia Tech that "over the next few months we will be studying Flint water quality issues…" Results indicating elevated lead levels in homes were reported as part of this study in late August. In September 2015, information was reported in news articles that

pediatricians in the City had data suggesting an increase in children's blood lead levels in two zip codes in the Flint area.

Prior to these dates, the City had already completed the required two 6-month rounds of monitoring and the DEQ had made a determination that the City must install corrosion control treatment as documented in correspondence dated August 17, 2015.

VIII. QUESTIONS RAISED REGARDING THE DEQ'S ACTIONS

1. **What was the DEQ's response to the USEPA's inquiry in February 2015 regarding the optimized corrosion control treatment being implemented by the City under the LCR?**

   The DEQ indicated that the City was complying with the LCR, the lead 90th percentile level was below the action level of 15 ppb, and the City was already conducting the second round of monitoring which would provide for a determination of whether additional treatment needed to be installed. It should be noted that once treatment is designated as optimal, there is no requirement in the LCR that lead results be lower than they were before treatment was installed. The 90th percentile only needs to be lower than the action level in the LCR.

2. **Did the DEQ attempt to mislead the USEPA in a February 27, 2015, e-mail responding to the USEPA's inquiry regarding Optimal Corrosion Control Treatment?**

   No. There was no attempt by the DEQ to mislead the USEPA. There is an e-mail from Steve Busch, Jackson and Lansing District Supervisor, Office of Drinking Water and Municipal Assistance, indicating that the City was practicing a corrosion control program. What was meant was that the City was performing the required monitoring to determine whether or not they were practicing optimized corrosion control. The DEQ subsequently clarified its position in follow-up e-mails and telephone conversations with the USEPA.

3. **When General Motors announced its intent to terminate water service from the City and purchase water from Genesee County, should this have been a sign that there were concerns with the quality of the water after the switch to the Flint River?**

   No. General Motors made a decision regarding the quality of water for its manufacturing processes. At the time, the company indicated that the chloride levels were above limits acceptable as part of the manufacturing facility's limit for production purposes. The level of chlorides in the water treated by the City was not a human health or aesthetic concern.

   Chloride does have a secondary maximum contaminant level established by the USEPA, not for health-related concerns but rather for taste and aesthetic concerns. Concentrations greater than the secondary maximum contaminant level of 250 milligrams per liter (mg/l) become objectionable due to taste. According to the City's records, the chloride concentration in the Flint River water is generally about 45 mg/l and the treated water chloride concentration leaving the water treatment

plant ranges between 55 and 65 mg/l. It should be noted that the City uses ferric chloride as its primary coagulant, although this does not add a significant amount of chloride to the finished water.

4. Has the USEPA subsequently admitted that the LCR is subject to differing interpretations such as that presented by the DEQ?

Yes. On November 3, 2015, the USEPA issued a memorandum regarding the "Lead and Copper Rule Requirements for Optimal Corrosion Control Treatment for Large Drinking Water Systems". This memorandum addresses concerns raised about the application of the LCR, specifically the requirements pertaining to maintenance of optimal corrosion control treatment, in situations in which a large water system ceases to purchase treated water and switches to a new drinking water source. The USEPA states that this type of situation rarely arises, that the language of the LCR does not specifically discuss such circumstances, and that there are differing possible interpretations of the LCR with respect to how the rule's optimal corrosion control treatment procedures apply to this situation. The memorandum is intended to clarify, on a prospective basis, steps agencies should take or apply in the future. USEPA's new guidance provides acknowledgement that the LCR is subject to differing interpretations. The DEQ's interpretation and application of the LCR in this situation was in compliance with the federal SDWA and Act 399.

5. Did the DEQ reject any of the samples submitted by the City?

Yes, samples at two locations were excluded from the compliance calculation in conformance with rules issued by the USEPA.

According to the LCR, compliance samples must be a first draw, 1-liter sample collected from a cold water, kitchen or bathroom tap after the tap has stood unused for not less than 6 hours. Federal and state rules require community public water systems to identify a pool of targeted high-risk sampling sites, called Tier 1 sampling sites. For a municipality such as the City, the Tier 1 sampling pool must consist of single family structures that are:

- served by a lead service line,
- contain lead pipes, or
- contain copper pipes soldered with lead installed after 1982 but before Michigan enacted the ban on solder containing high concentrations of lead (June, 1988).

As long as a community has Tier 1 sites that contain lead service lines, they are required to collect at least 50 percent of their compliance samples from these lead service line sites. Finally, federal and state rules specify that "Sampling sites may not include faucets that have point of use or point of entry treatment devices designed to remove inorganic contaminants." Such treatment devices include home softeners, iron filters, etc. Samples collected from multiple family residences, commercial buildings, institutional facilities, or single family structures with point-of-use or point-of-entry treatment can only be used if the community has insufficient Tier 1 sites available.

One of the samples submitted by the City was excluded from the 90th percentile compliance calculation in the latest monitoring period because it was taken from a tap at a non-residential site (non-Tier 1). The other sample result that was excluded was collected from a single family home that has a whole house treatment system. Both of these sites are, therefore, excluded from the compliance consideration based upon federal and state rules.

6. Did the DEQ review the information submitted by the City to ensure all samples were from Tier 1 sites?

Yes. The DEQ examined the information submitted and certified by the City that its LCR compliance monitoring sites consisted entirely of Tier 1 criteria sites, which met the requirements of this rule to maximize sampling of high-risk targeted sites.

During the initial implementation of the LCR approximately 25 years ago, water supplies were required to complete a materials evaluation of their distribution system to identify a pool of targeted, high-risk sampling sites. These sites were to be categorized into one of three Tiers (1, 2, or 3) based on risk. The DEQ created an LCR reporting template for water systems to identify each compliance sampling site by Tier, service line material, and building plumbing material.

If a water system has sufficient Tier 1 sites, they are required to sample them before using any lower Tier sites. Furthermore, if they have sufficient sampling sites with lead service lines, they are required to use them to make up at least 50 percent of their sampling pool each monitoring period. Water supplies are also required to use the same sampling sites each time or explain on their LCR reporting form why they were unable to do so. Finally, the water system is required to certify all of the information they provide on the LCR reporting form is factual.

The DEQ must rely upon the public water system to identify appropriate sampling sites for LCR monitoring. The DEQ public water supply program has no control or authority over service lines or domestic plumbing. As a result, we have no records on construction standards or materials used by customers for these components. If these records exist, they are kept by plumbing code enforcement officials.

In 2015, City employees again certified that the information submitted on their LCR monitoring reports for the two 6-month rounds of monitoring conducted after they began treating the Flint River were accurate, and DEQ staff review of that information indicated it was in compliance with the monitoring requirements. The DEQ had no reason to question the validity of the City's reports until the DEQ heard City employees revealing to the media that the City did not know for certain if its compliance monitoring was collected from homes with lead service lines. As a result, the DEQ began to investigate the City's monitoring sites. As the City began to transfer its customer information to electronic records, the DEQ determined from the information available that a significant number of these sites that had been listed as having lead service lines either did not have them or the information was unavailable. On November 9, 2015, the DEQ notified the City in writing that it would be necessary to conduct a complete assessment of its sampling pool and report back its findings by December 30, 2015. The DEQ is now awaiting the City's response.

7. Did the DEQ believe the levels of lead found at 212 Browning in April 2015 were indicative of a system-wide problem?

High levels of lead were collected in samples taken from this residence. It was determined to be coming from an unusually long lead service line. For some reason, this home was not connected to the water main that ran in front of the house, but rather to a main located on a street several houses away. The City replaced the lead service line May 6, 2015. Since the internal plumbing of the house is plastic, it was believed that replacement of the lead service line would resolve the problem, and subsequent sampling taken at this address showed that replacement of the service line did mitigate the problem. There was, therefore, no reason to believe that this was indicative of a system-wide problem.

8. Do the DEQ's sampling instructions comply with the LCR?

The DEQ continues to seek official clarification from the USEPA regarding the sampling protocols. The DEQ's sampling recommendations were developed to ensure compliance with the USEPA's guidance provided in the preamble to their lead and copper regulations that said that household use should be "typical" for a residential customer on the day before sample collection for lead and copper. Early in the implementation of the LCR, the DEQ had encountered too many situations where compliance samples had been collected from kitchen and bathroom taps that had not been used in days and in some cases, even weeks, resulting in excessively stagnated water and correspondingly high lead levels that did not represent typical exposure expected after overnight stagnation. To incorporate these results into further regulatory decision making could have led to actions that were not indicative of a true public health threat. Further complicating this issue was the USEPA's direct implementation of the LCR in Washington, D.C., where it was learned that some "valid" lead results were not always being included in compliance calculations. Subsequently, the USEPA made invalidation of samples for any reason much more difficult. In order to ensure samples were taken at customer taps representative of typical use, the DEQ devised the current recommendations for ensuring appropriate but not excessive stagnation for LCR monitoring.

The DEQ continues to believe it is appropriate to ensure that taps being sampled are representative of typical household use and are sampled during the recommended stagnation period of 6-18 hours. The LCR does not say the result should represent the "absolute worst case" condition – it talks about sampling the highest risk locations (lead plumbing, lead service lines, high lead content solder piping, etc.) after overnight stagnation and then collecting a first draw sample so as not to flush elevated lead from that tap at that point in time. There are a number of other states that share the DEQ's interpretation of the rule and the DEQ encourages the USEPA to provide official clarification directed at all states with primacy.

9. Does the DEQ require the use of small-neck bottles to obtain samples?

No. The DEQ does not mandate the use of small-neck bottles; it is the sampling method that is specified in both the federal SDWA and Act 399. Each certified drinking water laboratory provides bottles to their customers upon request for any particular analysis in accordance with the specifications in the SDWA. The bottles provided by the DEQ Drinking Water Laboratory for a lead and copper corrosion control sample meet these requirements.

From: Lyon, Nick (DHHS)
Sent: Thursday, December 03, 2015 10:54 AM
To: Baird, Richard (GOV);Clement, Elizabeth (GOV)
Subject: FW: Flint Lead information
Attachments: Flint Lead MDHHS Sitrep 11_30_15.docx; Flint Lead MDHHS Sitrep 12 1_15.docx

FYI. These are the regular reports I am now receiving.

Michigan Department of Health and Human Services Environmental Health

Flint Water Lead Project

MDHHS Situation Report

****NOTE: Contains potentially Identifiable Information- REDACT AS INDICATED****

New items for the day listed first and in bold print.

Daily Briefing and Situation Report

Date: November 30, 2015

Surveillance Indicators: People Tested since 10/1/2015: 1,361;

- Children less than 6 years old ≥ 5 µg/dl since 10/1/2015: 15
- Children 6 to 17 years old ≥ 5 µg/dl since 10/1/2015: 6
- Adults 18 years and older ≥ 5 µg/dl since 10/1/2015: 9

Severity Indicators: Hospitalized/Discharged-1/1; Deaths- 0

DAILY ACTIVITY SUMMARY

Elevated Blood Level (EBL) Environmental Investigations – Wes Priem, Courtney Wisinski

- **Contractor (ETC) has 8 investigations scheduled.**
- **The high EBLL home is scheduled for Friday 12/4/15.**
- DEH-Finalized residential tap water sampling protocol used to evaluate lead concentrations in households
- Contractor (ETC) has completed 1 EBL investigation, but will have to return for water sampling.

MDHHS/Genesee County Health Department (GCHD) Case Management (CM) Services

- No additional updates for 11/30/15
- Week Ending 11/20/15:
    - Number of contacts attempted: 58
    - Contacted and offered case management: 13
- DEH staff developing case management and EBL investigation database
    - compiles blood test results, case management services, and environmental sampling data for each Flint child with elevated blood lead level

Epidemiology/Surveillance – Patti McKane, Martha Stanbury

- **Completed re-evaluation of blood lead testing data from 1/1/2010 to current per the request of the Governor's office. Counts for 10/10/2015 will vary slightly from previously reported because of the change in de-duplication procedures to accommodate yearly counts.**
- **Draft Blood Lead Data report completed and conveyed to Eden Wells, Corinne Miller and Angela Minicuci.**

- Some problems were experienced in accessing all the laboratory electronic data files going back to last week's submissions over the holiday. Most were resolved with help from DTMB, and the rest should be resolved tomorrow morning. As a result, no daily report was created of newly reported individuals with BLL>20files but we will have this tomorrow.
- 1 child hospitalized PHI <2 yo, identified by lab who contacted primary provider with elevated blood lead level of 52 mcg/dl; hospitalized at Children's PHI follow-up tests decreased without need for chelation- discharged to home PHI
    - GCHD follow-up PHI and PHI case management and investigation in process- possible history of lead paint ingestion
    - Child with history of PHI
    - Other children in household tested, also followed by PCP.

Communications/Information Sharing

- MDHHS/GCHD weekly call Nov 24 3PM- reviewed progress on case management and EBL testing
- Technical Advisory Committee meeting originally scheduled for December 9th- , then postponed by City of Flint, may actually take place: awaiting word from City.

Health Education Resources Updates - Kory Groetsch (stand-in for Michelle Bruneau)

- Bathing-specific fact sheet under development.
- DEH has drafted a phosphate fact sheet, reviewing/revising with DEQ Drinking Water Staff
- DEH working with CLPPP and GCHD to revise parent resources package to reduce reading level.

Toxicology - Kory Groetsch, Jennifer Gray

- Developing Access database to track services provided to EBL children. Meeting held with other DEH staff to begin design.

WIC

- No additional updates for 11/30/15
- Letter sent 11/24 to GCHD about Ready-to-feed formula availability from WIC program
- Talking points for WIC staff and for providers shared

Healthcare/Providers

- No additional updates for 11/30/15
- Forum for primary care providers in Flint by public health being planned- 2nd – 3rd week December
- WIC information to be shared by GCHD to providers

DEQ Information - Linda Dykema as Liaison

- **MDEQ would like to issue school drinking water testing results in coordination with MDHHS release of the blood lead test reporting.**

Flint Water Lead Project

Michigan Department of Health and Human Services
Situation Report for December 1, 2015

****NOTE: Contains potentially Identifiable Information- REDACT AS INDICATED****
New items for the day listed first and in bold print.

Daily Briefing and Situation Report prepared by Linda Dykema

Surveillance Indicators: People Tested since 10/1/2015: 1,361;

Children less than 6 years old ≥ 5 µg/dl since 10/1/2015: 15

Children 6 to 17 years old ≥ 5 µg/dl since 10/1/2015: 6

Adults 18 years and older ≥ 5 µg/dl since 10/1/2015: 9

Severity Indicators: Hospitalized/Discharged-1/1; Deaths- 0

DAILY ACTIVITY SUMMARY

Elevated Blood Level (EBL) Environmental Investigations – ETC Contractors, Wes Priem, Courtney Wisinski

- **2 EBL investigations completed.**
- 8 investigations scheduled.
- The high EBLL home is scheduled for Friday 12/4/15.

MDHHS/Genesee County Health Department (GCHD) Case Management (CM) Services – Nancy Peeler

- **CM report through 11/25/15:**
  - **# of contacts attempted: 136**
  - **# offered CM: 46**
  - **# CM started: 5**
  - **# of children receiving CM who live in Flint: 5**
  - **# billed to Medicaid: 5**
  - **# Other disposition: 2 (2 children moved to Oakland County)**

- **Held call with GCHD staff to clarify and resolve questions about the CM budget. The revised budget will be submitted in eGrams on or about 12/7/15.**

- **Held weekly status call with CM staff at GCHD:**
  - **Need to include developmental screening as part of the CM protocol, and need to share screening results with Early On when a referral is made;**

Epidemiology/Surveillance – Patti McKane, Martha Stanbury, Bob Scott, Jessica Cooper

- Completed re-evaluation of blood lead testing data from 1/1/2010 to current per the request of the Governor's office.
- Revised Draft Blood Lead Data report completed.

- 1 child hospitalized PHI, <2 years old, identified by lab who contacted primary provider with elevated blood lead level of 52 µg/dl; hospitalized at Children's PHI; follow-up tests decreased without need for chelation- discharged to home PHI.
    - GCHD follow-up PHI case management and investigation in process- possible history of lead paint ingestion
    - Child with history of PHI
    - Other children in household tested, also followed by PCP.

Communications/Information Sharing – Linda Dykema, Eden Wells

- **Weekly (Tues. 8:00 am) coordination call with DEQ/LARA/HHS. Discussed need for informational materials for schools/residents regarding lead free plumbing replacements.**
- MDHHS/GCHD weekly call Nov 24 3PM- reviewed progress on case management and EBL testing
- Technical Advisory Committee meeting originally scheduled for December 9th- , then postponed by City of Flint, may actually take place: awaiting word from City.

Health Education Resources Updates - Michelle Bruneau, Emily Houk

- **Revising Phosphate fact sheet. Will discuss with DEQ Drinking Water staff on 12/2/15**
- Bathing-specific fact sheet under development.
- DEH working with CLPPP and GCHD to revise parent resources package to reduce reading level.
- Working with Healthy Homes Section staff to revise EBL report for Flint Residents.

Toxicology - Kory Groetsch, Jennifer Gray, Lisa Quiggle

- **Working with GCHD and DEQ to address questions concerning impact of phosphate treatment on drinking water filters.**
- **Working with Healthy Homes Section staff to revise EBL report for Flint Residents.**

WIC

- No additional updates for 12/1/15
- Letter sent 11/24 to GCHD about Ready-to-feed formula availability from WIC program
- Talking points for WIC staff and for providers shared

Healthcare/Providers

- **Forum for primary care providers in Flint POSTPONED pending coordination with local providers**
- WIC information to be shared by GCHD to providers

DEQ Information - Linda Dykema as Liaison

- MDEQ would like to issue school drinking water testing results in coordination with MDHHS release of the blood lead test reporting.

From: Lyon, Nick (DHHS)
Sent: Friday, December 04, 2015 10:29 AM
To: Baird, Richard (GOV)
Subject: FW: Call with Matt Davis

From: Moran, Susan (DHHS)
Sent: Thursday, December 03, 2015 4:42 PM
To: Lyon, Nick (DHHS) <LyonN2@michigan.gov>; Becker, Timothy (DHHS) <beckert1@michigan.gov>; Lasher, Geralyn (DHHS) <lasherg@michigan.gov>
Cc: Grijalva, Nancy (DHHS) <GrijalvaN@michigan.gov>; Wells, Eden (DHHS) <WellsE3@michigan.gov>; Dykema, Linda D. (DHHS) <DykemaL@michigan.gov>
Subject: Call with Matt Davis

We had a great call with Matt, overall seemed very supportive of our recent efforts and intends to modify the letter to the Governor based on actions taken by MDHHS.

Highlights from our discussion:

- VERY PLEASED with today's release of information regarding lead testing
- Matt supportive of our ICS-like structure (with project managed by Division of Environmental Health) – very much in line with centralized coordination and communication
- Agrees with our proposal to use Medicaid population denominator as proxy for measuring progress in accelerating lead testing efforts
- VERY pleased with the efforts to partner with, engage Medicaid Health Plans in the public health response
- Had some suggestions for using MCIR as a tool to link children and their school districts to determine potential lead exposure
- Agrees there is lack of consensus among community providers about testing infants, but Eden/Sue/Matt agree that there must be a risk assessment for lead exposure from water, infants are at highest risk for adverse effects.

Please let me know if you have questions.

From: Lyon, Nick (DHHS)
Sent: Monday, December 14, 2015 11:40 AM
To: Hollins, Harvey (GOV)
Subject: Fwd:
Attachments: Secondary Prevention MI 121415.pptx; ATT00001.htm

Sent from my iPad

Begin forwarded message:

> **From:** "Mona" <monahannaattisha@gmail.com>
> **To:** "Lyon, Nick (DHHS)" <LyonN2@michigan.gov>
> **Subject: Fwd:**
>
> Mona Hanna-Attisha MD MPH FAAP
> Director, Pediatric Residency Program
> Hurley Children's Hospital
> Michigan State University
>
> Mona Hanna-Attisha
>
> Begin forwarded message:
>
> > **From:** Mona Hanna-Attisha <MHanna1@hurleymc.com>
> > **Date:** December 14, 2015 at 9:10:41 AM EST
> > **To:** Mona Hanna-Attisha <MHanna1@hurleymc.com>,
> > "monahannaattisha@gmail.com" <monahannaattisha@gmail.com>
> >
> > Mona Hanna-Attisha MD MPH FAAP
> > Program Director Pediatric Residency
> > Hurley Children's Hospital at Hurley Medical Center
> > Michigan State University College of Human Medicine
> > Department of Pediatrics and Human Development
> > Mhanna1@hurleymc.com

#flintwatercrisis

HURLEY CHILDREN'S HOSPITAL

Background & Secondary Prevention

Mona Hanna-Attisha MD MPH FAAP
Hurley Children's Hospital
Michigan State University College of Human Medicine

Agenda

- Flint Water Timeline
- Lead Facts
- Hurley Research Findings
- Introduction to Toxic Stress
- Next steps – Secondary Prevention

Flint Drinking Water Crisis

- Financial Emergency Managers
- Water switch to Flint River (April 2014)
- Fecal coliform and boil advisories *3 (Sept 2014)
- GM stopped using Flint water – corroding parts (Oct 2014)
- Disinfectant byproducts TTHM (Jan 2015-Sept 2015)

Flint Drinking Water Crisis

HURLEY CHILDREN'S HOSPITAL

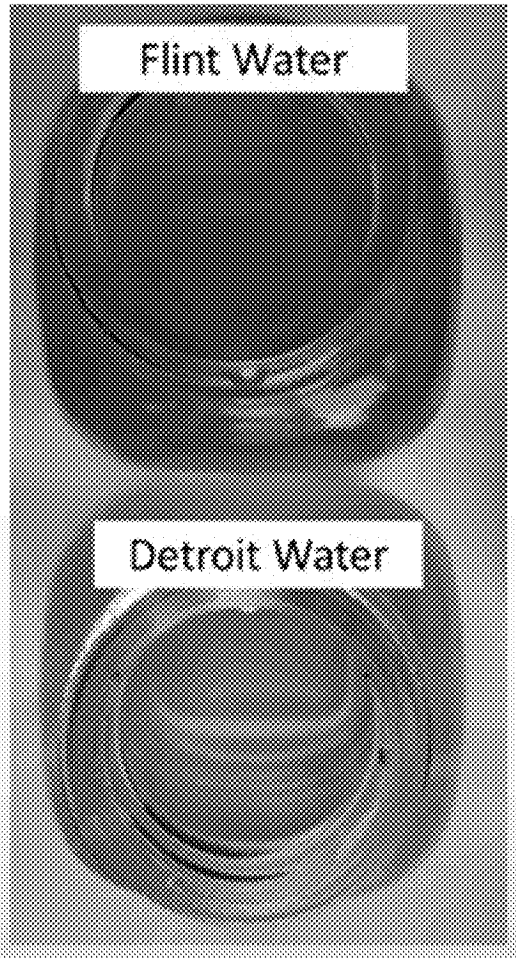
- Perfect storm for lead leaching
  - Flint water more corrosive
  - Lack of corrosion control
  - Aging infrastructure (lead plumbing)
  - Decreased water use - population loss, high water rates

HURLEY MEDICAL CENTER

Flint Drinking Water Crisis

HURLEY CHILDREN'S HOSPITAL

- High lead levels detected, EPA contacted (February 2015)
- Leaked EPA memo (June 2015)
  - LeeAnn Walters WLL 13,200 ppb (toxic waste)
- Dr Marc Edwards, Virginia Tech Research (Aug 2015)
  - Flintwaterstudy.org
  - Corrosion & water lead
- Hurley Research (Sept 2015)



https://www.wsws.org/en/articles/2015/09/26/flin-s26.html

Why do we care about lead?

HURLEY CHILDREN'S HOSPITAL

- Lead is a potent neurotoxin with lifelong, multigenerational impacts
- Blood lead levels (BLL) 5 ug/dL or more considered elevated blood lead levels (EBLL)
- Just a few years ago (2012), 10 ug/dL was cutoff
- NO safe blood lead level
- Disproportionately impacts low income and minority children
- Primary prevention is most important

HURLEY MEDICAL CENTER

Primary Prevention

HURLEY CHILDREN'S HOSPITAL

- "Because no measurable level of blood lead is known to be without deleterious effects, and because once engendered, the effects appear to be irreversible in the absence of any other interventions, public health, environmental and housing policies should encourage PREVENTION of all exposure to lead."

"Low Level Lead Exposure Harms Children: A Renewed Call for Primary Prevention." 2012 CDC Advisory Committee on Childhood Lead Poisoning Prevention.

HURLEY MEDICAL CENTER

Impact on cognition

HURLEY CHILDREN'S HOSPITAL

- Vast evidence supports increased likelihood of:
  - Decrease in IQ
    - An increase in BLL from 1 to 4 ug/dL, drops mean IQ -3.7 points
  - Small change in mean IQ, shifts entire population IQ distribution
    - Reduces high achievers IQs (>130) and increases kids with low IQs (<70)
    - Implications for early intervention, special education services, employment, incarceration, life achievement, etc

Lanphear BP et al., Low-level environmental lead exposure and children's intellectual function: an international pooled analysis. Environ Health Perspect, 2005. 113:894-9.
Fewtrell LJ, Pruss-Ustun A, Landrigan P, and Ayuso-Mateos JL, Estimating the global burden of disease of mild mental retardation and cardiovascular diseases from environmental lead exposure. Environmental Research, 2004. 94:120-33.

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Impact on behavior

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- Increased likelihood of :
  - ADHD behaviors
  - Delinquent behaviors and arrests
  - Total arrests and increased rates of arrests involving violent offenses
  - Other health effects: hematologic, cardiovascular, immunologic, endocrine, etc

Wright, JP, KN Dietrich, MD Ris, et al. 2008. Association of prenatal and childhood blood lead concentrations with criminal arrests in early adulthood. *PLoS Med* 5(5): e101

Chen, A, B Cai, KN Dietrich, et al. 2007. Lead exposure, IQ, and behavior in urban 5-7 year-olds: Does lead affect behavior only by lowering IQ? *Pediatrics* 119(3): e650-e658.

Needleman, HL, C McFarland, RB Ness, et al. 2002. Bone lead levels in adjudicated delinquents: A case control study. *Neurotoxicology and Teratology* 24(6):711-717.

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Cost

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- "For childhood lead poisoning, $5.9 billion in medical care costs, as well as an additional **$50.9 billion** (sensitivity analysis: $44.8–$60.6 billion) per year in lost economic productivity resulting from reduced cognitive potential from preventable childhood lead exposure."

- "The present value of Michigan's economic losses attributable to lead exposure in the 2009 cohort of 5 year-olds ranges from $3.19 (using U.S. blood lead levels) to **$4.85 billion** (using Michigan blood lead levels) per year in loss of future lifetime earnings."

Leonardo Trasande and Yinghua Liu. Reducing The Staggering Costs Of Environmental Disease In Children, Estimated At $76.6 Billion In 2008. *Health Affairs*, 30, no.5 (2011):863-870

The Price of Pollution: Cost Estimates of Environment-Related Childhood Diseases in Michigan. 2010 Report by Michigan Network of Children's Environmental Health

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Lead in Water

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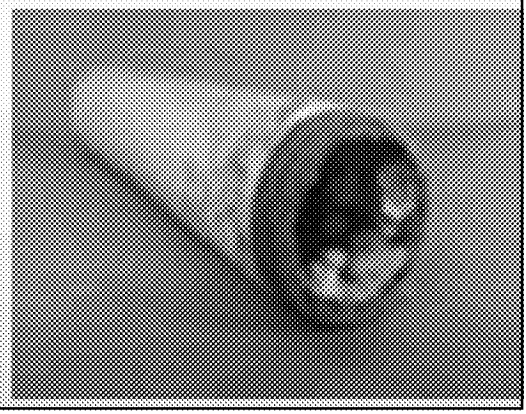
- Not what medicine/public health used to
  - Lead paint obsessed
  - "drinking through a lead painted straw"
- Soluble metal – ingestion via particulate or dissolved in water
- Drinking and cooking risks



Lead in water

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- Disproportionally impacts developmentally-vulnerable formula-fed infants
  - For about 25% of infants drinking formula made from tap water at 10 ppb, blood lead would rise >= 5 ug/dL
- Significant risk to unborn babies
  - Increase in fetal deaths and reduced birth weights

Triantafyllidou, S., Gallagher. D. and Edwards, M. Assessing risk with increasingly stringent public health goals: the case of water lead and blood lead in children. Journal of Water and Health. doi: 10.2166/wh.2013.067 58-68 (2014).
Edwards, M. Fetal Death and Reduced Birth Rates Associated with Exposure to Lead-Contaminated Drinking Water. Env. Sci. and Tech. 2013 DOI: 10.1021/es4034952

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Hurley Children's RESEARCH FINDINGS

Sept 24

Medical Community Press Conference

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Methods

- HMC IRB approved
- Data from all blood lead levels processed at Hurley Medical Center
- ZIP code based
- Two periods of comparison (same seasons):
  - PRE-SWITCH: January 1, 2013 – September 15, 2013
    - **WATER SWITCH APRIL 26, 2014**
  - POST-SWITCH: January 1, 2015 – September 15, 2015

- Analyzed % Elevated Blood Lead (EBLL)
  - EBLL = Blood lead Levels >= 5 ug/dL

Initial Research Results

- Zip code based (in media)

	ALL FLINT ZIPS (n=1746)	HIGH-WLL FLINT ZIPs (48503-48504) (n=742)	NON-FLINT ZIPS (n=1670)
PRE-SWITCH	2.1%	2.5%	0.6%
POST-SWITCH	4.0%	6.3%	1.0%

GEOcoded Analysis

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- N= 1473 for Flint water children (pre n=736, post n=737)
- N= 2202 for non-Flint water children (pre n=1210, post n=992)

Flint results for children 5 years and under:

- PRE-SWITCH % EBLL: **2.4%**
- POST-SWITCH % EBLL: **4.9%**
- **p < 0.05; STATISTICALLY SIGNIFICANT CHANGE**

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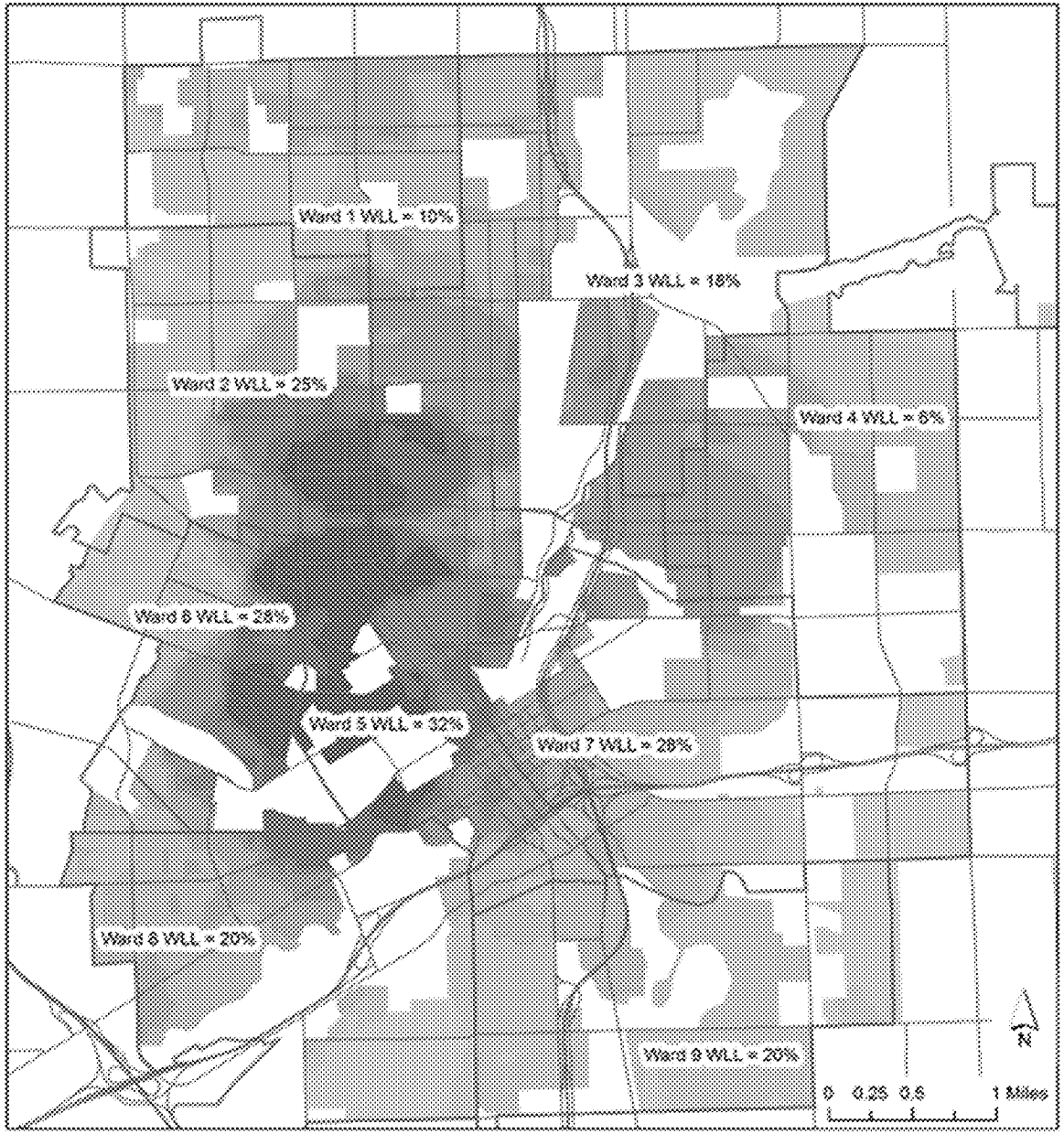

- Focus on high WLL wards (5, 6, 7); ie., those with high water lead levels

Results:

- PRE-SWITCH % EBLL: **4.0%**
- POST-SWITCH % EBLL: **10.6%**
- **$p < 0.05$; STATISTICALLY SIGNIFICANT CHANGE**

- Note: Hot spots between wards/zips

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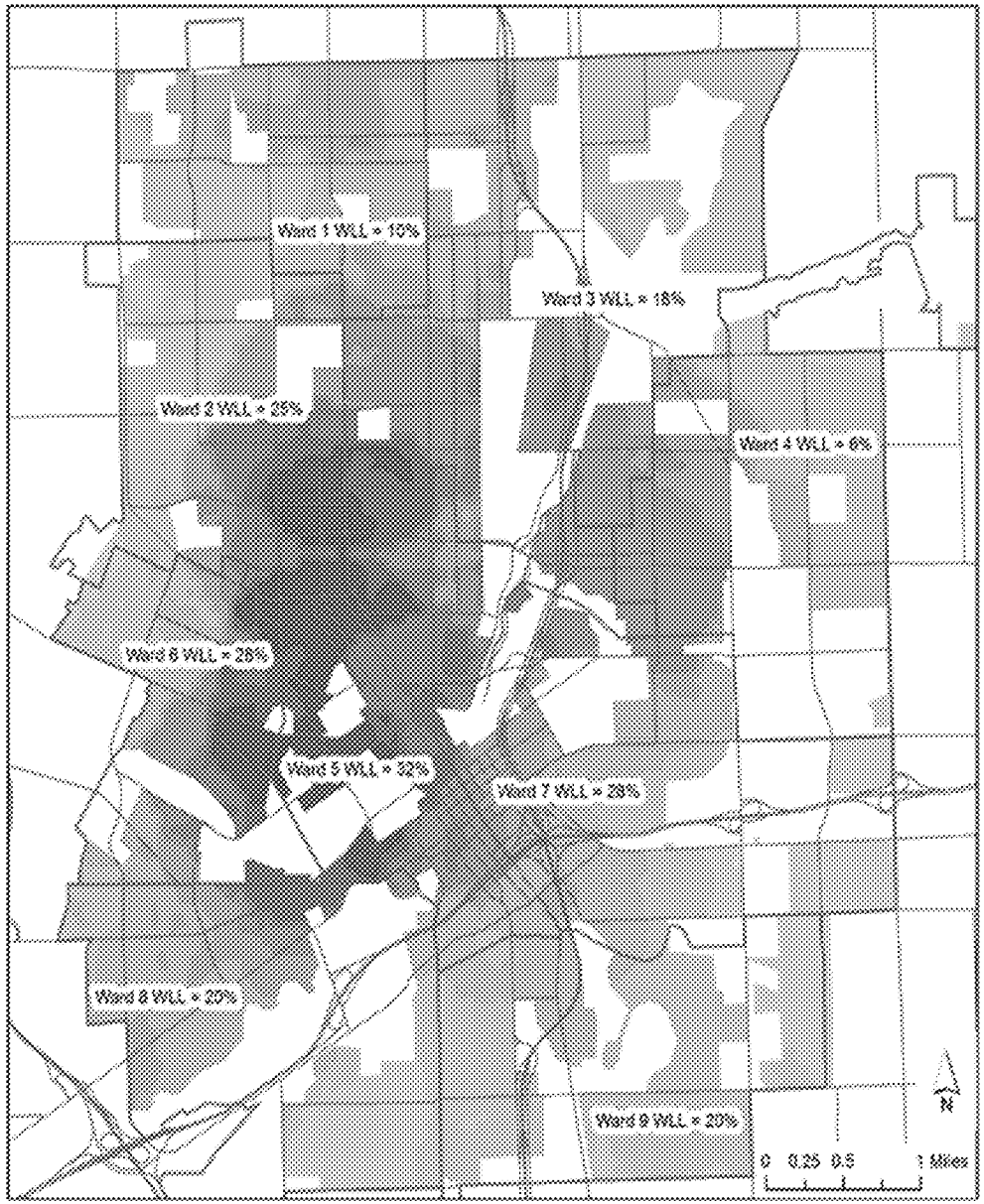


Flint City Wards

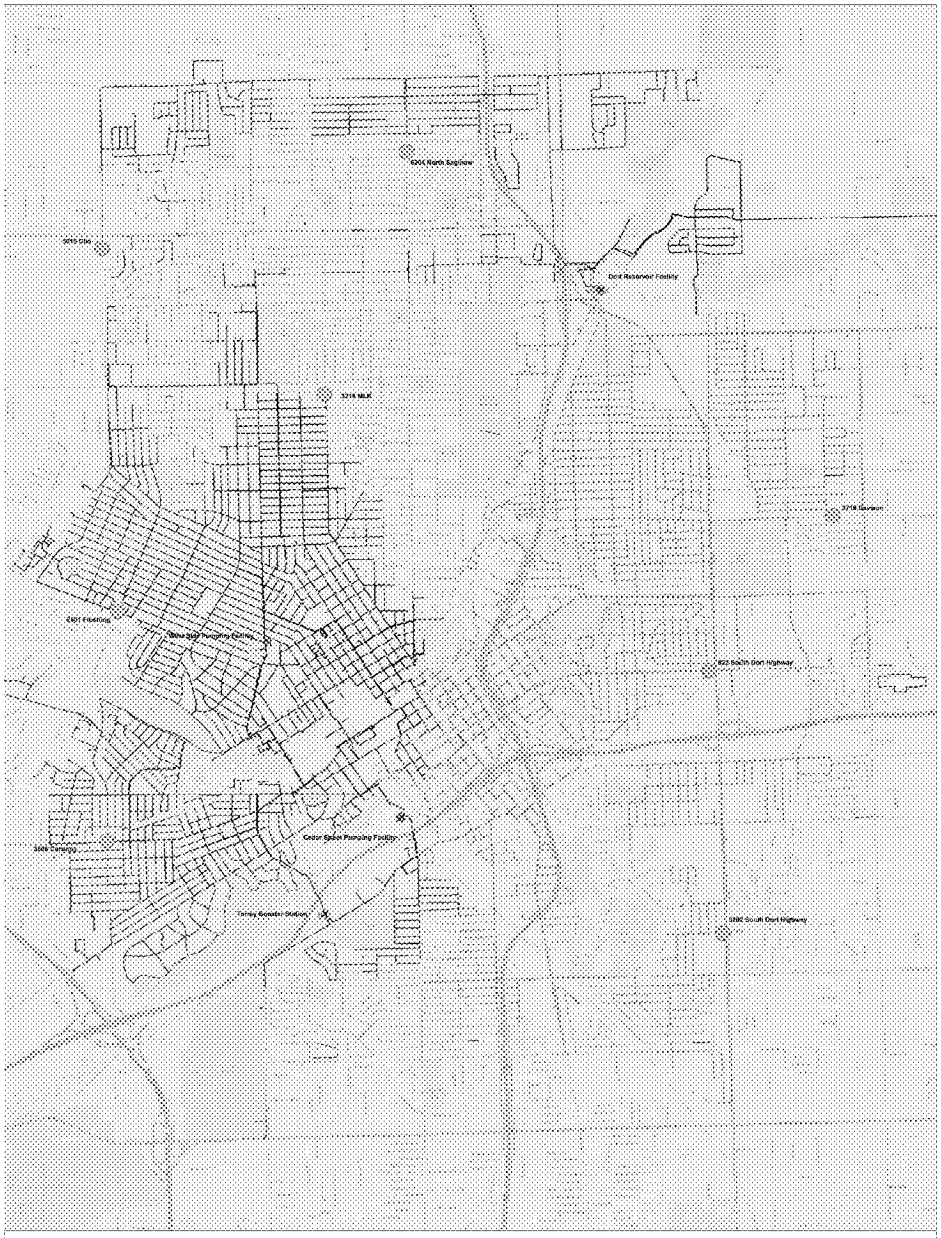
Major Streets

"Ward Y WLL = XX%" → % of ward where any water sample exceeded 15 ppb

Predicted BLL based on Ordinary Kriging Geostatistical Analysis

0.7 - 0.75		1.01 - 1.25	2.01 - 2.25
0.76 - 1		1.26 - 1.5	2.26 - 2.5
		1.51 - 1.75	2.51 - 2.75
		1.76 - 2	2.76 - 3.36

*Non-residential zones screened from results



Legend
Water Quality (Hrs)

- less than 24.0
- 24.0 to 72.0
- 73.0 to 144.0
- greater than 144.0
- Water sample location

CITY OF FLINT MAJOR WATER INFRASTRUCTURE

WATER AGE & WATER SAMPLE LOCATION MAP

January 21, 2015

N

0 550 1,100 2,200 3,300 4,400 Feet

Pre/Post EBLL

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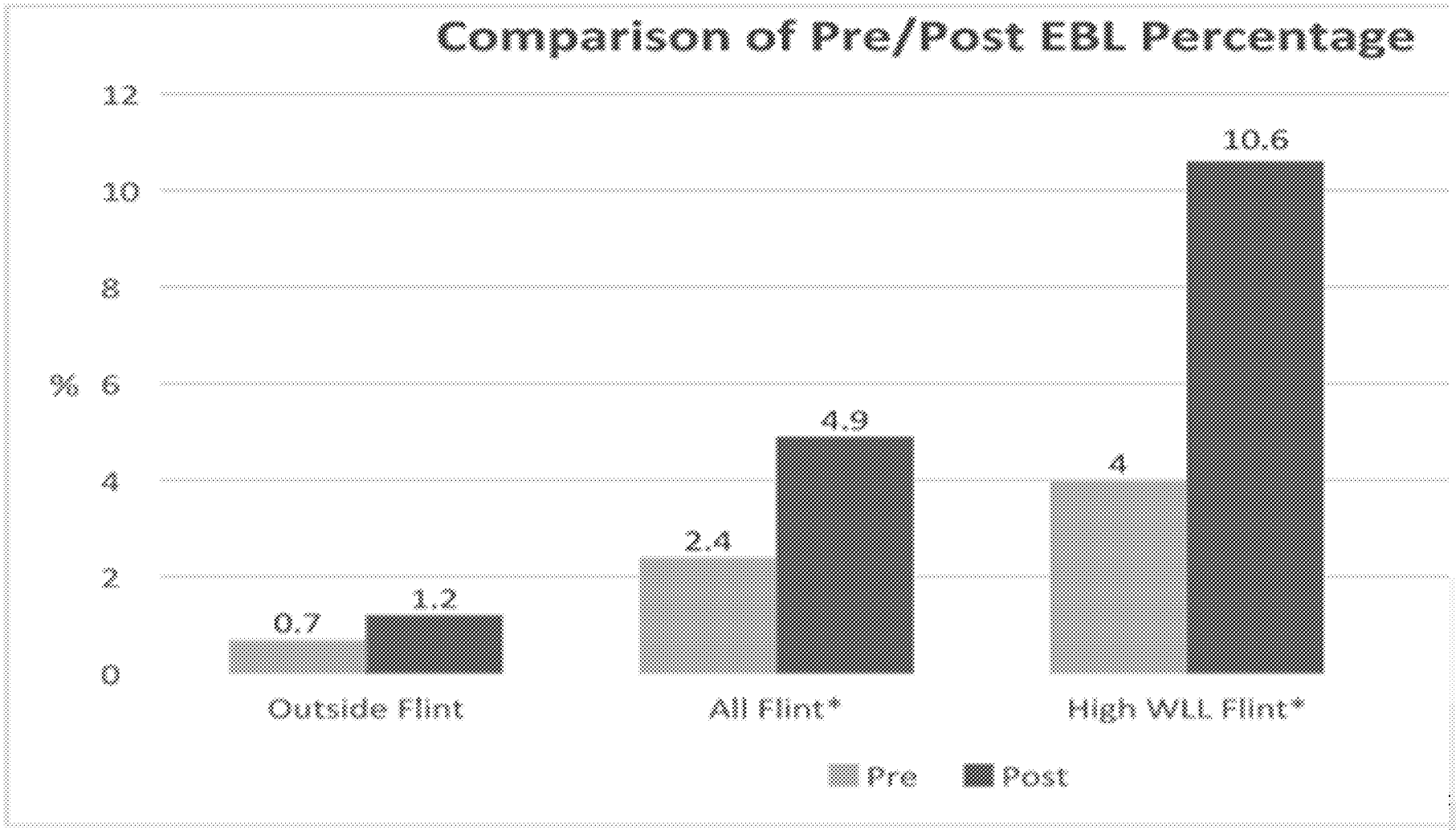

*p<0.05

Research results

- % of children with EBLL in Flint zips increased
  - Most striking increase in areas with highest water lead levels
- **Results significantly underestimate exposure:**
  - Infants not screened for lead
  - BLL may have peaked before being measured (blood half life 20-30 days)
  - Kids exposed in different settings throughout city
- Widened disparities
- Failure of primary prevention

What happened next?

- Sept 25 City of Flint Lead Health Advisory
- Sept 29 GCHD Health Advisory
- Oct 1 GCHD Public Health Emergency
- Oct 2 State filter program, increased water testing, expedited corrosion control
  - Oct 3 First filter distribution
- Oct 8 Three schools toxic WLL, announced reconnection to DWSD
- Oct 16 Water switched back to DWSD

Epigenetics

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Wayne State Researchers Discover Evidence That Lead Exposure in Mothers Can Affect Future Generations

Released: 2-Oct-2015 3:05 PM EDT
Source Newsroom: Wayne State University Division of Research

"A team of researchers at Wayne State University have discovered that mothers with high levels of lead in their blood not only affect the fetal cells of their unborn children, but also their grandchildren. "

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Now

- Preventable population-wide exposure
- Community traumatized
- Loss of trust in government and agencies
  - In 2015, in the middle of the great lakes, no guarantee of safe drinking water
- Ongoing public health emergency

Exposed Population

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- Currently identifying/labeling exposed population
- Cohort includes all children less than 6 years who at any time lived in Flint water limits (geocoded) from April 2014 to end date unknown (extend 9 months for fetal exposure).
- Per census data, approx. 8,000-9,000 children

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Quick Introduction to ACEs/Toxic Stress…

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Adverse Childhood Experiences (ACEs)

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- ACEs are potentially traumatic events that can have negative, lasting effects on health and well-being.
- Also referred to as toxic stress or childhood trauma.
- As number of ACEs increase, the risk for health problems increase in a strong and graded fashion.
- An ACE score of 6 or more results in a 20 year decrease in life expectancy.

- CDC ACE study
  - Kaiser Permanente from 1995 to 1997 with more than 17,000 participants.

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Toxic Stresses

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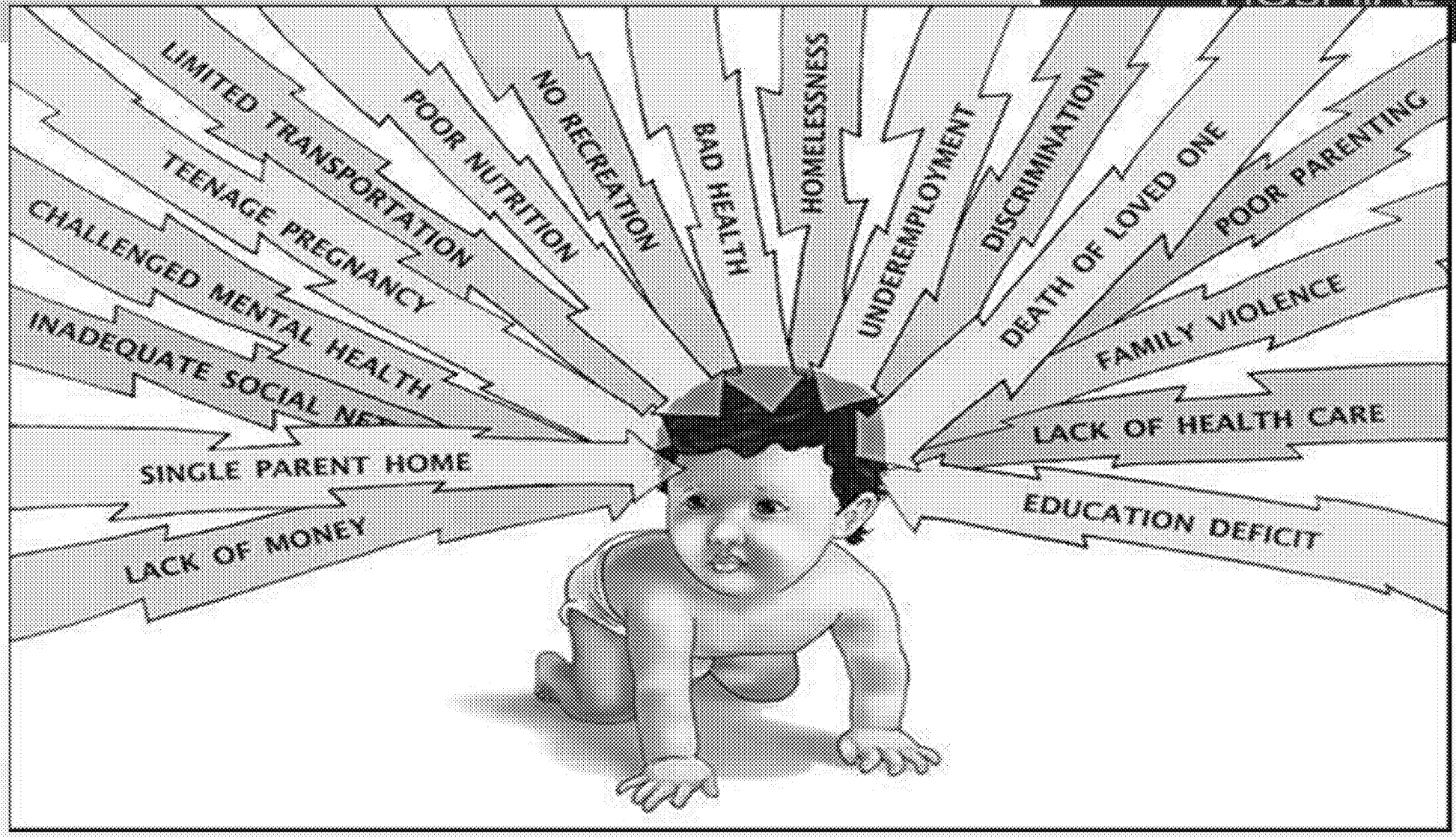

https://casaofsantacruz.wordpress.com/2014/10/08/continuing-education-webinar-how-toxic-stress-impacts-cas-children-families-communities-2/

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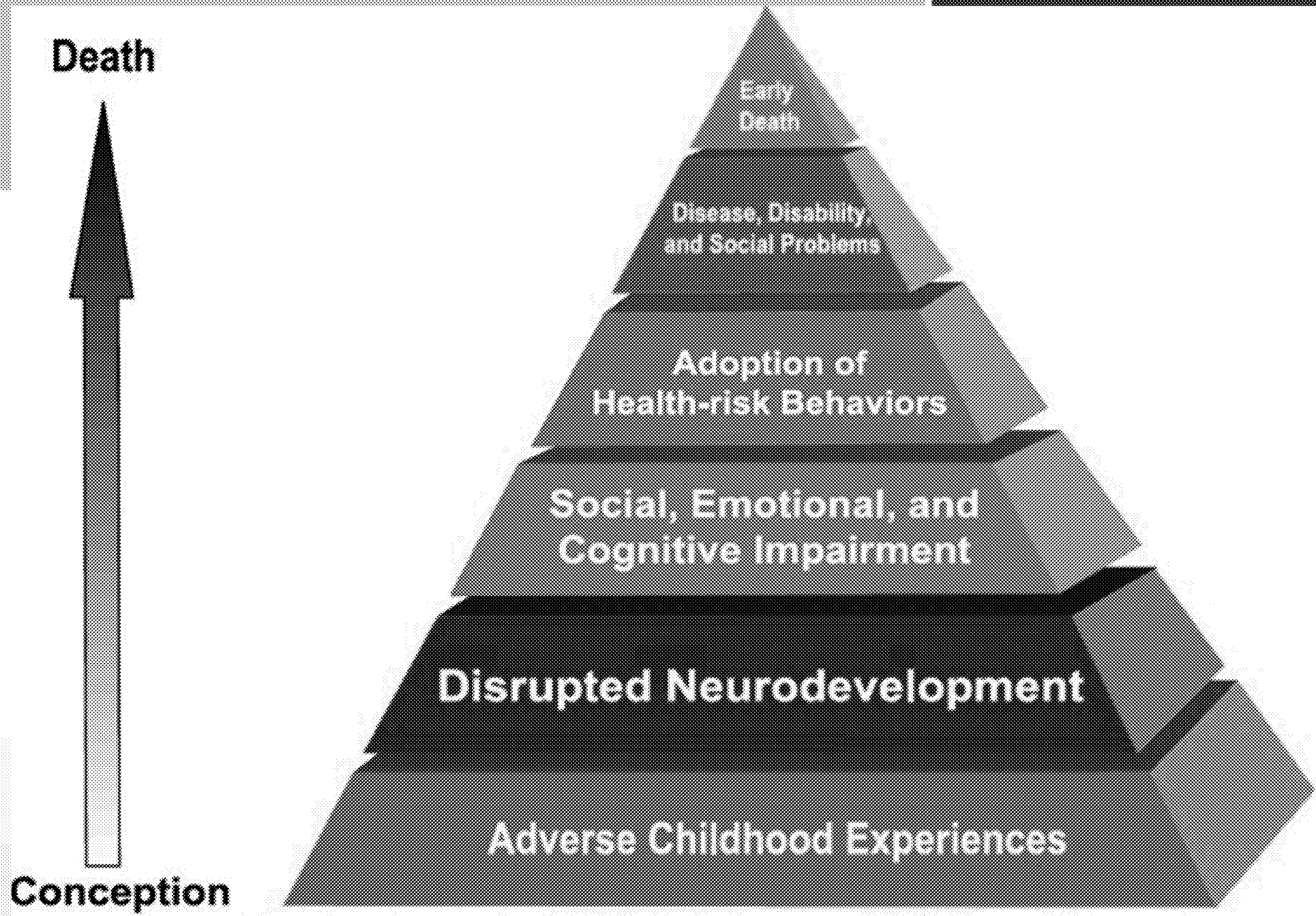

Mechanisms by Which Adverse Childhood Experiences Influence Health and Well-being Throughout the Lifespan

http://www.cdc.gov/violenceprevention/acestudy/

EPIGENETICS

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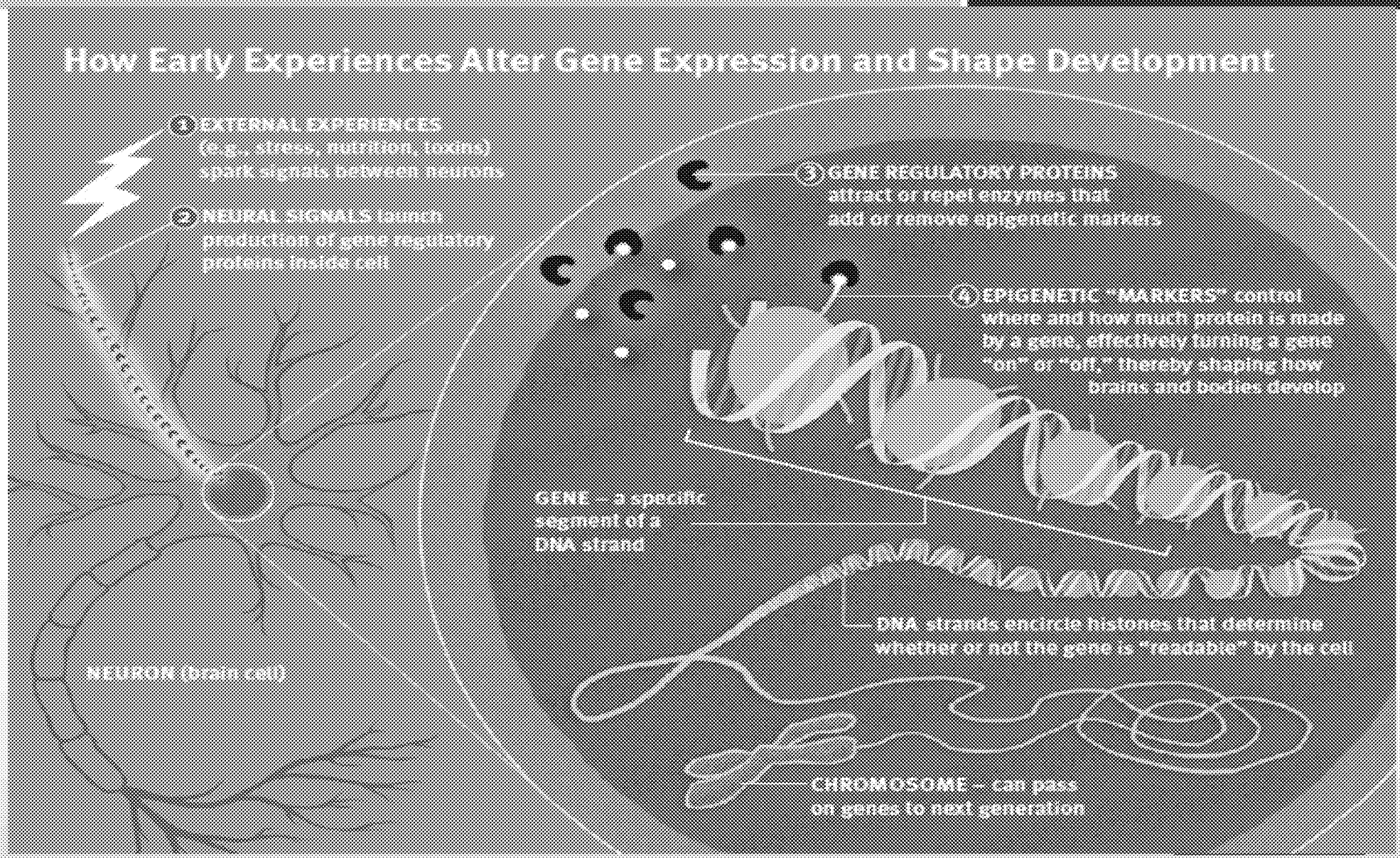

http://developingchild.harvard.edu/science/deep-dives/gene-environment-interaction/

ACE/Toxic Stress

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- Many chronic diseases/disparities in adults are determined decades earlier, by experiences in childhood (0-6 critical)
- Lead exposure is an ACE/toxic stress

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Flint kids...

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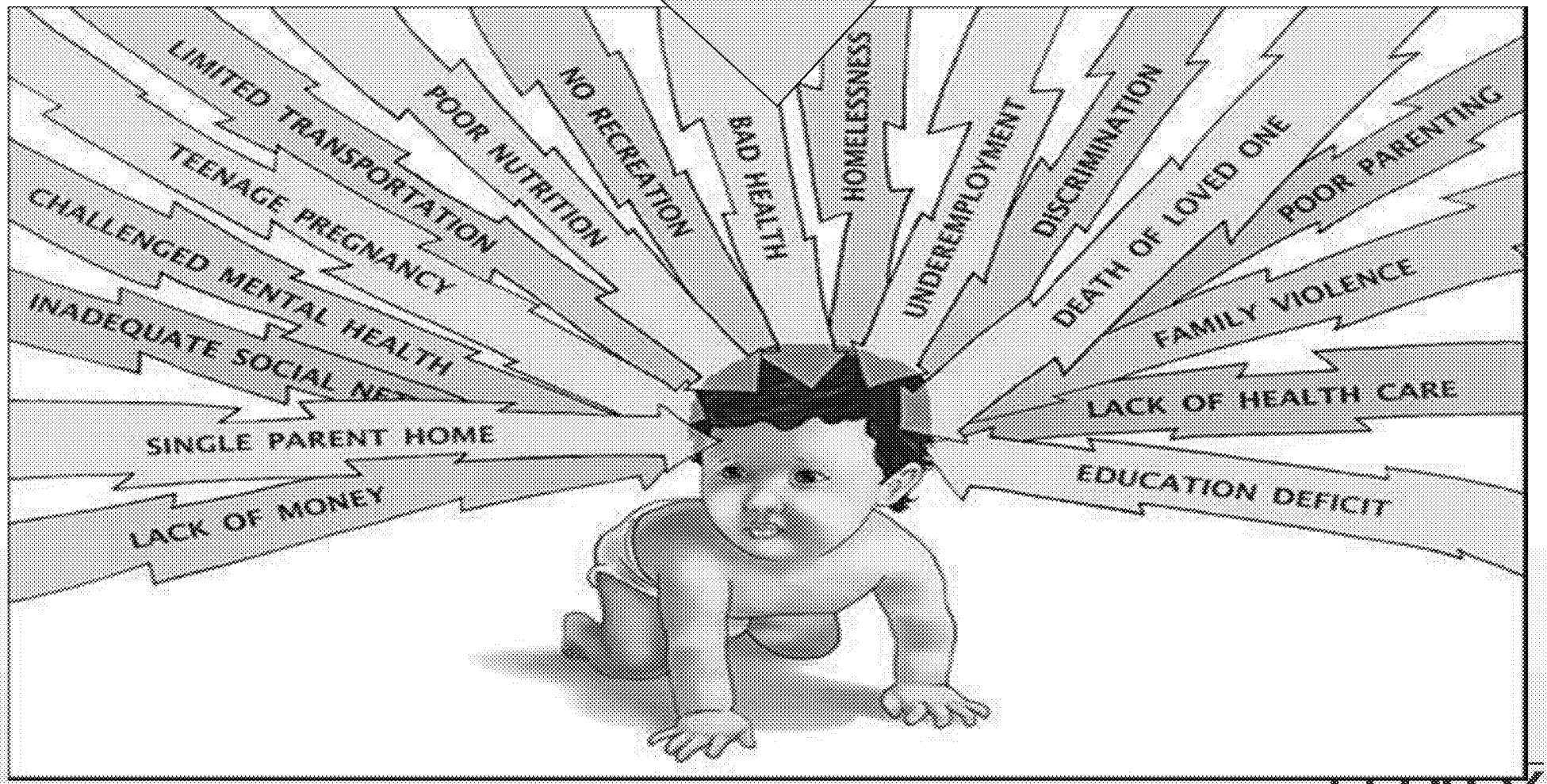

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- Now what can we do???

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Research/Assessment

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- Assess the impact of the exposure
  - Health impact
    - BLL
    - Longitudinal neurodevelopmental f/u
    - Cord blood Pb, brain injury markers, epigenetics
    - Retrospective fetal deaths, IUGR
  - Nutrition impact
  - Psychosocial impact
  - Water quality/infrastructure impact
- Continued monitoring
  - Academic/public health collaborations

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Secondary Prevention

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- Unique opportunity to be proactive, to regain public trust, and to **buffer** impact of exposure
  - Short Term
  - Long Term

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Short-Term Secondary Prevention

- Consistent, coordinated, multi-method, trusted messaging/education/risk communication/PSAs
  - Need for central command/hub/emergency response

Short-Term Secondary Prevention

- Water still not safe (public health emergency)
  - Corrosion control optimization
  - Ongoing risk from scale disruption
  - Door to door filter/replacement distribution
    - # filters distributed approx 1/3 of homes
  - Public education re water precautions (filters, flushing, cold water, cooking, infants, etc)
  - Lead plumbing

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Secondary Prevention Evidence Based Interventions

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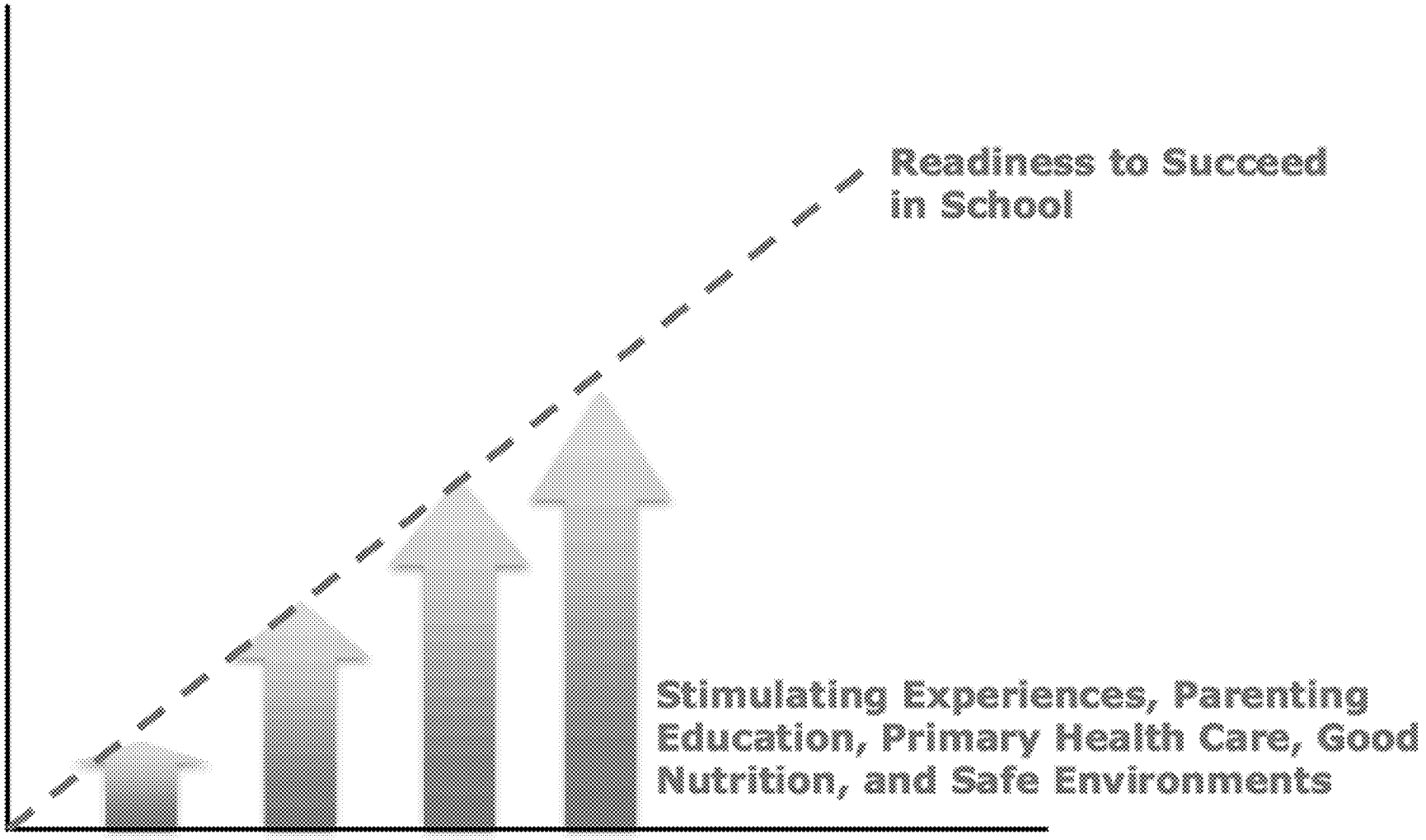
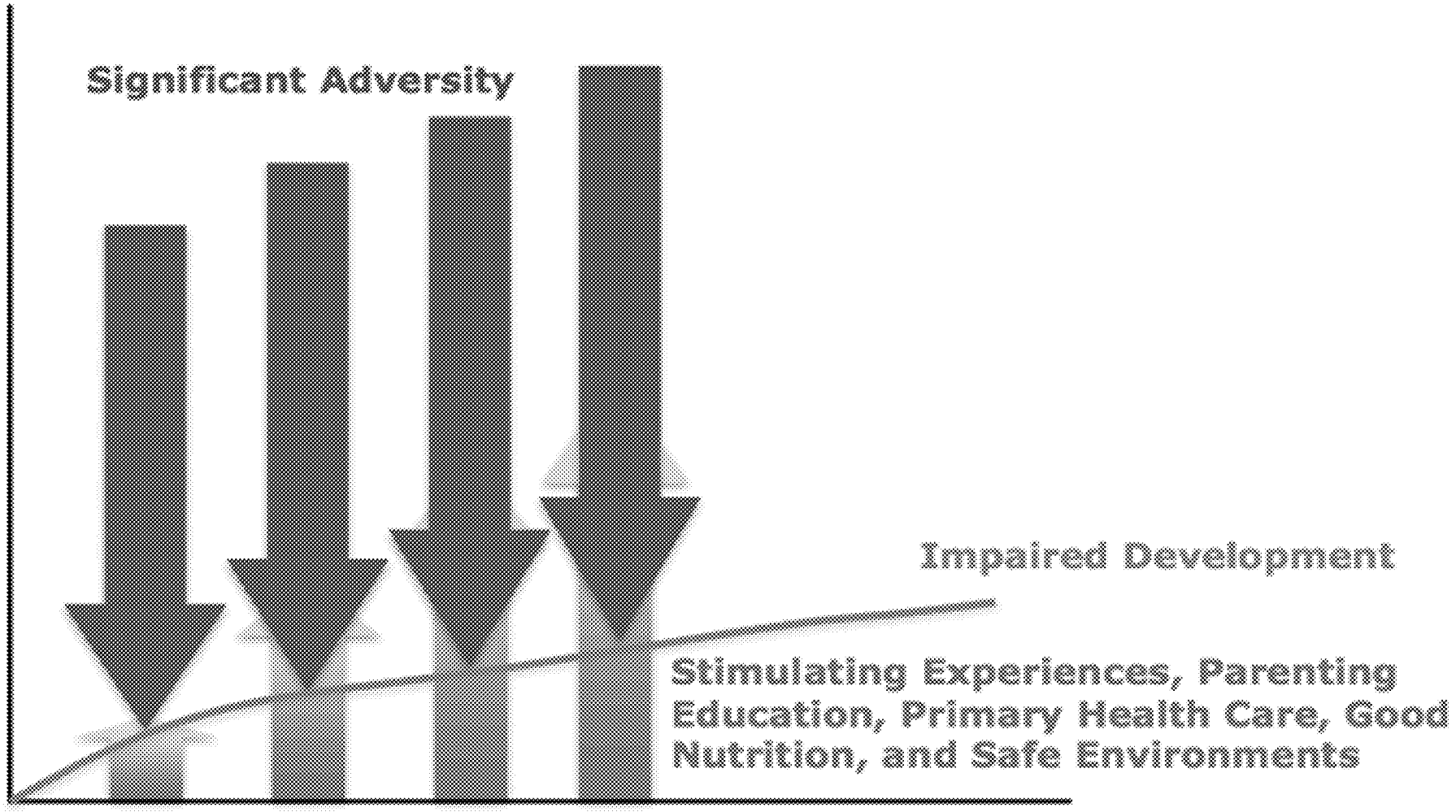
We know what works....



https://www.aap.org/en-us/advocacy-and-policy/federal-advocacy/Documents/Panel%201%20-%20Shonkoff%20Center%20on%20the%20Developing%20Child%20Presentation.pdf

And we know what hurts...



https://www.aap.org/en-us/advocacy-and-policy/federal-advocacy/Documents/Panel%201%20-%20Shonkoff%20Center%20on%20the%20Developing%20Child%20Presentation.pdf

Evidence Based Interventions

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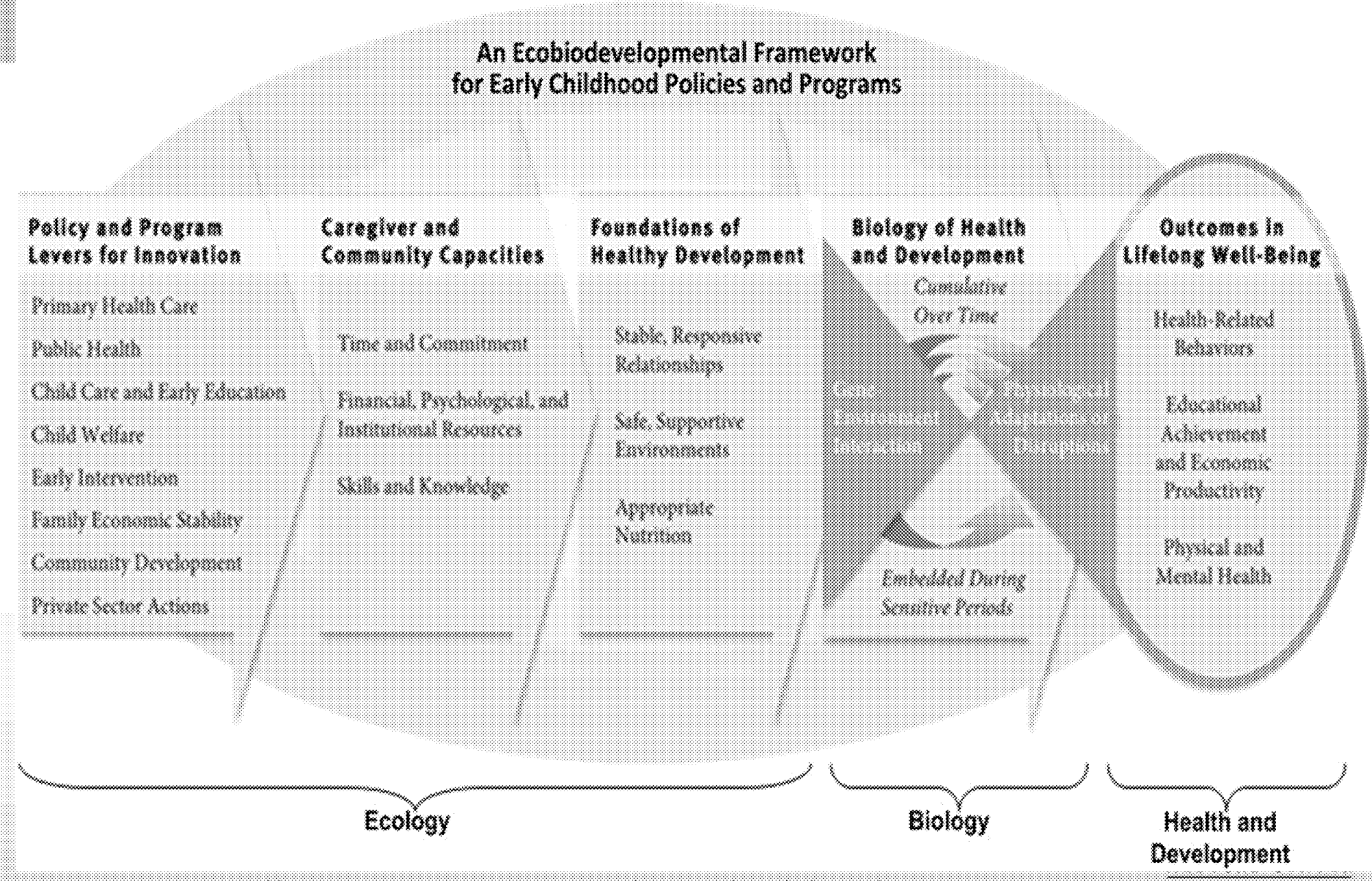

http://pediatrics.aappublications.org/content/129/1/e232/F2.expansion.html

#flintwatercrisis
Secondary Prevention

- Medical/Health
- Nutrition
- Education
- Caregiver capacity
- Water quality

Secondary Prevention
Medical/Health

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- Support and education for primary care providers regarding aggressive long-term neurodevelopmental screening & testing
- Improve access to Developmental and Behavioral (DBP) specialists, pediatric psychologists, pediatric psychiatrists
  - Preemptive referral to mental health/toxic stress screening
  - Support capacity buliding and/or incentivize recruitment to allow Gensee Health System (CMH) to buil this capacity which is currently needed and lacking
- Increase recognition and education regarding trauma informed care, social determinants of health (SDOH)
- Consider health fund/enrollment in Children's Special Health Care Services (CSHCS) for exposed kids to cover long-term needs

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Secondary Prevention Medical/Health

- Expand state-funded Genesee Health System (CMH) services
  - Infant Mental Health (30 capacity)
  - Child case management
  - Home-based services
  - Trauma informed care – trauma focused CBT

Secondary Prevention
Medical/Health

- Role of Medicaid HMO plans:
  - Support to drive patients to medical home: enhanced transportation, case management, HEDIS monitoring, pt incentives, mental health access, etc
  - Reimbursement for integrated social work, registered dietician, mental health services, OT/PT services
  - Encourage collaboration/mandate support of Genesee Children's Healthcare Access Program (CHAP)

Hurley Children's Clinic

Thinking Outside The Box

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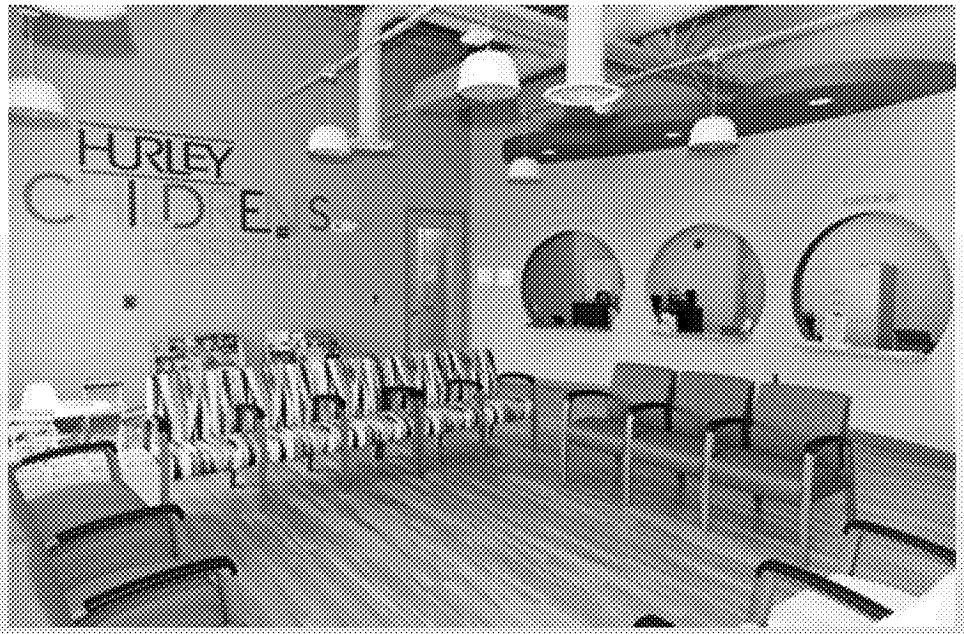

- Transportation
- Social work
- WIC RD/Nutrition
- Peds Psychology
- Training site

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Secondary Prevention
Nutrition

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- Short-term mitigation/protection
  - Promotion/education of Iron, Calcium, Vit C diets
- Promote enrollment and participation in pre-existing nutrition resources (WIC, SNAP, DUFB, MTA)
- Expand WIC eligibility, access (co-locate with PMD), benefits

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Secondary Prevention
Nutrition

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- Improve food access/security efforts via subsidies, pilots – grocery stores, mobile groceries, urban farming, etc
  - Buy/limit liquor licenses
- Invest in breastfeeding promotion, education, and support services

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Secondary Prevention
Education

- Subsidize quality childcare options
- Automatic referral/assessment by Early Intervention (Early On)
- Enroll all in early head start, head start
  - Universal Pre-school/Flint Pre-Promise
- Strengthen special education capacity/trained personnel

Secondary Prevention
Education

- Invest in school health/wellness/behavioral health
  - School nurse:student ratio – MI ranked worst in country
  - 1:750 recommended
  - 1:6,500 Flint
- Place MDHHS employee at every school
- Model lead safe school campaigns
  - Proactive water testing, lead plumbing investigations
  - Lead mitigating school nutrition

Investing in Children: Younger The Better

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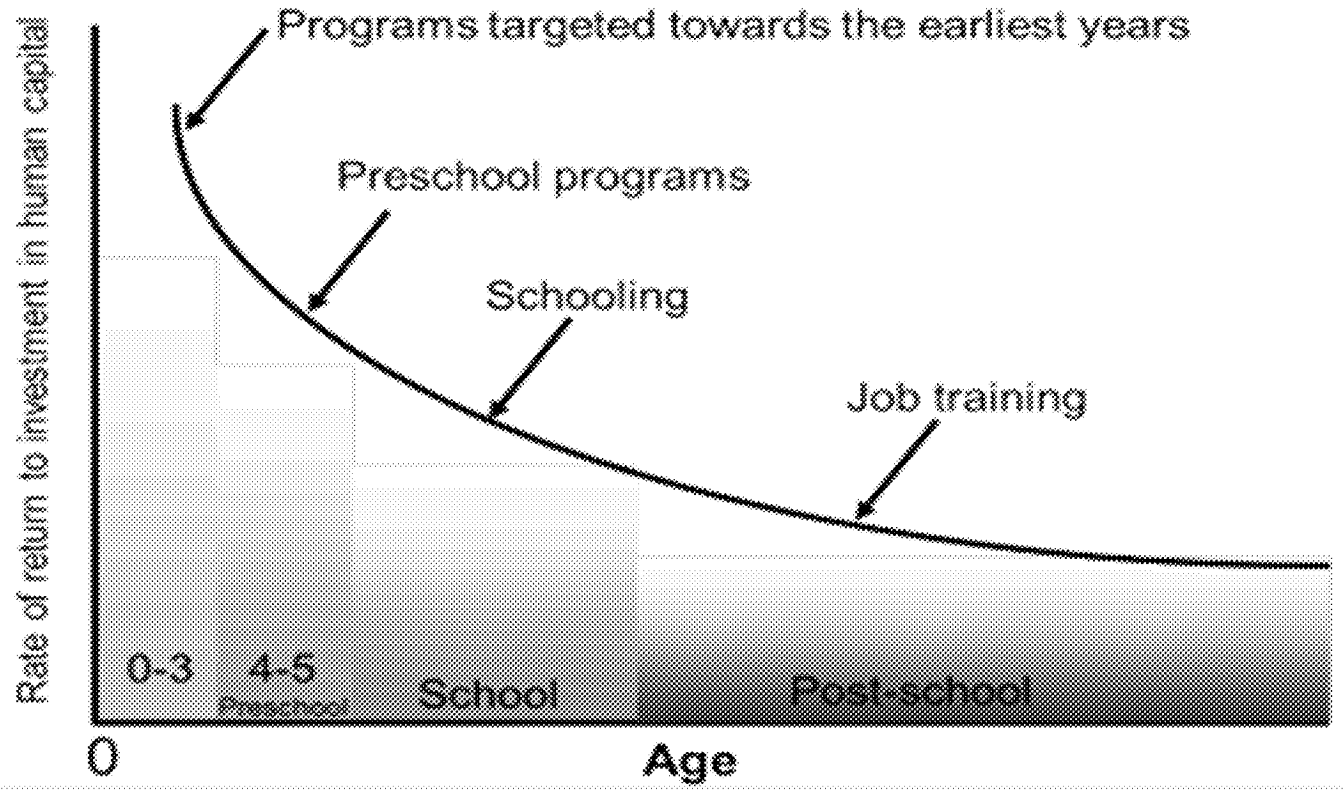
Rates of Return to Human Capital Investment at Different Ages: Return to an Extra Dollar at Various Ages



https://www.aap.org/en-us/advocacy-and-policy/federal-advocacy/Documents/Panel%202%20-%20Marks%20RWJF%20Presentation.pdf

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Secondary Prevention
Caregiver capacity

- Toxic stress and resilience
  - "Strong, frequent, and/or prolonged activation of the body's stress-response system in the absence of the **buffering protection of a supportive, adult relationship**."

Shonkoff, J & Garner, A. (2012) The lifelong effects of early childhood adversity and toxic stress. Pediatrics, 129(1). 232-246.

Secondary Prevention
Caregiver capacity

- Need to support parents and programs to improve parenting skills
- Evidence-based parenting programs
  - Incredible Years (HCH AAP Grant)
  - Triple P
  - Everyday Parenting
  - Adventures in Parenting
  - Home visiting programs
  - Strengthening Families Framework
  - Maternal Infant Health Program (MIHP)
  - Healthy Start
  - Nurse Family Partnership (NFP)

Nurse Family Partnership

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- 56% reduction in emergency room visits for accidents and poisonings in the second year of the child's life
- 50% reduction in behavioral problems when the children enter school.
- 48% reduction in state-verified reports of child abuse and neglect by child age 15
- 39% fewer healthcare encounters for injuries or ingesions in the first two years of life
- Increase in language scores

"Nurse-Family Partnership", Early Childhood, Social Programs That Work, Coalition for Evidence-Based Policy
hVp://evidencebasedprograms.org/wordpress/?page_id=57

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Secondary Prevention
Caregiver capacity

- Increase support for state-funded NFP, Healthy Start and MIHP
  - Hurley-run NFP capacity for 100

Secondary Prevention
Water Safety/Infrastructure

- Opportunity to model best practices for lead in water monitoring to protect public health rather than a focus on minimum compliance
  - EPA Flint Safe Drinking Water Taskforce
- Flint will change water source and treat water again once connected to KWA (2016), should not be rushed
- Full lead plumbing replacement (can be targeted)

Next Steps

- Primary prevention failed
  - Preventable population-wide exposure
- Secondary prevention must be priority

- Invest and prioritize in evidence based interventions that mitigate exposure and build childhood resilience
  - Ages 0 to 6 years critical for life course trajectory

Top Five Interventions

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1. Support for emergency response
2. Increase funding/capacity for home visiting maternal-infant support programs
3. Guarantee Flint Pre-Promise (3-5 year quality early education)
4. Fund RN in every Flint school
5. Encourage innovative Medicaid HMO plan and medical home initiatives (ie: CHAP)

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It's easier to build strong children than to repair broken men.

Frederick Douglass, 1855

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Additional Resources

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- Harvard Center for Developing Child
  - http://developingchild.harvard.edu/
- AAP Toxic Stress Resources
  - https://www.aap.org/en-us/advocacy-and-policy/aap-health-initiatives/EBCD/Pages/Public-Health-Approach.aspx
- Strengthening Families: A Protective Factors Framework
  - http://www.cssp.org/reform/strengtheningfamilies
- CDC ACE Study
  - http://www.cdc.gov/violenceprevention/acestudy/
- *Pediatrics* articles
  - AAP Policy Statement: Early Childhood Adversity, Toxic Stress, and the Role of the Pediatrician: Translating Developmental Science Into Lifelong Health
  - AAP Technical Report: The Lifelong Effects of Early Childhood Adversity and Toxic Stress

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Thank you!

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From: Lyon, Nick (DHHS)
Sent: Thursday, December 31, 2015 9:53 PM
To: Becker, Timothy (DHHS)
Subject: Fwd: Draft Documents Subject to Attorney Client Privilege (FIAAC)
Attachments: A Proposal to Create the Flint Water Inter [225139].docx; ATT00001.htm; IA Coord Com Org Chart [233264].pptx; ATT00002.htm; FY16 and FY17 Flint supplemental (233203).xls; ATT00003.htm

Begin forwarded message:

From: "Baird, Richard (GOV)" <bairdr@michigan.gov>
Date: December 31, 2015 at 2:37:23 PM CST
To: "Agen, Jarrod (GOV)" <AgenJ@michigan.gov>
Cc: "Baird, Richard (GOV)" <bairdr@michigan.gov>, "Kelenske, Chris (MSP)" <KelenskeC@michigan.gov>, "Holland, Meegan (GOV)" <HollandM2@michigan.gov>, "Creagh, Keith (DNR)" <creaghk@michigan.gov>, "Lyon, Nick (DHHS)" <LyonN2@michigan.gov>, "Redford, James (GOV)" <RedfordJ@michigan.gov>, "Murray, David (GOV)" <MurrayD1@michigan.gov>, "Scott, Allison (GOV)" <scotta12@michigan.gov>, "Clement, Elizabeth (GOV)" <clemente@michigan.gov>, "Hollins, Harvey (GOV)" <hollinsh@michigan.gov>
Subject: Draft Documents Subject to Attorney Client Privilege (FIAAC)

Team:

I have received all of the input provided and thank you. The following highlights:

- The only two "enterprise wide" folks we have as Coordinators are Harvey Hollins and Chris Kalenske. I have changed their titles to reflect a coordination/facilitation role and not connote "We are in charge and to hell with everyone else". Therefore I have changed the org chart and created a "dotted line" depiction—and also added the Legislative body as they (or subsets) may have a role here as well.

- But make no mistake, we are going to be accountable whether we should be or not so we are not syndicated the leadership that comes with the coordinating roles. I rewrote certain pieces of the proposal to reflect our inclusion, equality and partnership. But make no mistake, Harvey and Chris are the guys who will make this coordination effort work and if either of them encounter resistance with any of our partners in this effort, I have pledged to have their backs using my persuasive charm and bankruptcy tested mediation skills…

- I did not bring in more departments at this time. That is not to say they would not be value add, but there is a difference between an emergency response and planning effort, and introducing some other ways to get help and support to Flint. We will do that too, but not at this time.

- I have attached Tim Becker's Supplemental Request. Note that even at $6 million over 2 years it does not include funding for the sort of long term monitoring of consequences of lead impact.

- Lastly I want people to know that we are committed to a spirit of inclusion, even with those who have been relentless in their attacks without offering any insights to solutionality. But some of these people have a stronger interest in advancing their own personal agenda and not devoting any real efforts to solving real problems. They will only be welcome if they decide to pursue the latter behavior vs. the former.

Unless someone thinks I really botched something up in the proposal, I would now ask Jarrod to give it final blessing and share with the Governor to get confirmation on the way forward.

Thanks everyone for a less than 24 hour turnaround and…

Go Green

Ok ok…Go Blue too…

HNY,

Rich

Sent from Mail for Windows 10

A Proposal to Create the Flint Water Inter-Agency Coordinating Committee (FIACC)

In collaboration with the Flint After-Action Task Force, MSP Captain Chris Kelenske, DHHS Chief Deputy Tim Becker and DHHS Director Nick Lyon, Harvey Hollins and Rich Baird are recommending the immediate creation of the above referenced entity, with its sustained role and responsibility enabled under the Governor's Executive Order.

Statement of Need

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This inter agency group must fully engage with those we seek to serve. Equal partners. Equal leadership. Equal responsibility. Equal chance to be part of the solution to an important and not fully understood problem. We need our fellow citizens to be our partners in finding a solution, to feel they and their city and community leaders are not just part of the solution but are leading the solution with partners they can trust. This entity needs to be coordinated by State of Michigan leaders who represent statewide resources and constituencies and the citizens who comprise them. This coordinating body must include:

- The creation of a routine information process between all parties.
- Pursuit of other avenues of funding including federal grants and legislative appropriations.
- While the Emergency Management Act or the Stafford Disaster Relief and Emergency Assistance Act may be mechanisms to fix the issues in Flint, portions of the Emergency Management Act outlining management of events are applicable and should be implemented without delay (e.g. Local emergency operations plans/emergency operations guides as well as emergency operations support plans).

Action Plan and Establishing the FIACCC

It appears that a request for a Governor's declaration may be coming from Genesee County as quickly as January 4, 2016. The state's Emergency Coordinator (Capt. Kelenske) will evaluate the request and provide a recommendation whether to issue a declaration, following established protocol and due diligence. But immediately, we will:

1. Establish an interagency workgroup coordinated by Harvey Hollins and Chris Kelenske (who will be actively supported in their work by Rich Baird), and be comprised of DHHS, MDEQ, MSP, Treasury, Genesee County, City of Flint, MDE, LARA and external Subject Matter Experts (SMEs). Civil Rights and MSHDA may be added at a later time. If additional agencies/stakeholders who can assist with accomplishing the action plan are needed, they will be added. Personnel must be goal oriented, transparent with findings and measures of progress, and able to work toward accomplishing the Incident Action Plan created by the state in a timely manner. This is not a discussion or policy group.

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3. Utilize the National Incident Management System and Unified/Incident Command as appropriate.

4. Establish routine communications protocols at the operational, executive, and legislative levels as determined appropriate.

5. Establish interagency workgroup objectives using the following as a starting point.

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    - Convey the remediation plan objectives to all stakeholders and interested parties.
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- Develop priorities, costs, and potential funding sources for infrastructure upgrades as part of a long term recovery plan.
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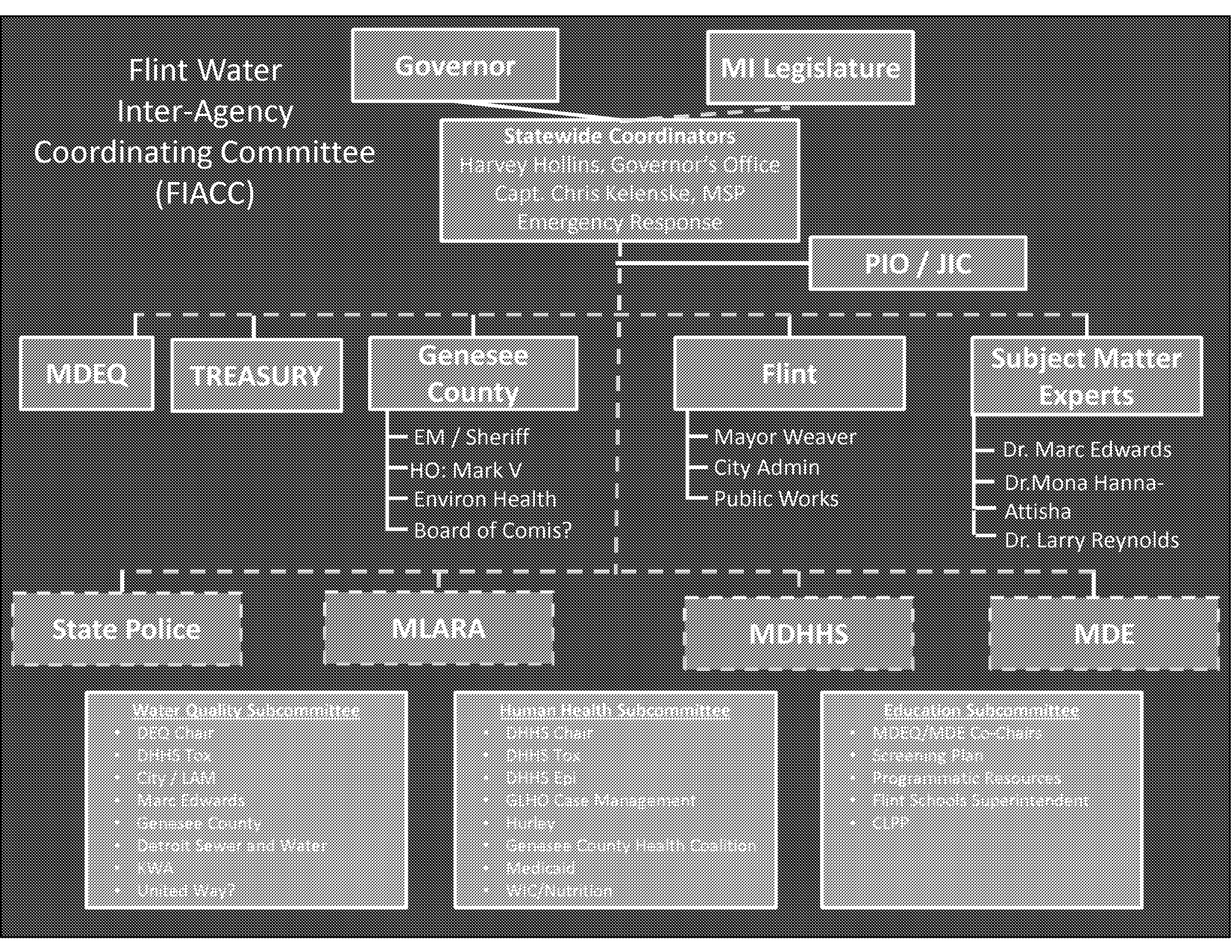
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MI Legislature
Statewide Coordinators
Harvey Hollins, Governor's Office
Capt. Chris Kelenske, MSP Emergency Response
PIO / JIC
MDEQ
TREASURY
Genesee County
EM / Sheriff
HO: Mark V
Environ Health
Board of Comis?
Flint
Mayor Weaver
City Admin
Public Works
Subject Matter Experts
Dr. Marc Edwards
Dr.Mona Hanna-Attisha
Dr. Larry Reynolds
State Police
MLARA
MDHHS
MDE
Water Quality Subcommittee
DEQ Chair
DHHS Tox
City / LAN
Marc Edwards
Genesee County
Detroit Sewer and Water
KWA
United Way?
Human Health Subcommittee
DHHS Chair
DHHS Tox
DHHS Epi
GCHC Case Management
Hurley
Genesee County Health Coalition
Medicaid
WIC/Nutrition
Education Subcommittee
MDEQ/MDE Co-Chairs
Screening Plan
Programmatic Resources
Flint Schools Superintendent
CUPP

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13	5	Increase community education	2	$ 120,000
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16		**Total FY16 Funding Request**	**9.5**	**$ 2,157,500**
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From: Lyon, Nick (DHHS)
Sent: Monday, January 04, 2016 11:07 AM
To: Roberts, John (DTMB)
Subject: Fwd: Draft Documents Subject to Attorney Client Privilege (FIAAC)
Attachments: A Proposal to Create the Flint Water Inter [225139].docx; ATT00001.htm; IA Coord Com Org Chart [233264].pptx; ATT00002.htm; FY16 and FY17 Flint supplemental (233203).xls; ATT00003.htm

Begin forwarded message:

From: "Baird, Richard (GOV)" <bairdr@michigan.gov>
Date: December 31, 2015 at 3:37:23 PM EST
To: "Agen, Jarrod (GOV)" <AgenJ@michigan.gov>
Cc: "Baird, Richard (GOV)" <bairdr@michigan.gov>, "Kelenske, Chris (MSP)" <KelenskeC@michigan.gov>, "Holland, Meegan (GOV)" <HollandM2@michigan.gov>, "Creagh, Keith (DNR)" <creaghk@michigan.gov>, "Lyon, Nick (DHHS)" <LyonN2@michigan.gov>, "Redford, James (GOV)" <RedfordJ@michigan.gov>, "Murray, David (GOV)" <MurrayD1@michigan.gov>, "Scott, Allison (GOV)" <scotta12@michigan.gov>, "Clement, Elizabeth (GOV)" <clemente@michigan.gov>, "Hollins, Harvey (GOV)" <hollinsh@michigan.gov>
Subject: Draft Documents Subject to Attorney Client Privilege (FIAAC)

Team:

I have received all of the input provided and thank you. The following highlights:

- The only two "enterprise wide" folks we have as Coordinators are Harvey Hollins and Chris Kalenske. I have changed their titles to reflect a coordination/facilitation role and not connote "We are in charge and to hell with everyone else". Therefore I have changed the org chart and created a "dotted line" depiction—and also added the Legislative body as they (or subsets) may have a role here as well.

- But make no mistake, we are going to be accountable whether we should be or not so we are not syndicated the leadership that comes with the coordinating roles. I rewrote certain pieces of the proposal to reflect our inclusion, equality and partnership. But make no mistake, Harvey and Chris are the guys who will make this coordination effort work and if either of them encounter resistance with any of our partners in this effort, I have pledged to have their backs using my persuasive charm and bankruptcy tested mediation skills…

- I did not bring in more departments at this time. That is not to say they would not be value add, but there is a difference between an emergency response and planning effort, and introducing some other ways to get help and support to Flint. We will do that too, but not at this time.

- I have attached Tim Becker's Supplemental Request. Note that even at $6 million over 2 years it does not include funding for the sort of long term monitoring of consequences of lead impact.

- Lastly I want people to know that we are committed to a spirit of inclusion, even with those who have been relentless in their attacks without offering any insights to solutionality. But some of these people have a stronger interest in advancing their own personal agenda and not devoting any real efforts to solving real problems. They will only be welcome if they decide to pursue the latter behavior vs. the former.

Unless someone thinks I really botched something up in the proposal, I would now ask Jarrod to give it final blessing and share with the Governor to get confirmation on the way forward.

Thanks everyone for a less than 24 hour turnaround and…

Go Green

Ok ok…Go Blue too…

HNY,

Rich

Sent from Mail for Windows 10

A Proposal to Create the Flint Water Inter-Agency Coordinating Committee (FIACC)

In collaboration with the Flint After-Action Task Force, MSP Captain Chris Kelenske, DHHS Chief Deputy Tim Becker and DHHS Director Nick Lyon, Harvey Hollins and Rich Baird are recommending the immediate creation of the above referenced entity, with its sustained role and responsibility enabled under the Governor's Executive Order.

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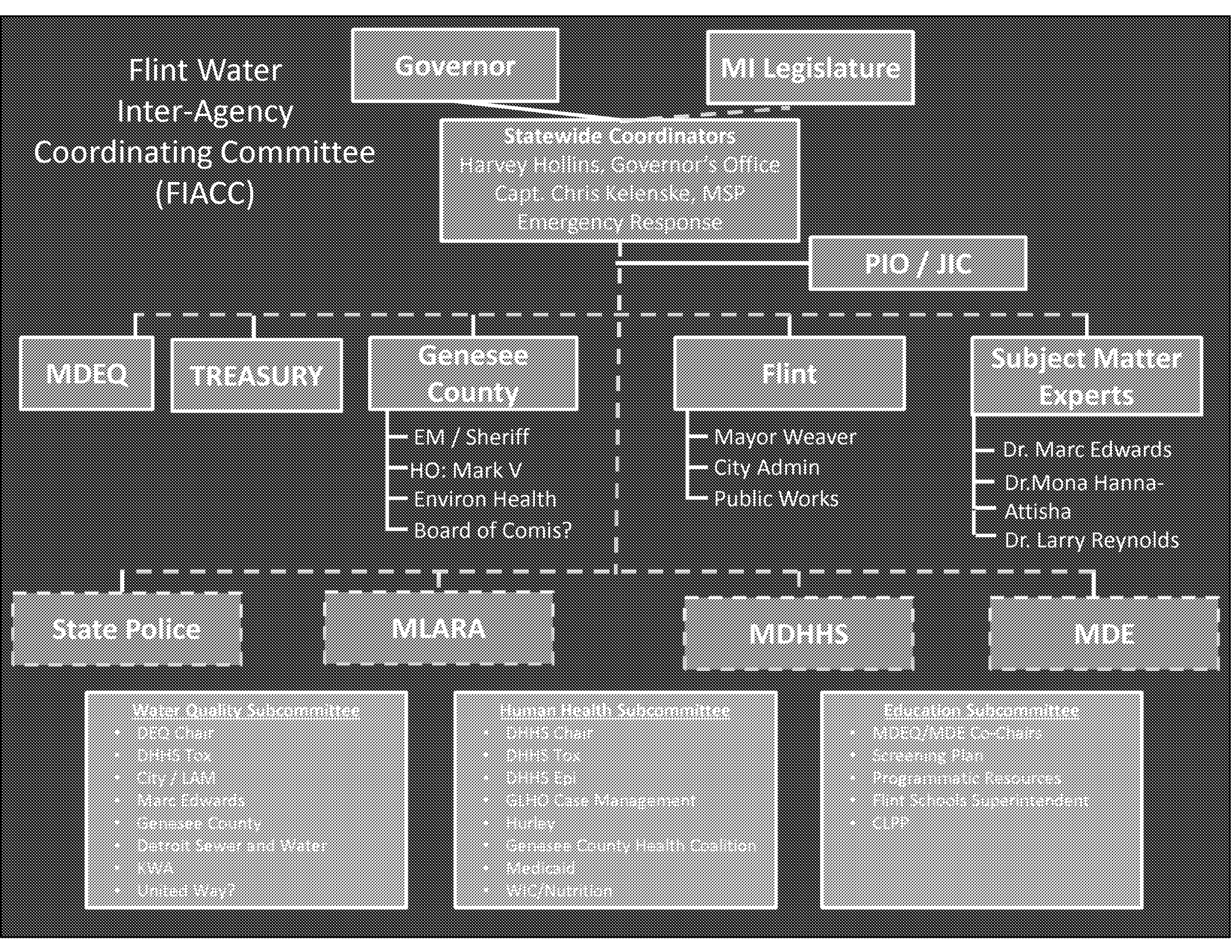
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From: Lyon, Nick (DHHS)
Sent: Monday, January 04, 2016 5:01 PM
To: Grijalva, Nancy (DCH) (GrijalvaN@michigan.gov);Wells, Eden (DCH)
Cc: Granger, Patricia (DHHS) (GrangerP@michigan.gov)
Subject: FW: Draft Documents Subject to Attorney Client Privilege (FIAAC)
Attachments: A Proposal to Create the Flint Water Inter [225139].docx; ATT00001.htm; IA Coord Com Org Chart [233264].pptx; ATT00002.htm; FY16 and FY17 Flint supplemental (233203).xls; ATT00003.htm

Draft only….

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Sent: Monday, January 04, 2016 11:07 AM
To: Roberts, John (DTMB) <RobertsJ9@michigan.gov>
Subject: Fwd: Draft Documents Subject to Attorney Client Privilege (FIAAC)

Begin forwarded message:

> **From:** "Baird, Richard (GOV)" <bairdr@michigan.gov>
> **Date:** December 31, 2015 at 3:37:23 PM EST
> **To:** "Agen, Jarrod (GOV)" <AgenJ@michigan.gov>
> **Cc:** "Baird, Richard (GOV)" <bairdr@michigan.gov>, "Kelenske, Chris (MSP)" <KelenskeC@michigan.gov>, "Holland, Meegan (GOV)" <HollandM2@michigan.gov>, "Creagh, Keith (DNR)" <creaghk@michigan.gov>, "Lyon, Nick (DHHS)" <LyonN2@michigan.gov>, "Redford, James (GOV)" <RedfordJ@michigan.gov>, "Murray, David (GOV)" <MurrayD1@michigan.gov>, "Scott, Allison (GOV)" <scotta12@michigan.gov>, "Clement, Elizabeth (GOV)" <clemente@michigan.gov>, "Hollins, Harvey (GOV)" <hollinsh@michigan.gov>
> **Subject: Draft Documents Subject to Attorney Client Privilege (FIAAC)**
>
> Team:
>
> I have received all of the input provided and thank you. The following highlights:
>
> - The only two "enterprise wide" folks we have as Coordinators are Harvey Hollins and Chris Kalenske. I have changed their titles to reflect a coordination/facilitation role and not connote "We are in charge and to hell with everyone else". Therefore I have changed the org chart and created a "dotted line" depiction—and also added the Legislative body as they (or subsets) may have a role here as well.
>
> - But make no mistake, we are going to be accountable whether we should be or not so we are not syndicated the leadership that comes with the coordinating roles. I rewrote certain pieces of the proposal to reflect our inclusion, equality and partnership. But make no mistake, Harvey and Chris are the guys who will make this coordination effort work and if either of them encounter resistance with any of our partners in this effort, I have pledged to have their backs using my persuasive charm and bankruptcy tested mediation skills…

- I did not bring in more departments at this time. That is not to say they would not be value add, but there is a difference between an emergency response and planning effort, and introducing some other ways to get help and support to Flint. We will do that too, but not at this time.

- I have attached Tim Becker's Supplemental Request. Note that even at $6 million over 2 years it does not include funding for the sort of long term monitoring of consequences of lead impact.

- Lastly I want people to know that we are committed to a spirit of inclusion, even with those who have been relentless in their attacks without offering any insights to solutionality. But some of these people have a stronger interest in advancing their own personal agenda and not devoting any real efforts to solving real problems. They will only be welcome if they decide to pursue the latter behavior vs. the former.

Unless someone thinks I really botched something up in the proposal, I would now ask Jarrod to give it final blessing and share with the Governor to get confirmation on the way forward.

Thanks everyone for a less than 24 hour turnaround and…

Go Green

Ok ok…Go Blue too…

HNY,

Rich

Sent from Mail for Windows 10

A Proposal to Create the Flint Water Inter-Agency Coordinating Committee (FIACC)

In collaboration with the Flint After-Action Task Force, MSP Captain Chris Kelenske, DHHS Chief Deputy Tim Becker and DHHS Director Nick Lyon, Harvey Hollins and Rich Baird are recommending the immediate creation of the above referenced entity, with its sustained role and responsibility enabled under the Governor's Executive Order.

Statement of Need

Due to a combination of resource constraints, inexperienced personnel, "silo" bureaucratic processes and the need to react to immediate problems, there is a lack of coordination, communication, and connected management amongst the departments and stakeholders who must work together to ensure Flint's return to clean, safe water and to coordinate mid and long term efforts to mitigate and address future health and behavioral consequences from lead ingestion. This group MUST be stood up regardless of whether (or when) the conditions required for a declaration of emergency are met by the City, County, State or Federal authorizers.

This inter agency group must fully engage with those we seek to serve. Equal partners. Equal leadership. Equal responsibility. Equal chance to be part of the solution to an important and not fully understood problem. We need our fellow citizens to be our partners in finding a solution, to feel they and their city and community leaders are not just part of the solution but are leading the solution with partners they can trust. This entity needs to be coordinated by State of Michigan leaders who represent statewide resources and constituencies and the citizens who comprise them. This coordinating body must include:

- The creation of a routine information process between all parties.
- Pursuit of other avenues of funding including federal grants and legislative appropriations.
- While the Emergency Management Act or the Stafford Disaster Relief and Emergency Assistance Act may be mechanisms to fix the issues in Flint, portions of the Emergency Management Act outlining management of events are applicable and should be implemented without delay (e.g. Local emergency operations plans/emergency operations guides as well as emergency operations support plans).

Action Plan and Establishing the FIACCC

It appears that a request for a Governor's declaration may be coming from Genesee County as quickly as January 4, 2016. The state's Emergency Coordinator (Capt. Kelenske) will evaluate the request and provide a recommendation whether to issue a declaration, following established protocol and due diligence. But immediately, we will:

1. Establish an interagency workgroup coordinated by Harvey Hollins and Chris Kelenske (who will be actively supported in their work by Rich Baird), and be comprised of DHHS, MDEQ, MSP, Treasury, Genesee County, City of Flint, MDE, LARA and external Subject Matter Experts (SMEs). Civil Rights and MSHDA may be added at a later time. If additional agencies/stakeholders who can assist with accomplishing the action plan are needed, they will be added. Personnel must be goal oriented, transparent with findings and measures of progress, and able to work toward accomplishing the Incident Action Plan created by the state in a timely manner. This is not a discussion or policy group.

It is an active problem solving, execution oriented group of professionals of equal stature completely dedicated to the Flint solution and remediation, and enabled by the statewide capabilities of the coordinators. Staff will be needed with competencies in disaster/emergency planning, operations, logistics and finance as outlined under the National Incident Management System (NIMS). These management components are accountable to the coordinating leadership to ensure tracking of resource requests, and incident action plan items are created, documented and completed. A draft Organization Chart is attached under separate cover and the "dotted lines" depict a non-hierarchical structure where the members commit to working, communicating and sharing collectively vs departmentally.

2. This body should be created by Executive Order and it must complement and not replace the current system under the Emergency Management Act. In fact, it should demonstrate how to best leverage support where existing laws fall short under a man-made emergency.

3. Utilize the National Incident Management System and Unified/Incident Command as appropriate.

4. Establish routine communications protocols at the operational, executive, and legislative levels as determined appropriate.

5. Establish interagency workgroup objectives using the following as a starting point.

Interagency Workgroup Objectives

1. Determine and convey acceptable standards for potable water.
    - Identify needed remediation.
    - Convey the remediation plan objectives to all stakeholders and interested parties.
    - Logistics plan for distribution and serving homebound citizens with water and filtration
    - Implement the plan.
2. Determine health impacts for the impacted population.
    - Identify treatment methods.
    - Nutrition education and support
    - Coping with lead exposure (care, monitoring, neurodevelopmental screening, access to DBP specialists, psychologists/psychiatrists, expanded county services, etc.)
    - Convey the treatment plan objectives to interested parties.
    - Implement the plan.
3. Establish a public information protocol to effectively inform the community of the situation and actions taken.
    - Identify existing Public Information outlets within the city, county, and state.
    - Establish a Joint Information Center
    - Provide for Emergency Alerts and Updates
    - Leverage public and private education schools
    - Determine official information flow and approval of information.
    - Convey to interested parties.
4. Assess the status of the infrastructure and determine feasible actions to upgrade the water system.
    - Determine current state of the infrastructure.

- Develop priorities, costs, and potential funding sources for infrastructure upgrades as part of a long term recovery plan.
- Seek partners to assist (NGOs, Foundations, Business, etc.)
- Implement the plan.

Next Steps

1. Input to this plan has been received and incorporated where feasible. Chief of Staff Jarrod Agen gives final draft approval and reviews with Governor Snyder as soon as possible but not later than Saturday, January 2, 2016

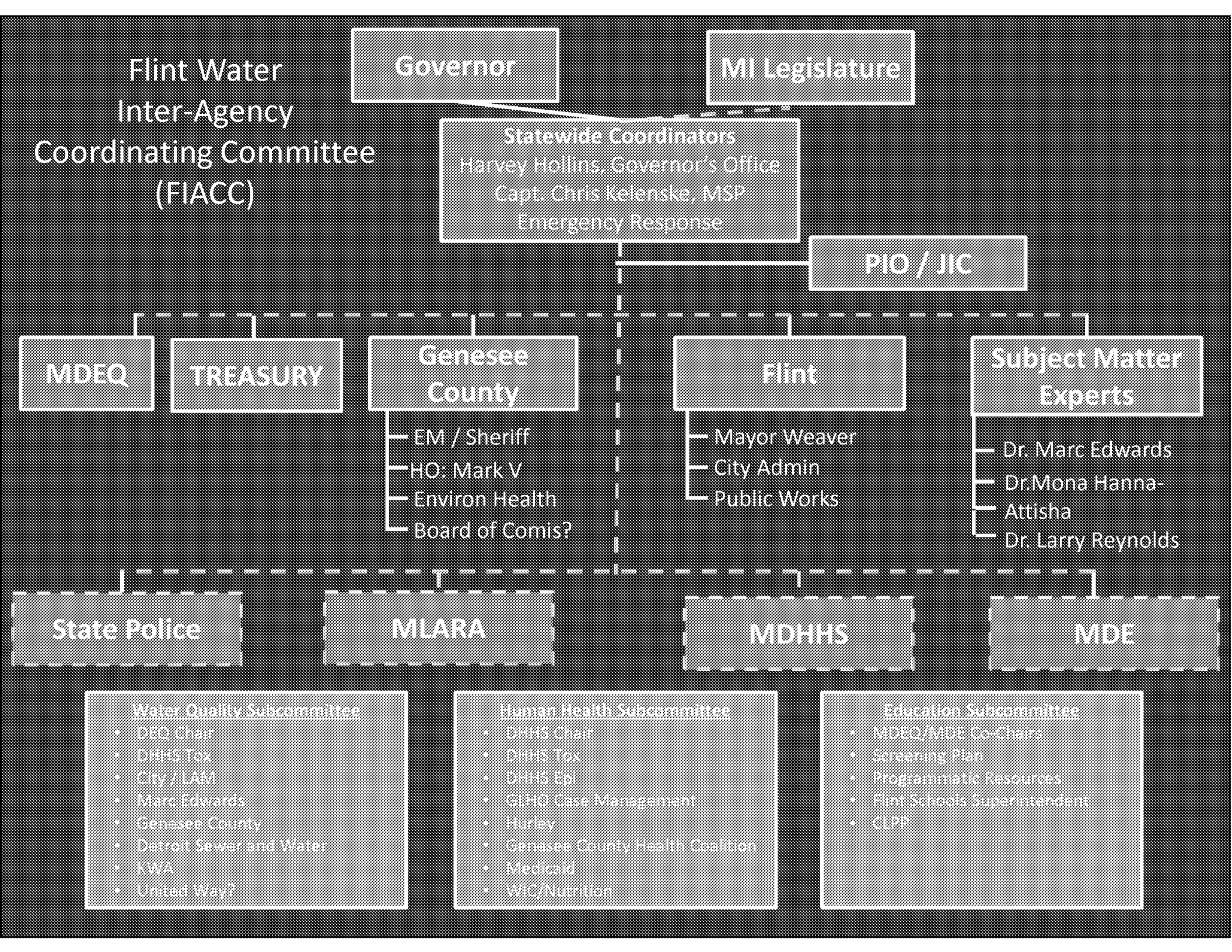
2. Governor Snyder reviews approves/adjusts and decides on the plan and authorizes Harvey Hollins to provide the plan to Mayor Karen Weaver on Saturday or Sunday, January 3, 2016.

3. As a courtesy, I would like to share the plan with the Flint WAATF after it has been provided to Mayor Weaver.

4. Communications should have a strategy on when this plan gets released publically (before, during or after the expected Emergency Declaration by Genesee County. If there is no declaration, we should proactively communicate (and perhaps share the communication with the TF).

5. We are not contemplating activating the State Emergency Operations Center (SEOC) until AFTER Genesee County has demonstrated they did all they conceivably could have done, utilized all available resources to include contracts and mutual aid, and couldn't solve the problem. That is what is required under the Emergency Management Act.

6. MDHHS has put forth a supplemental budget request for FY 16 and 17 for testing, outreach, education, etc. It does not contemplate behavioral or cognitive remediation in the event of lead poisoning.


Flint Water Inter-Agency Coordinating Committee (FIACC)
Governor
MI Legislature
Statewide Coordinators
Harvey Hollins, Governor's Office
Capt. Chris Kelenske, MSP Emergency Response
PIO / JIC
MDEQ
TREASURY
Genesee County
EM / Sheriff
HO: Mark V
Environ Health
Board of Comis?
Flint
Mayor Weaver
City Admin
Public Works
Subject Matter Experts
Dr. Marc Edwards
Dr.Mona Hanna-Attisha
Dr. Larry Reynolds
State Police
MLARA
MDHHS
MDE
Water Quality Subcommittee
DEQ Chair
DHHS Tox
City / LAN
Marc Edwards
Genesee County
Detroit Sewer and Water
KWA
United Way?
Human Health Subcommittee
DHHS Chair
DHHS Tox
DHHS Epi
GCHC Case Management
Hurley
Genesee County Health Coalition
Medicaid
WIC/Nutrition
Education Subcommittee
MDEQ/MDE Co-Chairs
Screening Plan
Programmatic Resources
Flint Schools Superintendent
CUPP

	A	B	C	D
1		**Michigan Department of Health and Human Services**		
2		**FY16 and FY17 Supplemental Request**		
3		**December 30, 2015**		
4				
5		**Appropriation**	**Contractual FTEs**	**Amount**
6				
7		**FY16 Supplemental Request - Assume funding recommended from February 1 - September 30, 2016**		
8				
9	1	Cost for epidemiologists	2	$ 115,000
10	2	Cost to abate lead homes in Flint	3.5	$ 1,687,500
11	3	Additional lead investigations	0	$ 100,000
12	4	Increase nurse case management	1	$ 75,000
13	5	Increase community education	2	$ 120,000
14	6	WIC outreach and transportation	1	$ 60,000
15				
16		**Total FY16 Funding Request**	**9.5**	**$ 2,157,500**
17				
18		**FY17 Supplemental Request - Assume full year**		
19	7	Continuation of FY16 Supplemental	8	$ 850,000
20	8	Cost for epidemiologists	2	$ 220,000
21	9	Cost to abate lead homes in Flint	4	$ 2,261,000

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5	**Detailed Description**
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9	Support two epidemiologists to analyze blood lead levels based on zip codes in the City of Flint. Work conducted by the epidemiologists will be new functions not currently conducted. Positions will be supported through contracts with MPHI.
10	Costs reflect contractual and service costs to abate lead from homes in the City of Flint. Contractual funds will support 3.5 contractual staff - 2.5 field consultants to conduct abatement and one to assist with client application and form processing (total $187,500). Funds for the service include the cost to abate 100 homes @ $15,000 each ($1.5 million) which will include internal housing plumbing components where necessary. Current efforts financed in the previous FY16 supplemental did not support lead abatement activities.
11	Additional contractual efforts to support lead investigations in 100 additional homes in the City of Flint. Service will be provided by ETC Consulting.
12	Funds support the increased testing and follow up necessary with the new homes being investigated. Nurse case managers provide follow up with families, provide nutrition counseling, and coordination with Environmental Blood Level (EBL) investigations.
13	Contractual FTEs will work with the Genesee County Health Department (GCHD) to build educational efforts in that community to develop a more detailed education plan.
14	One contractual peer educator FTE at Genessee County Health Department to help increase WIC enrollment and retention to assist with lead testing, nutrition education, and overall health of pregnant moms and infants.
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19	Continue the funds from the original FY16 supplemental for existing nurse case management of EBL home investigations.
20	Continue the funds from the FY16 request above and support two epidemiologists to analyze blood lead levels and will address broader areas beyond the City of Flint. Work conducted by the epidemiologists will be new functions not currently conducted.
21	Continue the funds from the FY16 request above and finance contractual and service costs to abate lead from homes in the City of Flint. Contractual funds will support 4 contractual staff - 3 field consultants to conduct abatement and one to assist with client application and form processing (total $311,000). Funds for the service include the cost to abate an increase to 130 homes @ $15,000 each ($1.95 million) which will include internal housing plumbing components where necessary. Current efforts financed in the previous FY16 supplemental did not support lead abatement activities.

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9	Could be work beyond Flint if these positions conduct other lead zip code analysis in other cities.
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	A	B	C	D
22	10	Additional lead investigations		$ 130,000
23	11	Increase nurse case management	1	$ 100,000
24	12	Increase community education	2	$ 180,000
25	13	WIC outreach and transportation	1	$ 90,000
26				
27		**Total FY17 Funding Request**	**18**	**$ 3,831,000**
28				
29		**Total FY16 and FY17 Funding Request**	**27.5**	**$ 5,988,500**
30				
31		Notes:		
32		(1) FY16 supplemental request reflects additional needs above the original supplemental level passed in November 2015.		
33		(2) FY16 levels support work to take place in the City of Flint only.		
34		(3) FY17 amounts are full year funding levels. Should the FY16 supplemental pass prior to the release of the FY17 Executive Recommendation, FY17 levels can be annualized to reflect the revised FY16 base.		

	E
22	Funds support additional lead environmental investigations. This is lead investigations in homes of children with high blood lead levels to determine all of the sources of lead exposure and plan for mitigation of lead. This does not include funding for lead abatement. This is done via contract with ETC Consulting. (No FTEs)
23	Continue the funds from the FY16 request above to support the increased testing and follow up necessary with the new homes being investigated. Nurse case managers provide follow up with families, nutrition counseling, and coordination with Environmental Blood Level (EBL) investigations.
24	Continue the contractual health educators at GCHD to work collaboratively with community agencies on awareness of lead hazards, increase lead testing, and nutrition education.
25	One contractual peer educator FTE at GCHD to help increase WIC enrollment and retention to assist with lead testing, nutrition education, and improve the overall health of pregnant moms and infants. Bus tokens (10,000 at $1 = $10,000), bus signs and other promotion materials for WIC at $5,000.
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From: Lyon, Nick (DHHS)
Sent: Monday, January 04, 2016 5:46 PM
To: n_lyon18@yahoo.com
Subject: FW: Michigan Report, Monday, December 28, 2015
Attachments: Michigan Report, Monday, December 28, 2015

From: Grijalva, Nancy (DHHS)
Sent: Monday, December 28, 2015 6:10 PM
To: Lyon, Nick (DHHS) <LyonN2@michigan.gov>; jimhavemanjr43@gmail.com
Subject: FW: Michigan Report, Monday, December 28, 2015

From: Lyon, Nick (DHHS)
Sent: Tuesday, January 05, 2016 2:40 PM
To: Cook, Mark
Subject: FW: Numbered Letter L 15-73
Attachments: L 15-73.pdf

Mark – Here's the L Letter we sent last week to Medicaid providers.

The approach we discussed would be beneficial to those you cover in Flint. We have stepped up our testing, outreach, and education efforts with the local public health department in a very significant way since it became apparent that there was an increase in children testing above the 5 micrograms level. As we discussed we have also begun doing home blood lead investigations with the supplemental funding approved late last year. I think a critical component going forward will be care coordination with children (and adults) who test above the threshold, including nutrition counseling. Molina had indicated they are working with other providers so if you haven't heard from them, you might want to reach out.

Thanks for your efforts.

Nick

From: MSAPolicy
Sent: Wednesday, December 30, 2015 4:35 PM

Subject: Numbered Letter L 15-73

Attached for your information is letter L 15-73, dated December 30, 2015.

L 15-73 – Blood Lead Guidelines to Address the City of Flint Residents' Potential Exposure to Lead.

This letter was sent to Practitioners, Clinics, Laboratories and Maternal Infant Health Program (MIHP) Providers in the City of Flint.

Medicaid Letters can be accessed on the web at www.michigan.gov/medicaidproviders >> Communication and Training >> Click 2015 under Numbered Letters.

Michigan Department of Health and Human Services
PO Box 30479
Lansing MI 48909

December 30, 2015

<Provider Name>
<Provider Address1>
<Provider Address2>
<Provider City> <state> <zipcode5-zip4>

Dear Provider:

RE: Blood Lead Guidelines to Address the City of Flint Residents' Potential Exposure to Lead

Michigan Medicaid Early Periodic Screening, Diagnosis and Treatment (EPSDT) guidelines require children to be tested for blood lead poisoning at 12 and 24 months of age, and between 36 and 72 months of age if the child has not been previously tested as indicated by the Medicaid Provider Manual. The Manual is located at: www.michigan.gov/medicaidproviders >> Policy and Forms.

Due to the enhanced public health issue of an increased risk for lead exposure in the City of Flint, providers have been advised to follow enhanced guidelines for lead testing in children:

- Providers should screen ALL children (regardless of Medicaid/insurance status) between 0 and 6 years of age that may have been exposed to the City of Flint drinking water after April 2014. Note: This includes all children less than 1 year of age and children between 3 and 6 years of age.

- If the child has already been screened since April 2014 by a capillary test, providers should follow-up on any elevated levels greater than 5 mcg/dl to ensure confirmatory venous testing is conducted.

- Providers should utilize the standard Blood Lead Level (BLL) Quick Reference for Primary Care Providers located at: www.mi.gov/documents/deq/ProviderQuickReference_Sept2015_501831_7.pdf?20151204122739.

- All clients with blood lead levels greater than 5 mcg/dl should be referred for case management coordinated through the Genesee County Health Department.

- Providers should inquire about the use of a drinking water filter and/or bottled water by all clients residing within the Flint city limits.

- Providers should inquire about other potential sources of lead within the household per the current recommendations of the Childhood Lead Poisoning Prevention Program's Statewide Lead Testing/Lead Screening Plan. The Statewide Lead Testing/Lead Screening Plan is located at: www.michigan.gov/documents/mdch/testing-screening071009_287511_7.pdf.

Lead testing performed using these enhanced testing guidelines is covered as a Medicaid EPSDT service. Providers should contact the beneficiary's Medicaid health plan for additional assistance if needed. Any questions regarding this letter should be directed to Provider Inquiry, Department of Health and Human Services, P.O. Box 30731, Lansing, Michigan 48909-8231, or e-mail at ProviderSupport@michigan.gov. When you submit an e-mail, be sure to include your name, affiliation, and phone number so you may be contacted if necessary. Providers may phone toll-free 1-800-292-2550.

Sincerely,

Chris Priest, Director
Medical Services Administration

From: Hanley, Farah (DHHS)
Sent: Friday, October 09, 2015 2:28 PM
To: Becker, Timothy (DHHS);Moran, Susan (DHHS)
Cc: Granger, Patricia (DHHS)
Subject: RE: schools not in Flint

Will do.

From: Becker, Timothy (DHHS)
Sent: Friday, October 09, 2015 2:23 PM
To: Moran, Susan (DHHS); Hanley, Farah (DHHS)
Cc: Granger, Patricia (DHHS)
Subject: RE: schools not in Flint

I figured this would become a statewide issue at some point, this is sooner than I expected it.

Farah: Please notify SBO of the pressure exerted on us with the DEQ testing recommendation. I'm not sure they can do anything about it in the current supplemental. We may need to stretch the tests out over time as limited staffing permits.

From: Moran, Susan (DHHS)
Sent: Friday, October 9, 2015 2:09 PM
To: Becker, Timothy (DHHS) <beckert1@michigan.gov>; Hanley, Farah (DHHS) <hanleyf@michigan.gov>
Cc: Granger, Patricia (DHHS) <GrangerP@michigan.gov>
Subject: FW: schools not in Flint
Importance: High

Tim—see note from Corinne regarding toxicology support resources. I'll tell her to go ahead and prepare proposal.

From: Miller, Corinne (DHHS)
Sent: Friday, October 09, 2015 1:11 PM
To: Moran, Susan (DHHS)
Subject: schools not in Flint

Sue,

Linda was on a call this morning with DEQ and Flint's Public Works director. During the call the DEQ staff indicated Wyant told them to prepare an army given that schools statewide will be encouraged to assess lead levels in drinking water.

I think if DHHS leadership needs to be made aware that we have a squadron but not an army. The submitted budget for the Flint situation includes an 0.2 or 0.25 FTE for toxicology but it can't be stretched to provide technical assistance for a statewide process. Would it help if Linda wrote a one-page proposal about what staffing is needed if this goes statewide, which I think it will.

Corinne

From: Dykema, Linda D. (DHHS)
Sent: Friday, October 09, 2015 12:59 PM

To: Miller, Corinne (DHHS)
Subject: schools

http://www.detroitnews.com/story/news/politics/2015/10/08/flint-water/73623958/

State officials plan to contact all schools in the state, urging them to assess their lead levels in drinking water. Facilities built in the last quarter-century are unlikely to have lead issues, but others built before the mid-1980s may have lead connections and could be a problem, according to the agency.

"Schools that have lead infrastructure should be testing," Wyant said.

Linda D. Dykema, Ph.D.
Environmental Public Health Director
Division of Environmental Health
Michigan Department of Health & Human Services
517.335.8566
dykemal@michigan.gov

From: McKane, Patricia (DHHS)
Sent: Wednesday, November 25, 2015 11:45 AM
To: Scott, Robert L. (DHHS)
Subject: Fwd: Blood Lead Testing Report through 13Nov2015
Attachments: 2015-11-24 - Flint Lead Report DRAFT 09 NEW.pdf; ATT00001.htm

Sent from my iPhone

Begin forwarded message:

> **From:** "Dykema, Linda D. (DHHS)" <DykemaL@michigan.gov>
> **Date:** November 24, 2015 at 9:39:28 AM EST
> **To:** "Miller, Corinne (DHHS)" <MillerC39@michigan.gov>, "Wells, Eden (DHHS)" <WellsE3@michigan.gov>, "Moran, Susan (DHHS)" <MoranS@michigan.gov>
> **Cc:** "Eisner, Jennifer (DHHS)" <EisnerJ@michigan.gov>, "McKane, Patricia (DHHS)" <McKaneP@michigan.gov>
> **Subject: Blood Lead Testing Report through 13Nov2015**
>
> Attached is the blood lead testing report through November 13, 2015 with updated Oct 1 to Oct 31 counts, Nov 1 to Nov 13 counts added, and summary text revised.

Michigan Department of Health and Human Services (MDHHS)
Blood Lead Level Test Results for Flint Zip Codes 48501-48507
Summary as of November 13, 2015

Executive Summary

This report is generated by MDHHS to track Blood Lead Level test results in Flint, Michigan.

- Counts on this report include both capillary and venous blood tests. People who have had multiple tests are counted only once.
- Since 10/1/2015, an additional 1,395 people have been tested in Flint.
- Continued testing efforts by Genessee County Health Department, MDHHS and local medical personnel have identified 26 children with blood lead levels greater than or equal to 5µg/dL (micrograms per deciliter) since 10/1/2015.
- Three percent of the children younger than 6 years old tested since 10/1/2015 have had blood lead levels greater than or equal to 5µg/dL.
- Additional testing is ongoing. Counts will vary as new results are added.

Adults (18 Years or Older)

Total number of adults tested for lead from 1/1/2013 to 4/14/2014	170
Number of adult BLL test results ≥5µg/dL from 1/1/2013 to 4/14/2014	22
Total number of adults tested for lead from 4/15/2014 to 9/30/2015:	207
Number of adult BLL test results ≥5µg/dL from 4/15/2014 to 9/30/2015:	13
Total number of adults tested for lead from 10/1/2015 to 10/31/2015:	**343**
Number of adult BLL test results ≥5µg/dL from 10/1/2015 to 10/31/2015:	**6**
Total number of adults tested for lead since 11/1/2015:	**51**
Number of adult BLL test results ≥5µg/dL since 11/1/2015:	**3**

Number of People Tested for Lead in Flint

Total number of people tested for lead from 1/1/2013 to 4/14/2014	4657
Total number of people tested for lead from 4/15/2014 to 9/30/2015	5017
Total number of people tested for lead from 10/1/2015 to 10/31/2015:	**1206**
Total number of people tested for lead since 11/1/2015:	**189**

Children Younger than 6 Years Old

Total number of children tested for lead from 1/1/2013 to 4/14/2014	3811
Number of child BLL test results ≥5µg/dL from 1/1/2013 to 4/14/2014	112
Total number of children tested for lead from 4/15/2014 to 9/30/2015:	4156
Number of child BLL test results ≥5µg/dL from 4/15/2014 to 9/30/2015:	181
Total number of children tested for lead from 10/1/2015 to 10/31/2015:	**516**
Number of child BLL test results ≥5µg/dL from 10/1/2015 to 10/31/2015:	**16**
Total number of children tested for lead since 11/1/2015:	**75**
Number of child BLL test results ≥5µg/dL since 11/1/2015:	**3**

Children 6 to 17 Years Old

Total number of children tested for lead from 1/1/2013 to 4/14/2014	676
Number of child BLL test results ≥5µg/dL from 1/1/2013 to 4/14/2014	5
Total number of children tested for lead from 4/15/2014 to 9/30/2015:	654
Number of child BLL test results ≥5µg/dL from 4/15/2014 to 9/30/2015:	7
Total number of children tested for lead from 10/1/2015 to 10/31/2015:	**347**
Number of child BLL test results ≥5µg/dL from 10/1/2015 to 10/31/2015:	**6**
Total number of children tested for lead since 11/1/2015:	**63**
Number of child BLL test results ≥5µg/dL since 11/1/2015:	**1**

From: Moran, Susan (DHHS)
Sent: Wednesday, November 25, 2015 4:43 PM
To: Anderson, Paula (DHHS)
Subject: FW: Follow up items
Attachments: MDHHS Flint Action Plan 11-24-15.docx; Considerations for Use of the ICS (3).docx; Gov Task Force on Flint Water Follow Up Lead Abatement.docx

Please print for MDHHS action plan folder

From: Lasher, Geralyn (DHHS)
Sent: Wednesday, November 25, 2015 11:16 AM
To: Moran, Susan (DHHS); Wells, Eden (DHHS); Hertel, Elizabeth (DHHS); Minicuci, Angela (DHHS); Eisner, Jennifer (DHHS); Miller, Corinne (DHHS); Dykema, Linda D. (DHHS); Robinson, Mikelle (DHHS)
Cc: Becker, Timothy (DHHS); Lyon, Nick (DHHS); Grijalva, Nancy (DHHS)
Subject: FW: Follow up items

Attached you will find the items I mentioned this morning that were forwarded to the Task Force yesterday.

--A detailed MDHHS Action Plan on Flint Water Public Health

--An overview provided by our Bureau of EMS, Trauma and Preparedness giving further detail on considerations for use of the Incident Command System or Community Health Emergency Coordination Center (CHECC)

--Answers to the lead abatement questions posed to the department from the Task Force.

Thanks--g

Flint Water Public Health Response: MDHHS Action Plan

Update 11-24-15

TASK	STATUS	ACTION	DATE COMPLETED
Filter Distribution	Residents may continue to obtain filters from Genesee County Community Action Resource Department (GCCARD) (both sites 9-4PM) and MDHHS clients can continue to obtain filters at the two MDHHS office locations or the GCCARD sites.	Since 10/6, 11,355 MDHHS purchased water filters and 200 water pitchers have been distributed.	**Ongoing**
Filter Replacement Distribution	The procedure is in place for replacement cartridge distribution including an abbreviated application for residents to apply for and obtain cartridge replacement. Cartridge replacement will occur at same locations as filter sites. DHHS is also placing an order for 750 replacement filters for the 8-cup Zerowater filters. 9000 Brita replacement filters on hand with an additional 10,000 readily available when needed. Total available= 19,000	1,418 MDHHS purchased replacement water filters have been distributed.	**Ongoing**
	MDHHS is currently coordinating with GCCARD on publicity for distribution of the replacement filters. United Way will provide Pur Filter Replacements. United Way will also be purchasing filter units for school water fountains. Press release planned Monday 11/2 re: pick up of replacement filters, videos to be posted on websites and you tube.	Jen Eisner will work with Hilda McShane	**Completed** 11/2
	United Way requested that MDHHS purchase Pur filter replacements. GCCARD requests that no more bottled water be donated. They have plenty in stock. Cash is preferred. City of Flint set up distribution point in City Administration office building. Genesee County Health Department (GCHD) will be providing City of Flint with Pur Filters. The Brita filter requires a form for MDHHS be filled out; there are some concerns that undocumented members of population will avoid Brita filters for this reason.	**No action indicated.**	
Public Education Proper Filter Use	When used improperly, the filters will exceed their capacity limit in a much shorter time frame thereby increasing need for filter replacement much sooner than expected. Develop NEW public education material about proper use of cartridge AND how to obtain filter replacement cartridges, targeted for release week of October 26 during lead awareness week.		**Completed**

TASK	STATUS	ACTION	DATE COMPLETED
	Request made for written instructions on filter cartridge replacements for nurse case managers to take on home visits. Wes is working to complete a packet for nurse case managers which will include information on filters.		**Completed**
	Video created by MDHHS with Home Depot demonstrating replacement of the Brita replacement filter. DEQ receiving questions about meters on the water filter pitchers delivered to the schools which are likely Zerowater Filters.	The video added to the gov/flintwater website.	**Completed 11/2**
	Video will be added to nurse training—Childhood Lead Poisoning Prevention Program (CLPPP).		**Completed 11-10**
Lead Testing Protocol:	Draft protocol has been completed, undergoing final review. Protocol calls for testing: Priority groups- • Confirmatory venous testing for children who had venous testing (115 children) • Children in day care, Head Start • children attending 3 schools (Freeman, Eisenhower, Brownell) • Children residing in high risk zip codes (03, 04) • All other students Protocol will be announced in a joint MDHHS/GCHD Press release.		**Completed 10-28**
Blood Lead Testing: 9/28/15-10/23/15	CLPPP processed 580 tests from Flint zip codes since 9-28-15; 5 children were reported with elevated lead blood levels. There approximately 200 children that have been identified for follow-up.	MDHHS has arranged a contract with the GCHD to provide nurses for the follow-up.	**Contract completed in E-grams as of 10-23**
	Cross reference list of children with elevated lead levels with filter distribution data to ensure household has a filter. (Peeler/Scott) So far only about 20% of approximately 200 children with EBL are known to have received a filter. GCHD will deliver filters to these homes as they are doing the case follow-up. GCHD will provide weekly updates.	Send list to Kris S (done)	In process
	A group will develop reporting metrics and system to track same: Linda Dykema, Wes Priem, Michele Bruneau, Bob Scott and group met to discuss metrics. Plan to produce first detailed report for internal review the week of Nov. 9th. Additional work on the numbers was required to ensure accuracy. A simplified version for external dissemination will be released after internal review.	**Completed**	**Completed**

TASK	STATUS	ACTION	DATE COMPLETED
	Linda Dykema is working on an analysis of blood lead tests done since 9-28-25. Epi will assist with this analysis. Still fine-tuning the report.		
	Draft press release, talking points and BLL report (for period 10/1/15-11/13/15) in progress.		**Pending**
	Reach out to Medical Services Administration of MDHHS to discuss maximum effort to promote blood lead testing of children 0-6	MDHHS developing strategy to reach out to Medicaid health plans.	Sue Moran, Chris Priest and Kathy Stiffler working on this currently.
Parent education	Parent education material completed. Discuss dissemination of parent material through Flint schools.	Call with Flint school superintendent, GCHD, and MDHHS scheduled 10-26-15 to discuss dissemination process.	**Completed**
	Schools require 6000+ information packets for distribution to all students. Print order sent to DTMB. Hardcopy will be distributed to GCHD for issuing to the schools, and to Headstart, daycare, and other agencies in Flint with children ages 0-5. Mark will drop off hard copies at GCHD. Toni LaRocco will take the lead in distribution of the materials to the schools and other agencies.	MDHHS Geralyn Lasher arranged for printing.	**Completed**. 10/30 printing completed and Mark dropped off 6,000 copies at the Flint School Admin. Building, and 2,500 to health dept. Remainder dropped off on 11/2.
	Ensure legislators receive material in advance	Elizabeth Hertel coordinate legislator notification	**Completed**

TASK	STATUS	ACTION	DATE COMPLETED
Provider Education	Provider Education material completed. Communication to providers will occur through GCHD and MDHHS networks (GCMS, GCARD, hospitals, etc).MDHHS will distribute through the Medicaid Health Plans. Hurley providers received the packet and the remainder of providers will receive the information next week.	Mark Valacek Wells/Peeler Electronic dist. through various listservs.	**Completed** 10/30 **Completed** 11/2
	A webinar for health care providers will be held in early December to discuss the Lead issue, blood lead testing, Ready to Feed Formula, and answer any questions. It will be co-sponsored by the GCHD medical director.		
Community public education and testing event	McLaren Health Plan in conjunction with GCHD hosted a public testing and awareness event on November 5 at the Burton GCHD site. 40 children were tested. McLaren will have providers on site to perform testing for their members; GCHD onsite to perform testing for all others. Event will also include Medicaid application assistance. Tony Larocco (GCHD) has contacted Molina and Meridian Health Plan regarding sponsorship of community testing and awareness event. Molina and Meridian Health Plan testing dates to be determined. GCHD will be at a community event on Nov. 12, from 2 PM to 7 PM, to focus on testing for children 0-5. (Brownell and Holmes Schools)> Another testing event was held at Brownell School on 11/12. Many organizations were present to provide information and services. 27 children were tested, 60 filters distributed. **There was only one EBL result from the Brownell clinic (5.5 ppb that will be reported out as a 6.0; McLaren results are not available yet.) Flint schools superintendent is interested in having another event.**	Dr. Forschee has been contacted. Tony contacted Molina and there is interest in a future testing event.	**Pending**
	There will be a combination school testing/townhall/education event, sponsored by Rep. Neeley, on Nov. 2nd. A telephonic townhall is slated for Oct. 28 by Rep. Neely. Gongwer reported that 4,000 people participated in this call.	FYI	**Completed**
Public Education Materials	Mark Johnson, is the regional representative for ASTDR and CDC. He has been designated as contact. A call was held with ATSRDR on 11/13 to discuss how to improve outreach efforts to the Flint community about lead hazards. It was suggested that state/county consider lowering the readability level of the lead materials for the public to 3rd or 4th grade	CLPPP and GCHD staff will review documents and work with the communication	**Pending**

TASK	STATUS	ACTION	DATE COMPLETED
	reading level. **A workgroup is currently reviewing the documents for needed changes. Jim Henry contacted Dr. Suzanne Selig (UMichigan-Flint School of Public Health) who will seek community feedback on the materials that have been developed. After readability changes, some of the materials will be translated into Spanish and Arabic.**	office on any changes.	
Environmental Investigation	MDHHS requested a $275,000 contract with ETC on Oct. 21st, 2015. About 275 EBL investigations are budgeted for Flint. Wes Priem will work with GCHD to coordinate with Flint Housing/other authorities to deal with recalcitrant landlords. MDHHS Division of Environmental Health (DEH) meeting on 11/5 with MDEQ staff to harmonize EBL investigation protocol with water testing protocol. 11/12 The EBL contractor met with GCHD staff to coordinate activities with case management. **The EBL investigation activities require a substantial amount of time (4 hours), less than that for the case management activities; however, the team is arranging joint visits where possible.**		**Contract completed 10/29**
Nurse Follow Up	Project sent to Contracts for inclusion in E-grams 10-23-15. 10-21-15 Funding for case management nurses will be disseminated to GCHD through new project: *Flint Water*, for $425,000 through the Comprehensive Contract E-grams system, to fund the: Follow-up of Children Reported with Elevated Lead Levels: Case Management Services. GCHD advised to secure approvals for use of these funds and begin procedures to place staff in appropriate positions to conduct the work. GCHD has shifted one nurse over for follow-up. That nurse if fully trained on elevated lead patient management. 1.5 nurse FTE's will be assigned and trained on 11-10-15. Lead Safe Home Program worked with GCHD on protocol to harmonize the flow of outreach to families with children with elevated blood levels. 11/10 Training has been completed for 2.5 FTE nurses. Some follow-up training will be scheduled as well. **Follow-up training with nurses was completed on 11-17. Weekly calls have been set up with CLPPP staff and nurses.** **Weekly status report from GCHD attached in separate file.**	Eden will contact Bob to send the list to Toni at GCHD so they can facilitate case management of children with elevated lead levels (done). Contract approved 10/26	**Completed** 10/27 **Completed** 11-10
Water Testing	DEQ will be testing at Freeman Elementary the week of 10-26-15, with plans to expand to	No action	

TASK	STATUS	ACTION	DATE COMPLETED
	14 schools. Residential testing will have a different protocol. GCHD has been in contact with DEQ to possibly assist in sampling. Linda Dykema has a draft Executive Summary for Health-Based Drinking Water Lead Levels developed. Once testing is completed, this document will serve as a decision guide on reopening of school and/or daycare water fountains/faucets for student use. Linda will revise the model to include paint chip values/risk levels. GCHD sanitarians are assisting DEQ with water sampling. We should anticipate some differences in opinion on actionable pb levels. Suggested that the following language that DC used be adapted for our use: "The removal of lead in drinking water is most effective if the full lead service line is removed from both the public and private property. If you choose not to replace your private side pipe, lead can continue to dissolve in your drinking water. You should also replace galvanized plumbing, older lead soldered pipes, and brass fixtures and use a different plumbing material in your home. Until all potential sources of lead in drinking water are removed from your private property, be sure to follow the flushing and filter instructions provided." "Water is lead-free when it leaves the treatment plant, but lead can be released when the water comes in contact with pipes and plumbing fixtures that contain lead. Lead sources and lead levels vary between buildings, so it is important to identify and remove any lead sources in each household." "Pregnant or nursing women and children under age six should use filtered tap water for drinking water and cooking until all lead sources are removed. Filters certified for lead removal are required to meet National Sanitary Foundation (NSF) Standard 53." **<u>This language will be incorporated into EBL investigation reports and in the educational packets the nurses will distribute.</u>**	indicated, informational only – DEQ.	**Pending**
Misc.	City of Flint is asking when the county will lift the emergency order. Jim Henry from GCHD mentioned he was hearing some concerns raised again about Legionella. Eden said that Jim Collins can help address this. Mark V. said that an extensive data analysis was done on this previously and it isn't an issue. DEQ gave permission to increase phosphate levels in the water temporarily. Some health concerns might be raised about this particularly for infants. Dr. Eden Wells said that it is unlikely to cause health problems but we can add information on the FAQ to help reassure		

TASK	STATUS	ACTION	DATE COMPLETED
	citizens. DEQ released its Freeman School water testing results this week. EPA released its report from its expedited review of the response as well. **The water testing protocol has been changed to no longer do pre-flushing of the pipes. Other schools that are interested in having their water tested should make a request to DEQ. LARA will do a plumbing assessment before the water samples are taken.** The City of Flint is considering taking over the cost of providing the replacement pipes for at least some of the high risk homes.	FYI only	
	A call was held on the 10th with MDHHS staff and the regional USDA staff and congressional staff, on the ready to feed formula issue. Both USDA and Sen. Stabenow's office satisfied with client communication and monitoring process in place. Talking points have been developed by WIC staff and sent to the communication office for review. The talking points have been approved by the Communications Office. There has only been one client request for Ready to Feed formula in the Flint WIC clinic. There will be a farmers market, in conjunction with a flu clinic, that the GCHD is holding on 21 November and lead-related information will be provided by GCHD.	FYI	**Completed** **Pending**
	Internal calls will be held once a week on Thursdays at 12:30.	FYI	**Ongoing**

BUREAU OF EMS, TRAUMA AND PREPAREDNESS

Considerations for Use of the Incident Command System (ICS) for the Flint Lead Contamination Incident
November 24, 2015

Basic ICS tenets:

- Activation of Incident Command System (ICS) is determined by the scope and magnitude of an incident.
- Commonalities in all incidents include acute harm to the environment, infrastructure or populace by an agent such as biological, toxin/poisons, or natural causes (severe weather is most common).
- The first step is determining the scope & magnitude of the incident with a preliminary assessment. This assessment determines if ICS is appropriate for the response and what the response should be for the mitigation or containment of the causative agent to minimize negative effects on the environment or public.
- Following the initial acute response phase, there is both short term and long term recovery. In this situation, this could include identification of exposed children, lead testing & treatment if appropriate and monitoring of that vulnerable population for negative health consequences in subsequent years.

Unified Command:

- This is the ICS method of best efficacy for incidents involving multiple jurisdictions or agencies.
- Enables institutions and agencies with different legal, geographic, and functional responsibilities to coordinate, plan, and interact effectively.
- The Incident Commanders within the Unified Command make joint decisions and speak as one voice. Any differences are worked out within the Unified Command. Unity of command is maintained. Each responder reports to a single supervisor within his or her area of expertise.
- An example of a Unified Command incident in Michigan is the response to the Enbridge Oil Spill. The command structure included federal, state and local staffing.
- Benefits of a unified approach are:
    - A shared understanding of priorities and restrictions.
    - A single set of incident objectives, planning process and incident action plan.
    - Collaborative strategies.
    - Improved internal and external information flow.
    - Less duplication of efforts.
    - Better resource utilization.

In Michigan, Emergency Management (EM) has ICS command & control of an incident. This is true whether it is local emergency management isolated to one jurisdiction or the MSP Emergency Management and Homeland Security Division for a multi-jurisdictional (3 or more) incident. Most emergencies occur first locally and therefore are under the authority of the local EM and county administration to determine the scope of the incident for utilization of the ICS structure and/or request assistance from the state. All other agencies, health, environmental, & agriculture, etc. are supporting agencies to the EM command and therefore coordinate their own resources for response.

The Michigan Department of Health and Human Services (MDHHS) Community Health Emergency Coordination Center (CHECC) functions within the Multiagency Coordination System (MACS) of the National Incident Management System (NIMS). The CHECC provides coordination and support for the command structure but does not function in a command role. Multiagency coordination is a process that allows different disciplines to work together more effectively. For the CHECC it includes essentially all of public health & healthcare (human services under development).

The primary benefits of the CHECC are during response for coordination of department resources to:

- Establish and clarify policy with the Executive Group.
- Perform a situational assessment
- Establish a health common operating picture.
- Set state level public health & healthcare priorities.
- Facilitate logistics support and resource allocation.
- Interagency activities.
- Synchronize health messaging to ensure that we are speaking with one voice.

Long Term Recovery Planning:
The Flint lead contamination incident is now in response including short term recovery and rapidly transitioning towards long term recovery. Long term recovery could entail community public works redevelopment and revitalization. It presents opportunities to restructure the community and simultaneously making it more resilient with determination of lead-vulnerable pediatric populations. The recovery process involves cooperation of the local agencies, the private sector and non-governmental organizations (such as volunteer organizations, civic organizations, healthcare, and the private sector) and the state. The Flint plan for recovery should outline the basic framework under which the various recovery agencies will operate, leaving the specific and detailed actions to each agency or organization to implement based on the recovery needs of the community and their regulatory authority, fiscal and other resources. This plan could be developed using a Unified Command structure under the direction of the local jurisdiction.

Conclusion:
There are many benefits to the ICS structure for all hazards emergencies. However, utilizing the CHECC at the current stage of this incident without a local ICS structure would appear to be more controlling than coordinating and could have negative outcomes. The deficits in this incident appear to be too many agencies working in silos and a lack of routine, consistent communications horizontally and vertically. A local Unified Command structure could still be implemented to correct these issues.

The CHECC is not required for the state-level assistance that is already being provided by the Michigan Department of Health and Human Services, the Chief Medical Executive, Childhood Lead Poisoning Prevention Program, Environmental Epidemiology and other staff. State level emergency management (SEOC) has not stepped into an operational role in the incident and the CHECC normally follows as support to that command lead. All staffs in the bureau/administration/department however are available to provide technical assistance to public health and healthcare when requested without an ICS structure. If a special team of subject matter experts needs to be assigned it is part of the daily operations and planning (for example with public health investigations of disease outbreaks) used to assist our partners across the state.

The MDHHS Action Plan for the Flint Water Public Health Response, demonstrates the numerous areas where the department is directly involved with federal, state and local partners and itemizes the issues that are being addressed. MDHHS can easily increase the frequency of the Action Plan updates to better ensure appropriate communication of activities with partners such as the Governor's Task Force on Flint Water Issues, the DEQ, the Genesee County Health Department, and others.

Trigger and Description	Scalability of Triggers in Relation to Level of CHECC Activation			
	Level 1	**Level 2**	**Level 3**	**Level 4**
BioWatch Actionable Result (BAR) • *BAR Elevated by BioWatch Advisory Committee*	• BioWatch Sampling Maintained	• BioWatch – BAR Confirmed	• BioWatch – Elevated by BAC • Agent Confirmed by Phase One Sampling • Two BioWatch Site Monitors Confirmed with BARs	Rehabilitation Needed Demobilization of Deployed Resources CHECC Demobilization Plan Implemented Re-supply Requested Physical Restoration Needed Financial Restoration Needed Behavioral Health Needs Identified
Emergency Declaration • *Governor Declares State of Emergency or Disaster* • *Health and Human Services (HHS) Secretary Declares a Public Health Emergency* • *Presidential Emergency or Disaster Declaration* • *A FEMA Region V Jurisdiction Declares Public Health Emergency* • *International Border Declaration/Closure* • *World Health Organization Declaration*	• Absence of National Emergency Declaration • No FEMA V State Declaration	• One or more FEMA V State(s) Declare an Emergency Due to a Threat with Imminent Public Health or Medical Implications	• National Declaration • FEMA V State Declaration Affecting Michigan	
Local/State/National Level Event/Incident • *Emergency Mutual Aid Compact (EMAC) Request(s) in Effect* • *Michigan Emergency Mutual Aid Compact (MEMAC)/Intrastate Mutual Aid Request(s) in Effect* • *Planned Significant Events* • *State Emergency Operations Center (SEOC) Activation* • *Resource Request in Effect Between Local Jurisdictions*	• Absence of State/National Incident/Event	• National Event/Incident Affecting One or More FEMA V State(s) with Public Health or Medical Implications • Planned Significant Event Affecting Michigan	• National Event/Incident Affecting Michigan • EMAC Request Made or Received	
Terrorism Incident • *Terrorist Claim Credible Threat* • *Credible Threat Confirmed by Detection Systems* • *MIOC Bulletin Confirms Credible Threat* • *Resource Request in Effect* • *Detroit Southeast Michigan Intelligence Center Confirms Credible Threat*	• Terrorism Threats Monitored	• Terrorism Incident Reported with Imminent Public Health or Medical Implications	• Terrorism Incident with Imminent Public Health or Medical Implications Confirmed by Intelligence Community	
Severe Weather or Natural Disaster • *Loss of Public Health or Healthcare Infrastructure* • *EMAC Request(s) in Effect* • *MEMAC Intrastate Mutual Aid Request(s) in Effect* • *Planned Significant Events* • *SEOC Activation* • *Resource Request in Effect (intrastate)* • *Bridge Border Closing* • *Increased Quarantine Activities* • *Increased Communicable Disease Reporting at Port(s)*	• Natural Disaster	• Natural Disaster Resulting in the Loss of Public Health or Healthcare Infrastructure • Intrastate Surge Resources Requests Received	• Natural Disaster Resulting in the Loss of Public Health or Healthcare Infrastructure Resulting in the Need to Request EMAC or Federal Assistance.	
Port of Entry (Isolation/Quarantine) • *Bridge Border Closing* • *Increased Quarantine Activities* • *Increased Communicable Disease Reporting at Port(s)*	• Port of Entry Quarantine and Isolation Procedures Maintained.	• More Than One Request for an Increase in Quarantine Activities at a Single Port of Entry	• Communicable Disease Reported at Port(s) of Entry Exceeds Pre-Identified Thresholds	

Trigger and Description	Scalability of Triggers in Relation to Level of CHECC Activation			
	Level 1	**Level 2**	**Level 3**	**Level 4**
Surveillance • *Unknown Etiology Detected* • *Known Communicable Disease Exceeding Thresholds* • *Unusual Health Events Reported* • *Unknown Etiology Reported as Having Unknown Characteristics Threatening to Public Health* • *Detection of Category A Agent* • *Additional Surveillance Requested*	• Syndromic Surveillance Maintained • No Category A or B Agents Detected	• Syndromic Surveillance Indicates Unknown Etiology with High Mortality/Morbidity Reported in 1-3 People • Category B Agents Detected in >1 People.	• Syndromic Surveillance Indicates Unknown Etiology with High Mortality/Morbidity • Reported in >3 People • Category A Agents Detected in >1 People.	

Michigan Department of Health and Human Services
Governor's Task Force on Flint Water follow up on lead abatement funding questions

What is total funding availability for lead abatement- please list by source?

Current abatement funding available is for abatement of lead-based paint hazards only by federal definition and does not include funding for water remediation.

Currently, the Division of Environmental Health, Healthy Homes Section has **$1,239,761 in state General Funds** and **approximately $450,000 in U. S. Department of Housing and Urban Development (HUD) funds** for lead-based paint hazard abatement for Fiscal Year 2016.

The Healthy Homes Section identified 10 target areas throughout the state for this funding based on number of children with elevated lead levels and amount of pre-1978 housing stock to receive priority for this funding. Genesee County is included as a designated target area. Also included as a target area is Kent County and the City of Grand Rapids as they were not awarded HUD funding during this round.

Amount of HUD funding that GCHD could have applied for had they chosen to do so?

In FY 2015, HUD made available lead-based paint hazard control funding in which agencies could apply for up to $3,325,000 (3 year funding round) for lead hazard abatement. The MDHHS, Healthy Homes Section applied and received $3,231,610 in HUD funds in FY 2015. The Genesee County Health Department and/or the City of Flint did not apply.

How much of the lead abatement funding has historically gone to Genesee County? Wayne County? City of Flint?

Federal
Data from HUD indicates:

City of Flint
No grants awarded.
No history of grants applied for through HUD.

Genesee County
2009 $2,070,000

Applied for grant in 2012, not awarded
Applied for grant in 2014, not awarded

Wayne County (excludes City of Detroit)

1997	$4,994,424
2007	$3,000,000
2012	$2,480,000

Applied for grant in 2009, not awarded
Applied for grant in 2010, not awarded
Applied for grant in 2011, not awarded

City of Detroit

1995	$5,917,839
2002	$2,160,000
2004	$4,000,000
2006	$3,996,680
2009	$3,535,372
2014	$3,637,000

State

Through the Healthy Homes Section, Lead Safe Home Program, since inception of the program in 1997:

Genesee County/City of Flint

Approximately $1,330,688 has been used to abate lead-based paint hazards in approximately 224 homes located in Genesee County, with $1,183,503 (approximately 203 homes) of this funding going directly to homes located in the City of Flint.

Wayne County

Approximately $3,175,249 has been used to abate lead-based paint hazards in approximately 528 homes located in Wayne County, with $2,735,645 (approximately 448 homes) of this funding going directly to homes located in the City of Detroit.

How many homes in city of Flint abated in FY 15? Any homes abated thus far in FY 2016?

Through the MDHHS Lead Safe Home Program, of the 177 homes abated statewide in Fiscal Year 2015, nine were projects located within the City of Flint. In addition, there are currently three enrolled properties within the City of Flint to date in Fiscal Year 2016.

Genesee County and/or the City of Flint did not apply for HUD funding in Fiscal Year 2015 and therefore does not currently have their own funding available for lead-based paint hazard abatement.

Message

From: Moran, Susan (DHHS) [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=187C9CA7FCA94C14A6F60427230837A4-MORAN SUSAN]
Sent: 11/6/2015 5:59:17 PM
To: Anderson, Paula (DHHS) [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=e04871ddd17b4003822218d2f2576b76-Anderson Paula]
Subject: Fwd: Talking points
Attachments: Flint Lead Trend 11 6 2015Talking.docx; ATT00001.htm

You can distribute the table and talking points to those on the 2:30 call.

Sent from my iPhone

Begin forwarded message:
From: "Miller, Corinne (DHHS)" <MillerC39@michigan.gov>
Date: November 6, 2015 at 12:47:37 PM EST
To: "Moran, Susan (DHHS)" <MoranS@michigan.gov>, "Dykema, Linda D. (DHHS)" <DykemaL@michigan.gov>, "Wells, Eden (DHHS)" <WellsE3@michigan.gov>
Cc: "LyonCallo, Sarah (DHHS)" <lyoncallos@michigan.gov>, "McKane, Patricia (DHHS)" <McKaneP@michigan.gov>
Subject: FW: Talking points

From: McKane, Patricia (DHHS)
Sent: Friday, November 06, 2015 12:44 PM
To: Miller, Corinne (DHHS) <MillerC39@michigan.gov>; LyonCallo, Sarah (DHHS) <lyoncallos@michigan.gov>
Subject: Talking points

Talking Points:

- <!--[if !supportLists]--><!--[endif]-->Rates of positive lead tests (greater than or equal to 5 mcg/dl) vary over time partly due to small numbers and seasonal fluctuation.
- <!--[if !supportLists]--><!--[endif]-->Shortly after the 2010 quarters rates were below the state 5 year average in most Flint zip codes.
- <!--[if !supportLists]--><!--[endif]-->Beginning in Quarter 3 of 2014 rates increased in all Flint zip codes except 48507
- <!--[if !supportLists]--><!--[endif]-->In Q1 2015 rates decreased, but begin rising and are highest in Q3 of 2015 in zip codes 48503 and 48504.
- <!--[if !supportLists]--><!--[endif]-->Data for Q4 2015 is incomplete and based on tests drawn after October 1, with results reported to and processed in the MDHHS data warehouse. Data from this quarter should not be used for comparison until the quarter is complete.

Also saved in the document

Patricia McKane, DVM MPH - Manager, Maternal & Child Health Epidemiology Section | Michigan Department of Health and Human Services | Lifecourse Epidemiology and Genomics Division | PO Box 30195 / 201 Townsend St 4th Floor - Lansing, MI 48909 | Cell 517-PPI | Office ph: 517-335-9456 Fax 517-335-9790 | McKanep@michigan.gov

Work Hours:
M_F 7:30am – 4:00 pm

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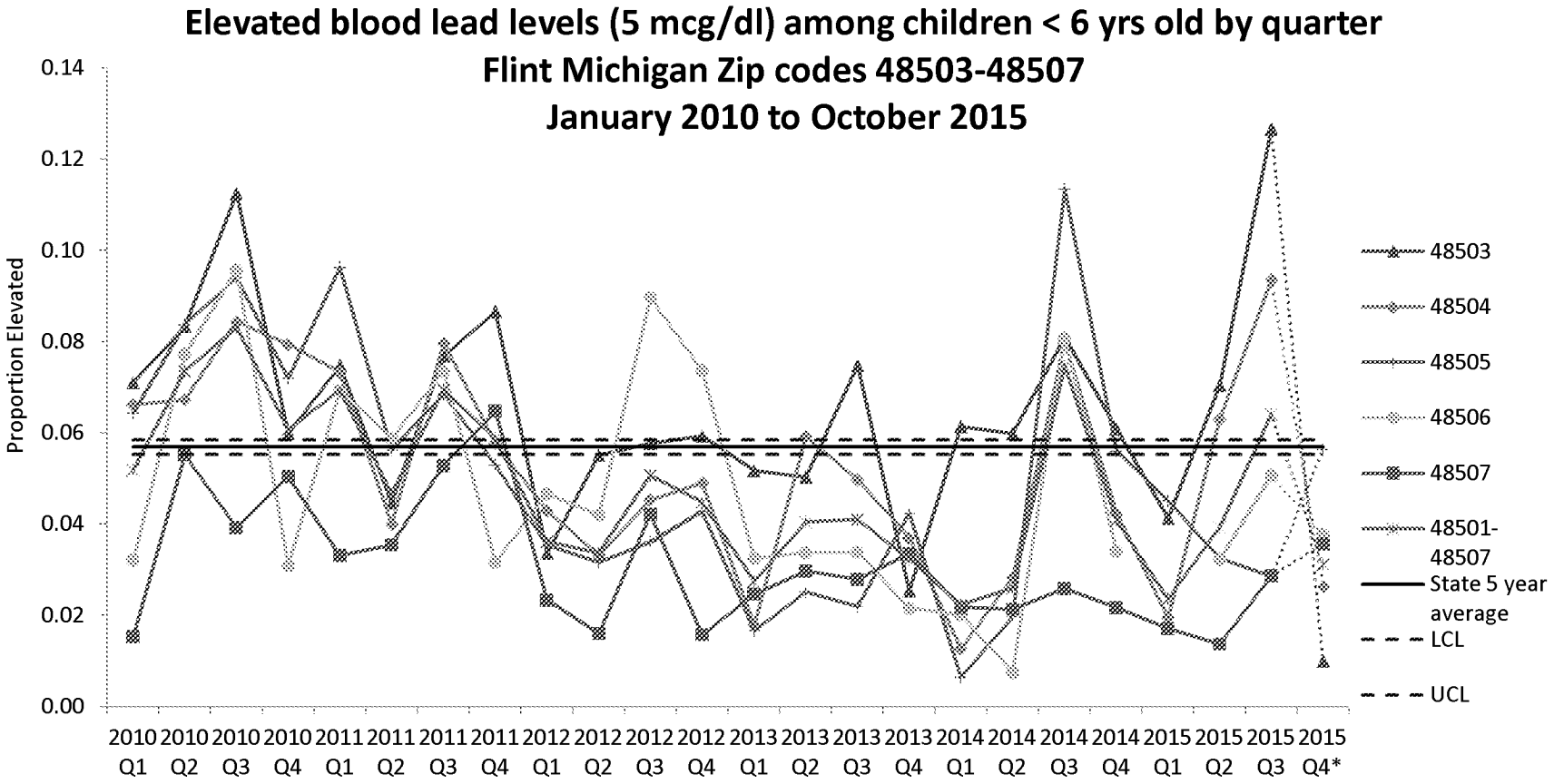


Deduplicated by time period (quarter), retains highest venous test or capillary test if no venous test during the time period.
Data for Q4 2015 are incomplete.

For Internal Use only. Cells with fewer than 5 observations need to be suppressed.

Table 1. Elevated blood lead levels (5 mcg/dl) among tested children < 6 years old by quarter, City of Flint by Zip Code, January 2010 to October 2015

	48501			48502			48503			48504			48505			48506			48507			All Flint		
Year Quarter	Tested(n)	≥ 5	%	Tested(n)	≥ 5	%	Tested(n)	≥ 5	%	Tested(n)	≥ 5	%	Tested(n)	≥ 5	%	Tested(n)	≥ 5	%	Tested(n)	≥ 5	%	Tested(n)	≥ 5	%
2010 Q1	3	0	0	1	0	0	169	12	7.1	272	18	6.6	311	20	6.4	187	6	3.2	195	3	1.5	1138	59	5.2
2010 Q2	1	0	0	1	0	0	180	15	8.3	238	16	6.7	215	18	8.4	194	15	7.7	163	9	5.5	992	73	7.4
2010 Q3	2	0	0	5	0	0	160	18	11.3	249	21	8.4	202	19	9.4	188	18	9.6	204	8	3.9	1010	84	8.3
2010 Q4	1	0	0	2	1	50.0	117	7	6.0	151	12	7.9	139	10	7.2	129	4	3.1	119	6	5.0	658	40	6.1
2011 Q1	4	1	25.0	0	0	0	107	8	7.5	150	11	7.3	135	13	9.6	101	7	6.9	151	5	3.3	648	45	6.9
2011 Q2	1	0	0	5	0	0	134	6	4.5	175	7	4.0	160	9	5.6	170	10	5.9	169	6	3.6	814	38	4.7
2011 Q3	0	0	0	1	0	0	130	10	7.7	226	18	8.0	219	15	6.8	204	15	7.4	227	12	5.3	1007	70	7.0
2011 Q4	1	0	0	0	0	0	127	11	8.7	173	10	5.8	170	9	5.3	126	4	3.2	185	12	6.5	782	46	5.9
2012 Q1	0	0	0	2	0	0	119	4	3.4	163	7	4.3	141	5	3.5	150	7	4.7	171	4	2.3	746	27	3.6
2012 Q2	0	0	0	1	0	0	127	7	5.5	180	6	3.3	158	5	3.2	119	5	4.2	187	3	1.6	772	26	3.4
2012 Q3	3	0	0	3	0	0	156	9	5.8	243	11	4.5	194	7	3.6	145	13	9.0	261	11	4.2	1005	51	5.1
2012 Q4	0	0	0	2	0	0	118	7	5.9	163	8	4.9	140	6	4.3	122	9	7.4	190	3	1.6	735	33	4.5
2013 Q1	0	0	0	2	0	0	116	6	5.2	168	3	1.8	120	2	1.7	123	4	3.3	162	4	2.5	691	19	2.7
2013 Q2	1	0	0	5	1	20.0	139	7	5.0	186	11	5.9	159	4	2.5	148	5	3.4	202	6	3.0	840	34	4.0
2013 Q3	0	0	0	4	1	25.0	147	11	7.5	201	10	5.0	182	4	2.2	177	6	3.4	215	6	2.8	926	38	4.1
2013 Q4	1	0	0	2	0	0	118	3	2.5	189	7	3.7	118	5	4.2	139	3	2.2	209	7	3.3	776	25	3.2
2014 Q1	0	0	0	2	0	0	114	7	6.1	158	2	1.3	155	1	0.6	149	3	2.0	183	4	2.2	761	17	2.2
2014 Q2	1	0	0	1	0	0	117	7	6.0	177	5	2.8	152	3	2.0	134	1	0.7	187	4	2.1	769	20	2.6
2014 Q3	0	0	0	7	1	14.3	173	14	8.1	225	18	8.0	194	22	11.3	161	13	8.1	232	6	2.6	992	74	7.5
2014 Q4	0	0	0	2	0	0	115	7	6.1	141	6	4.3	125	7	5.6	117	4	3.4	184	4	2.2	684	28	4.1
2015 Q1	1	0	0	2	0	0	121	5	4.1	154	3	1.9	133	6	4.5	134	0	0.0	175	3	1.7	720	17	2.4
2015 Q2	0	0	0	2	0	0	142	10	7.0	127	8	6.3	123	4	3.3	124	4	3.2	218	3	1.4	736	29	3.9
2015 Q3	0	0	0	3	0	0	150	19	12.7	171	16	9.4	140	4	2.9	138	7	5.1	209	6	2.9	811	52	6.4
2015 Q4*	0	0	0	1	0	0	100	1	1.0	76	2	2.6	71	4	5.6	53	2	3.8	84	3	3.6	385	12	3.1

Childhood Lead Testing Reporting –weekly, quarterly and cumulative analysis technical specifications.

Case Definitions

Child or Adult tested - The number of unduplicated individuals whose blood lead level was reported via either the lab or the provider to the MDHHS lead program and uploaded into the MDHHS data warehouse.

Age groups were sub-categorized as:

1. Children ages 0 through 5 years of age
2. Children ages 6 through 17 years of age.
3. Adults age 18 years and older.

Elevated blood lead level - Blood lead result $\geq$ 5mcg/dl

Test results sub-categories as defined by the American Academy of Pediatrics:

1. < 5 mcg/dl
2. 5-14 mcg/dl
3. 15-44 mcg/dl
4. > 44 mcg/dl

Test results are the highest test reported, either venous or capillary.

Time frame is based on the Specimen Date
The average interval between Specimen Date and Report Date (upload into the data warehouse) is 12.4 days, so we need at least 2 weeks for the data to settle. However, when we extracted the sample using report date, we found records with specimen dates' from 2012-2014. Thus we are using specimen date to extract the data.

Place: Based on Patient Zip and limited to zip codes 48501 to 48507.

Other
Deduplicated to time period retaining highest venous test or capillary if no venous.
Purpose is to identify children tested during the time frame.

Additional analyses are needed to better understand how results are received and processed in the data warehouse (we are finding true duplicates, duplicates reported on subsequent report dates, long interval between specimen date and report date, and we aren't finding as many children receiving follow-up testing as we would expect, but may need to lengthen our time frame to look for them).

Talking Points:

- Rates of positive lead tests (greater than or equal to 5 mcg/dl) vary over time partly due to small numbers and seasonal fluctuation.
- Shortly after the 2010 quarters rates were below the state 5 year average in most Flint zip codes.
- Beginning in Quarter 3 of 2014 rates increased in all Flint zip codes except 48507
- In Q1 2015 rates decreased, but begin rising and are highest in Q3 of 2015 in zip codes 48503 and 48504.
- Data for Q4 2015 is incomplete and based on tests drawn after October 1, with results reported to and processed in the MDHHS data warehouse. Data from this quarter should not be used for comparison until the quarter is complete.

From: Moran, Susan (DHHS)
Sent: Tuesday, November 10, 2015 9:50 AM
To: Anderson, Paula (DHHS)
Subject: Fwd: Final Draft BLL Report
Attachments: 2015-11-10 - Flint Lead Report DRAFT 05.indd; ATT00001.htm; 2015-11-10 - Flint Lead Report DRAFT 05 - without percentages.pdf; ATT00002.htm

Please print color copy

Sent from my iPhone

Begin forwarded message:

> **From:** "Dykema, Linda D. (DHHS)" <DykemaL@michigan.gov>
> **To:** "Lasher, Geralyn (DHHS)" <lasherg@michigan.gov>, "Moran, Susan (DHHS)" <MoranS@michigan.gov>, "Wells, Eden (DHHS)" <WellsE3@michigan.gov>
> **Cc:** "McKane, Patricia (DHHS)" <McKaneP@michigan.gov>, "LyonCallo, Sarah (DHHS)" <lyoncallos@michigan.gov>, "Miller, Corinne (DHHS)" <MillerC39@michigan.gov>, "Minicuci, Angela (DHHS)" <MinicuciA@michigan.gov>
> **Subject: Final Draft BLL Report**
>
> All,
>
> Attached is the final draft of the BLL data report in InDesign and pdf format.
>
> Linda

Michigan Department of Health and Human Services (MDHHS)
Summary of Blood Lead Level Test Results for Flint ZIP Codes 48501-48507
As of October 30, 2015

Executive Summary

This report is generated by MDHHS to track Blood Lead Level test results in Flint, Michigan.

- Counts on this report include both capillary and venous blood tests. People who have had multiple tests are counted only once.
- Since 10/1/2015, an additional 963 people have been tested in Flint.
- Continued testing efforts by Genessee County Health Department, MDHHS and local medical personnel have identified 18 children with blood lead levels greater than or equal to 5ug/dL since 10/1/2015.
- 3% of the children younger than 6 years old tested since 10/1/2015 have had blood lead levels greater than or equal to 5ug/dL.
- Additional testing is ongoing. Counts may vary slightly as new results are added.

Number of People Tested for Lead in Flint

Total number of people tested for lead from 4/15/2014 to 9/30/2015	5017
Total number of people tested for lead since 10/1/2015:	**963**

Children Younger than 6 Years Old with Blood Lead Levels (BLL) ≥5ug/dL

Total number of children tested for lead from 4/15/2014 to 9/30/2015:	4156
Number of child BLL test results ≥5ug/dL from 4/15/2014 to 9/30/2015:	181
Total number of children tested for lead since 10/1/2015:	**385**
Number of child BLL test results ≥5ug/dL since 10/1/2015:	**12**

Adults with Blood Lead Levels (BLL) ≥5ug/dL

Total number of adults tested for lead from 4/15/2014 to 9/30/2015:	207
Number of adult BLL test results ≥5ug/dL from 4/15/2014 to 9/30/2015:	13
Total number of adults tested for lead since 10/1/2015:	**289**
Number of adult BLL test results ≥5ug/dL since 10/1/2015:	**6**

Children 6 to 18 Years Old with Blood Lead Levels (BLL) ≥5ug/dL

Total number of children tested for lead from 4/15/2014 to 9/30/2015:	654
Number of child BLL test results ≥5ug/dL from 4/15/2014 to 9/30/2015:	7
Total number of children tested for lead since 10/1/2015:	**289**
Number of child BLL test results ≥5ug/dL since 10/1/2015:	**6**

From: Moran, Susan (DHHS)
Sent: Thursday, December 03, 2015 2:26 PM
To: Anderson, Paula (DHHS)
Subject: FW: Summary Data
Attachments: Flint EBL Data Press Release FINAL.PDF; Flint Blood Lead Level Summary Report December.pdf

Please print both documents for my Flint folder

From: Lasher, Geralyn (DHHS)
Sent: Thursday, December 03, 2015 2:00 PM
To: Valacak, Mark; Brickey, Tamara; LaRocco, Toni; McShane, Hilda; Johnson, M.D., Gary
Cc: Miller, Mark (DHHS); Moran, Susan (DHHS); Robinson, Mikelle (DHHS); Thompson, Sheryl D. (DHHS); Wells, Eden (DHHS)
Subject: Summary Data

This afternoon at 2:30 p.m., the Michigan Department of Health and Human Services will issue the attached press release and summary report detailing the latest data on blood lead levels in Flint.

We wanted to ensure that the Genesee County Health Department received this information in advance of the press release being issued.

The summary report provides annual historical information on children younger than six years, children between the ages of six and seventeen years and adults tested for lead. It also provides detail on the number of test results for these category groups that have tested above five micrograms per deciliter. The summary report also provides information on the numbers tested and with elevated blood lead levels since the MDHHS Action Plan began in October.

The preliminary data indicates that 30 of 1,361 adults and children tested in Flint since October 1 had elevated blood lead levels.

Thank you,
Geralyn

Geralyn Anne Lasher
Senior Deputy Director for External Relations and Communications
Michigan Department of Health and Human Services
201 Townsend Street, Capitol View Building
Lansing Michigan 48913
P: (517) 241-2112
C: PPI
LasherG@michigan.gov
@glasher

STATE OF MICHIGAN
DEPARTMENT OF HEALTH AND HUMAN SERVICES
LANSING

RICK SNYDER
GOVERNOR

NICK LYON
DIRECTOR

FOR IMMEDIATE RELEASE
December 3, 2015

CONTACT: Jennifer Eisner
(517) 241-2112

MDHHS releases latest data outlining blood lead levels in Flint

Follow-up care, case management resources continue for families

LANSING, Mich. – Preliminary data indicates that 30 of 1,361 adults and children tested in Flint since October 1 had elevated blood lead levels, according to a report issued today by the Michigan Department of Health and Human Services.

This marks the first summary report on lead testing called for in the state's action plan related to health concerns about Flint's water infrastructure.

"Our goal is to help families reduce their exposure to lead sources," said Dr. Eden Wells, MDHHS chief medical executive. "We have made progress in testing and identifying those with elevated blood lead levels, and the department will continue to work closely with the Genesee County Health Department to reach these families. We will remain diligent in our ongoing outreach and education efforts."

Information comes from tests administered citywide to 1,361 children and adults since October 1. Tests showed that 21 of 969 children age 17 or younger and 9 of 392 adults over the age 18 were identified with elevated blood lead levels.

The report covers test results reported to MDHHS since the state action plan was put in place Oct. 2. It includes the number of tests and number of elevated blood lead levels greater than 5 micrograms per deciliter, and captures both capillary and venous blood tests that have been reported to MDHHS since the beginning of October. People who have had multiple tests are counted only once. Five micrograms per deciliter is the level that the Centers for Disease Control and Prevention considers elevated and triggers health care professional follow up with families.

The full report is posted online at www.michigan.gov/flintwater and will be updated as more data becomes available.

When reviewing historical trend data, the risk of lead exposure is highest during the third quarter of each year – July through September. Seasonal variation is the result of a number of factors including increased exposure to lead in dust and soil in the summer months.

In the third quarter of 2010, 8.3 percent of Flint children 6 and under showed elevated blood lead levels. The figure gradually decreased to 4.1 percent in the third quarter of 2013. During the same months in 2014, the figure increased to 7.5 percent and decreased to 6.4 percent in the third quarter of 2015.

– MORE –

Last month, MDHHS collaborated with the county health department and local partners to distribute educational resources and informational letters to Flint parents regarding lead testing. The state is providing funding for GCHD nurses to work with families when an elevated blood lead level has been detected. During these follow-up visits, nurses coordinate with environmental health investigators to meet with families in their homes to identify lead exposures, address questions and provide water filters. People can be exposed to lead from paint, soil, plumbing and other sources.

MDHHS continues to provide free water filters and replacement cartridges to Flint residents at four locations, including the MDHHS Flint offices and the Genesee County Community Action Resource Department. For a full list of locations and hours of distribution, visit www.michigan.gov/flintwater.

To help residents properly install water filters, and to demonstrate how to replace the original when it expires, MDHHS has created an instructional video on its YouTube channel. For updates, visit www.michigan.gov/flintwater.

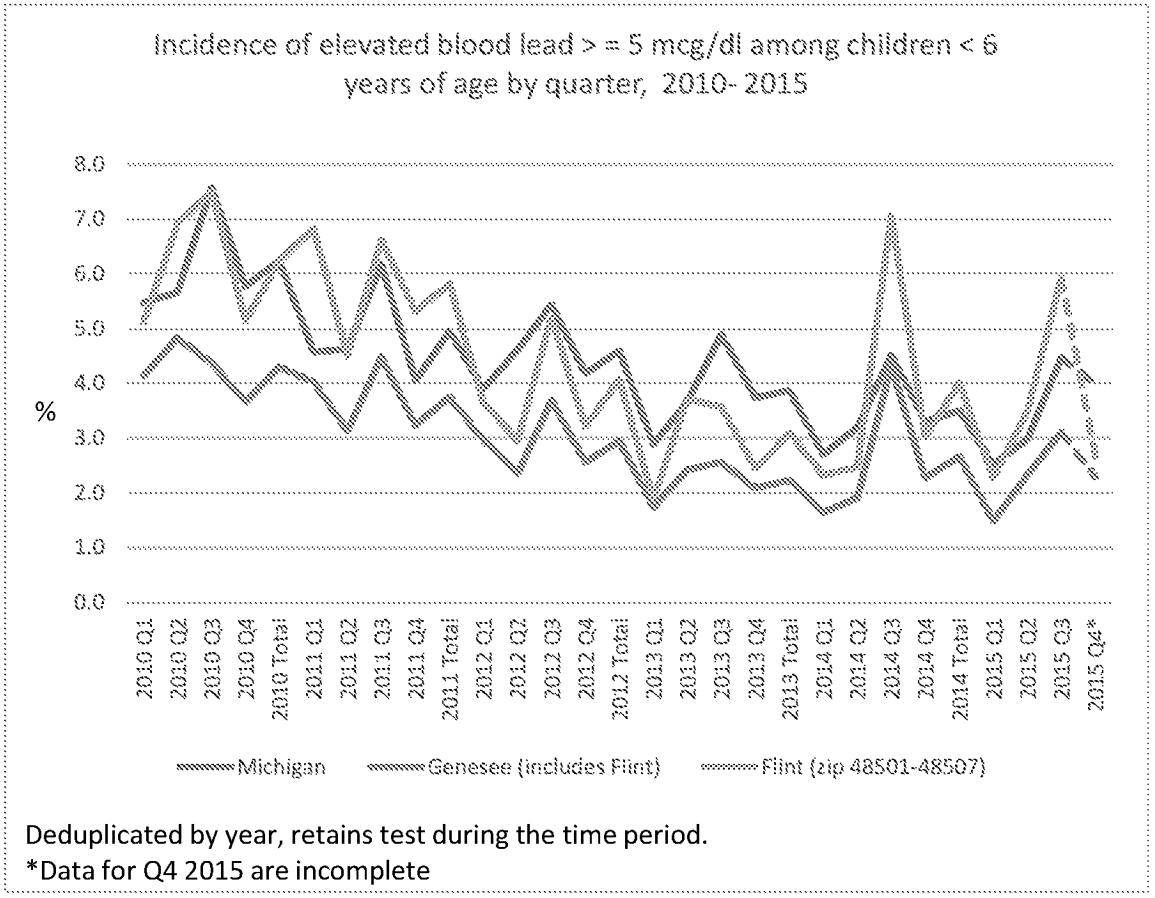
# # #

Michigan Department of Health and Human Services (MDHHS)
Blood Lead Level Test Results for Flint Zip Codes 48501-48507
Genesee County, and the State of Michigan
Summary as of November 13, 2015

Executive Summary

This report is generated by MDHHS to track Blood Lead Level test results in Flint, Michigan.

- Counts on this report include both capillary and venous blood tests. People who have had multiple tests are counted only once per year.
- Since 10/1/2015, an additional 1,361 people have been tested in Flint.
- Continued testing efforts by Genesee County Health Department, MDHHS and local medical personnel have identified 21 children with blood lead levels greater than or equal to 5µg/dL (micrograms per deciliter) since 10/1/2015.
- Three percent of the children younger than 6 years old tested since 10/1/2015 have had blood lead levels greater than or equal to 5µg/dL.
- Additional testing is ongoing. Counts will vary as new results are added.



Deduplicated by year, retains test during the time period.
*Data for Q4 2015 are incomplete

** Data for Quarter 4 of 2015 are incomplete and subject to change*

	Children younger than 6 Years Old			Children 6 to 17 Years Old		
	Michigan	Genesee County	Flint 48501-48507	Michigan	Genesee County	Flint 48501-48507
Total tested for lead 1/1/2010 to 12/31/2010:	152,608	6,932	3,560	17,963	867	463
Number of test results ≥5µg/dL 1/1/2010 to 12/31/10:	9,509	298	222	907	25	20
Total tested for lead from 1/1/2011 to 12/31/2011:	149,420	6,667	3,093	15,725	1,038	544
Number of test results ≥5µg/dL 1/1/2011 to 12/31/11:	7,392	250	180	651	20	15
Total tested for lead 1/1/2012 to 12/31/2012:	146,142	7,008	3,112	15,460	1,386	630
Number of test results ≥5µg/dL 1/1/2012 to 12/31/12:	6,704	206	127	478	17	12
Total tested for lead 1/1/2013 to 12/31/2013:	145,813	6,986	3,077	13,897	1,241	566
Number of test results ≥5µg/dL 1/1/2013 to 12/31/13:	5,647	156	95	342	9	4
Total tested for lead 1/1/2014 to 12/31/2014:	141,355	6,690	3,045	12,936	913	428
Number of test results ≥5µg/dL 1/1/2014 to 12/31/14:	4,948	178	122	386	6	5
Total tested for lead 1/1/2015 to 11/13/2015:	120,699	5,778	2,704	10,841	1,197	765
Number of test results ≥5µg/dL 1/1/2015 to 11/13/2015:	4,200	149	101	309	10	8
Total tested for lead 10/1/2015 to 11/13/2015:	14,593	957	560	1,412	502	409
Number of test results ≥5µg/dL 10/1/2015 to 11/13/2015:	583	22	15	38	6	6

** Data for Quarter 4 of 2015 are incomplete and subject to change*

	Adults 18 Years and Older			Total Number of People of All Ages Tested		
	Michigan	Genesee County	Flint 48501-48507	Michigan	Genesee County	Flint 48501-48507
Total tested for lead 1/1/2010 to 12/31/2010:	13,853	602	195	184,424	8,401	4,218
Number of test results ≥5µg/dL 1/1/2010 to 12/31/10:	1,462	42	18	11,878	365	260
Total tested for lead 1/1/2011 to 12/31/2011:	13,259	542	139	178,404	8,247	2,726
Number of test results ≥5µg/dL 1/1/2011 to 12/31/11:	1,369	44	16	9,412	314	211
Total tested for lead 1/1/2012 to 12/31/2012:	13,059	556	155	174,661	8,950	3,907
Number of test results ≥5µg/dL 1/1/2012 to 12/31/12:	1,415	33	11	8,597	256	150
Total tested for lead 1/1/2013 to 12/31/2013:	12,199	498	136	171,909	8,725	3,779
Number of test results ≥5µg/dL 1/1/2013 to 12/31/13:	1,499	54	16	7,488	219	115
Total tested for lead 1/1/2014 to 12/31/2014:	12,684	441	112	166,975	8,044	3,585
Number of test results ≥5µg/dL 1/1/2014 to 12/31/14:	1,422	44	12	6,756	228	139
Total tested for lead 1/1/2015 to 11/13/2015:	11,685	860	526	143,225	7,835	3,995
Number of test results ≥5µg/dL 1/1/2015 to 11/13/2015:	1,195	30	15	5,704	204	124
Total tested for lead 10/1/2015 to 11/13/2015:	1,615	483	392	17,620	1,942	1,361
Number of test results ≥5µg/dL 10/1/2015 to 11/13/2015:	160	11	9	781	44	30

** Data for Quarter 4 of 2015 are incomplete and subject to change*

From: Travis, Rashmi (DHHS)
Sent: Monday, October 05, 2015 6:23 PM
To: Peeler, Nancy (DHHS);Scott, Robert L. (DHHS)
Subject: FW: Flint EBL's
Attachments: Response to N.Lyon 10.5.15 v2.docx; Flint_EBLLs_Retesting_v2.pdf; AAP Medical Management of Childhood Lead Exposure-June-2013.pdf; Blood Lead Level (BLL) Quick Reference for Primary Care Providers.pdf; Lead Program Process Map 1.27.15.pptx

Importance: High

GREAT JOB, Nancy and Bob! Once again, thanks for being available for questions and calls today!
Rashmi

From: Peeler, Nancy (DHHS)
Sent: Monday, October 05, 2015 5:59 PM
To: Wells, Eden (DHHS)
Cc: Travis, Rashmi (DHHS); Moran, Susan (DHHS); Scott, Robert L. (DHHS); Fink, Brenda (DHHS)
Subject: RE: Flint EBL's
Importance: High

Sending updated Response, with original attachments, PLUS requested data is attached. Please let us know if you have questions or need additional information.

Nancy

From: Wells, Eden (DHHS)
Sent: Monday, October 05, 2015 2:46 PM
To: Peeler, Nancy (DHHS)
Cc: Travis, Rashmi (DHHS); Moran, Susan (DHHS); Scott, Robert L. (DHHS); Fink, Brenda (DHHS)
Subject: Re: Flint EBL's

These are beautiful-!!!- thanks- I will let Nick know regarding data

Sent from my iPhone

On Oct 5, 2015, at 1:33 PM, Peeler, Nancy (DHHS) <PeelerN@michigan.gov> wrote:

> Attached is our initial response, plus attachments that we referenced in the response. Let us know if you think the attachments are helpful or too much.
>
> Bob is still analyzing data to give specific responses where they were requested. We estimate it will take most of today to assemble that data for you.
>
> Nancy

From: Wells, Eden (DHHS)
Sent: Monday, October 05, 2015 9:01 AM
To: Peeler, Nancy (DHHS)
Cc: Travis, Rashmi (DHHS); Moran, Susan (DHHS)
Subject: FW: Flint EBL's

Good morning, Nancy!

Please respond to me on this with a CC to Rashmi and Sue Moran. I have the heat map from last week, but he wants the numbers as well---
---------- Forwarded message ----------
From: **Eden Wells** <ewells@umich.edu>
Date: Mon, Oct 5, 2015 at 8:57 AM
Subject: Re: Flint EBL's
To: "Lyon, Nick (DHHS)" <LyonN2@michigan.gov>
Cc: "Moran, Susan (DHHS)" <MoranS@michigan.gov>, "Grijalva, Nancy (DHHS)" <GrijalvaN@michigan.gov>

Good morning,

I will get information right away to CLPP on this- but there are established protocols, and they do involve the primary care provider as well. I have a heat map showing the numbers of children above 5 and 15 by zip, so I know we have those numbers as well. To you shortly,

E

Eden V. Wells, MD, MPH, FACPM
Clinical Associate Professor, Epidemiology
Director, Preventive Medicine Residency
University of Michigan School of Public Health
1415 Washington Heights,
Ann Arbor, MI 48109
Tel: 734-647-5306
Fax: 734-936-2084
ewells@umich.edu

On Mon, Oct 5, 2015 at 8:52 AM, Lyon, Nick (DHHS) <LyonN2@michigan.gov> wrote:

So, I have a process question: If a child tests above 5 micg/dl, the suggested protocol is to provide information on how to mitigate lead exposure in the home and do a follow up blood test in the future. Can someone describe the protocols/requirements that are supposed to be followed and who is doing it?

I am also curious to know how we've done with children who have a confirmed elevated blood level. If I look at the zip code data we were using last week, there have been more than 100

children who have tested at 5 or above from 2014 Q3 – 2015 Q2. How many of those children have been retested and what is their result?

I would also like to know summary level data for these zip codes for how many children have tested above .14, and what the follow up rates have been for them as well.

I think this would and should be the next question that we are receiving…You identified the issue, you are suggesting a test, filter, flush approach…what about the kids who tested above the threshold?

Nick

<Blood Lead Level (BLL) Quick Reference for Primary Care Providers.pdf>

<Lead Program Process Map 1.27.15.pptx>

<AAP Medical Management of Childhood Lead Exposure-June-2013.pdf>

<DRAFT Response to N.Lyon 10.5.15.docx>

If a child tests above 5 mcg/dL –

- Both Medicaid and the MDHHS Childhood Lead Poisoning Prevention Program (CLPPP) have adopted the Recommendations on Medical Management of Childhood Lead Exposure and Poisoning provided by the American Academy of Pediatrics (AAP) Pediatric Environmental Health Specialty Unit. These recommendations lay out the steps and activities for a **Primary Care Provider** (PCP) once a child has an elevated blood lead level.
  - Medicaid has integrated these Recommendations into the Medicaid Provider Manual.
  - CLPPP has developed a Quick Reference for Primary Care Providers that summarizes the same recommendations (attached, and also available on the home page of the program website, www.michigan.gov/lead).
  - The PCP should:
    - Review the test results with the family
    - If original test was a capillary sample, confirm results with venous sample
    - Provide anticipatory guidance
    - Review environmental history, including other children who may be exposed
    - Provide nutrition counseling and monitor development
    - Refer for case management
    - Re-test every 1-3 months
    - IF level >44, consult with experts (Children's Hospital of Michigan)

- The AAP document also suggests that the PCP refer the patient to local health authorities if such resources are available.

What we've done for children who have a confirmed elevated blood lead levels (EBL).

- Per Public Health code, CLPPP sends weekly data to each local health department, listing all new lead tests for children in that jurisdiction (see attached Process Map).

- Lead follow-up services are NOT a mandated service; Local Public Health (LPH) agencies are not mandated provide any kind of follow-up services or even open the CLPPP data files. Each agency chooses whether to respond, and what kind of response they want to make.

- LPH can bill Medicaid on a fee-for-services basis for lead testing, for 2 nursing assessment visits, and for 1-2 environmental investigation visits. However, health departments find that the reimbursement rate does not cover their cost of providing these services.

- The requested data for FY2014 Q3 – FY2015 Q2 regarding follow-up testing is attached.
  - We assumed that the request was referencing quarters based on the fiscal year to capture the timeframe after the change in water source (not quarters based on calendar year).
  - For the 43 children with levels of 5-14 mcg/dL, 14 (32.5%) were retested. One had a level that rose above 15 mcg/dL, the other 10 stayed in the same range or dropped below 5 mcg/dL.

- For the 3 children with a level >15 mcg/dL, one (33%) was retested, and that child's level has stayed above 15 mcg/dL.
- There were another 71 children that had initial capillary tests showing a level of 5 mcg/dL or above; only 15 (21%) have had the required confirmatory venous test. The single child with the highest level (> 15 mcg/dL) did not have a confirmatory venous test.
- For those with initial capillary tests that received a follow-up venous test, 7 had a level that dropped below 5 mcg/dL; 7 fell in the 5-14 mcg/dL range; and one was > 15 mcg/dL.

Next steps/in process

- The Medicaid Health Plan re-bid included the requirement that plans provide Care Coordination for every enrolled child with a blood lead level >5.

- CLPPP is working with Medicaid to determine best approaches for:
  - Providing weekly data files to support these new care coordination services.
  - Developing the process and identifying payment strategies to establish a pool of trained and certified providers in each community that the health plans can refer to who will provide follow-up health-related services to families in their homes.
  - These providers could include a Community Health Worker, may be a Nurse, still TBD. This could include LPH, but would need to include other potential providers to cover communities where LPH chooses not to provide any to lead follow-up services.

- The Healthy Homes Section is participating in these conversations, relative to the EBL investigations that are necessary, however there currently appear to be fewer options for addressing issues around funding and providing the EBL investigations.

- In addition, CLPPP currently provides Prevention grants to 10 communities, including Genesee County. We use a data-drive process to identify the communities with the highest number of children with elevated blood lead levels in the range of 5-14 mcg/dL. The Genesee County grant, for $7,500, is focused specifically on Flint. The grant provides resources to support the local health department to conduct prevention activities in homes of families with children with blood lead levels 5 to 14 mcg/dL, and in homes of pregnant women enrolled in Medicaid living in homes built before 1960 (the current contract says levels of 5 to 9, and we are fixing this to read 5 to 14). We anticipate that these grants could end after this fiscal year, depending on how the system might be re-shaped based on the health plan bids.

- CLPPP also funds Education & Outreach grants, organized by Prosperity Region. St. Clair Public Health currently holds the grant to provide Education to stakeholders in Region 6 ($20,000), which includes Genesee County. They provide training and materials to health care providers, child care providers, public schools, owners and tenants of residential dwellings, and parents of young children.

Follow-up for Children in Flint (ZIPs 48501-48507) with Elevated Blood Lead Levels April 2014 through March 2015

Children with Initial Confirmed (Venous) Elevated BLL 5-14

Children w/BLL 5-14:	43	
With retest:	14	
Most recent retest was <5:		4
5 to 14:		9
>= 15:		1

Children with Initial Confirmed (Venous) Elevated BLL >= 15

Children w/BLL >= 15:	3	
With retest:	1	
Most recent retest was <5:		0
5 to 14:		0
>= 15:		1

Children with Initial Capillary Elevated BLL 5-14 (needing confirmation)

Children w/BLL 5-14:	70	
With confirmatory venous:	15	
Confirmatory test was <5:		7
5 to 14:		7
>= 15:		1

Children with Initial Capillary Elevated BLL >= 15 (needing confirmation)

Children w/BLL >= 15:	1
With confirmatory venous:	0

October 5, 2015

Source: MDHHS Data Warehouse

Recommendations on Medical Management of Childhood Lead Exposure and Poisoning

No level of lead in the blood is safe. In 2012, the CDC established a new "reference value" for blood lead levels (5 mcg/dL), thereby lowering the level at which evaluation and intervention are recommended (CDC).

Lead level	Recommendation
< 5 mcg/dL	1. Review lab results with family. For reference, the geometric mean blood lead level for children 1-5 years old is less than 2 mcg/dL . 2. Repeat the blood lead level in 6-12 months if the child is at high risk or risk changes during the timeframe. Ensure levels are done at 1 and 2 years of age. 3. For children screened at age < 12 months, consider retesting in 3-6 months as lead exposure may increase as mobility increases. 4. Perform routine health maintenance including assessment of nutrition, physical and mental development, as well as iron deficiency risk factors. 5. Provide anticipatory guidance on common sources of environmental lead exposure: paint in homes built prior to 1978, soil near roadways or other sources of lead, take-home exposures related to adult occupations, imported spices, cosmetics, folk remedies, and cookware.
5-14 mcg/dL	1. Perform steps as described above for levels < 5 mcg/dL. 2. Re-test venous blood lead level within 1-3 months to ensure the lead level is not rising. If it is stable or decreasing, retest the blood lead level in 3 months. Refer patient to local health authorities if such resources are available. Most states require elevated blood lead levels be reported to the state health department. Contact the CDC at 800-CDC-INFO (800-232-4636) or the National Lead Information Center at 800-424-LEAD (5323) for resources regarding lead poisoning prevention and local childhood lead poisoning prevention programs. 3. Take a careful environmental history to identify potential sources of exposures (see #5 above) and provide preliminary advice about reducing/eliminating exposures. Take care to consider other children who may be exposed. 4. Provide nutritional counseling related to calcium and iron. In addition, recommend having a fruit at every meal as iron absorption quadruples when taken with Vitamin C-containing foods. Encourage the consumption of iron-enriched foods (e.g., cereals, meats). Some children may be eligible for Special Supplemental Nutrition Program for Women, Infants and Child (WIC) or other nutritional counseling. 5. Ensure iron sufficiency with adequate laboratory testing (CBC, Ferritin, CRP) and treatment per AAP guidelines. Consider starting a multivitamin with iron. 6. Perform structured developmental screening evaluations at child health maintenance visits, as lead's effect on development may manifest over years.
15-44 mcg/dL	1. Perform steps as described above for levels 5-14 mcg/dL. 2. Confirm the blood lead level with repeat venous sample within 1 to 4 weeks. 3. Additional, specific evaluation of the child, such as abdominal x-ray should be considered based on the environmental investigation and history (e.g., pica for paint chips, mouthing behaviors). Gut decontamination may be considered if leaded foreign bodies are visualized on x-ray. Any treatment for blood lead levels in this range should be done in consultation with an expert. Contact local PEHSU or PCC for guidance; see resources on back for contact information.
>44 mcg/dL	1. Follow guidance for BLL 15-44 mcg/dL as listed above. 2. Confirm the blood lead level with repeat venous lead level within 48 hours. 3. Consider hospitalization and/or chelation therapy (managed with the assistance of an experienced provider). Safety of the home with respect to lead hazards, isolation of the lead source, family social situation, and chronicity of the exposure are factors that may influence management. Contact your regional PEHSU or PCC for assistance; see resources on back for contact information.

Document authored by Nicholas Newman, DO, FAAP, Region 5 PEHSU, Helen J. Binns, MD, MPH, Region 5 PEHSU, Mateusz Karwowski, MD, MPH, Region 1 PEHSU, Jennifer Lowry, MD , Region 7 PEHSU and the PEHSU Lead Working Group.

American Academy of Pediatrics
DEDICATED TO THE HEALTH OF ALL CHILDREN™

PEHSU

Recommendations on Medical Management of Childhood Lead Exposure and Poisoning

Principles of Lead Exposure in Children

- A child's blood lead concentration depends on their environment, habits, and nutritional status. Each of these can influence lead absorption. Children with differing habits or nutritional status but who live in the same environment can vary on blood lead concentration. Further, as children age or change residences, habits or environments change creating or reducing lead exposure potential.
- While clinically evident effects such as anemia, abdominal pain, nephropathy, and encephalopathy are seen at levels >40 µg/dL, even levels below 10 µg/dL are associated with subclinical effects such inattention and hyperactivity, and decreased cognitive function. Levels above 100 µg/dL may result in fatal cerebral edema.
- Lead exposure can be viewed as a lifelong exposure, even after blood lead levels decline. Bone acts as a reservoir for lead over an individual's lifetime. Childhood lead exposure has potential consequences for adult health and is linked to hypertension, renal insufficiency, and increased cardiovascular-related mortality.
- Since lead shares common absorptive mechanisms with iron, calcium, and zinc, nutritional deficiencies in these minerals promotes lead absorption. Acting synergistically with lead, deficiencies in these minerals can also worsen lead-related neurotoxicity.

Principles of Lead Screening

- Lead screening is typically performed with a capillary specimen obtained by a finger prick with blood blotted onto a testing paper. Testing in this manner requires that the skin surface be clean; false positives are common. Therefore, elevated capillary blood lead levels should be followed by venipuncture testing to confirm the blood lead level. In cases where the capillary specimen demonstrates an elevated lead level but the follow-up venipuncture does not, it is important to recognize that the child may live in a lead-contaminated environment that resulted in contamination of the finger tip. Efforts should be made to identify and eliminate the source of lead in these cases. Where feasible, lead screening should be performed by venipuncture.

Principles of Iron Deficiency Screening

- The iron deficiency state enhances absorption of ingested lead.
- Hemoglobin is a lagging indicator of iron deficiency and only 40% of children with anemia are iron deficient.
- Lead exposed children (≥ 5 mcg/dL) are at risk for iron deficiency and should be screened using CBC, Ferritin, and CRP. Alternatively, reticulocyte hemoglobin can be used, if available.
- Children with iron deficiency, with or without anemia, should be treated with iron supplementation.

Resources

• Pediatric Environmental Health Specialty Unit (PEHSU)Network	• www.pehsu.net or 888-347-2632
• Poison Control Center (PCC)	• www.aapcc.org/ or 800-222-1222
• Centers for Disease Control and Prevention	• www.cdc.gov/nceh/lead/ or 800-232-4636
• U.S. Environmental Protection Agency	• www.epa.gov/lead/ or 800-424-5323

Suggested Reading and References:

Pediatric Environmental Health, 3rd edition. American Academy of Pediatrics, 2012.
Woolf A, Goldman R, Bellinger D. *Pediatric Clinics of North America* 2007;54(2):271-294.
Levin R, et al. *Environmental Health Perspectives* 2008; 116(10):1285-1293.
Baker RD, Greer FR. *Pediatrics* 2010;126(5):1040-50.
Guidelines for the Identification and Management of Lead Exposure in Pregnant and Lactating Women. CDC, 2010.
CDC Response to Advisory Committee on Childhood Lead Poisoning Prevention Recommendations in "Low Level Lead Exposure Harms Children: A Renewed Call of Primary Prevention" June 7, 2012

This document was supported by the Association of Occupational and Environmental Clinics (AOEC) and funded (in part) by the cooperative agreement award number 1U61TS000118-04 from the Agency for Toxic Substances and Disease Registry (ATSDR).

Acknowledgement: The U.S. Environmental Protection Agency (EPA) supports the PEHSU by providing funds to ATSDR under Inter-Agency Agreement number DW-75-92301301-0. Neither EPA nor ATSDR endorse the purchase of any commercial products or services mentioned in PEHSU publications.

(June 2013 update)

CHILDHOOD LEAD POISONING

Blood Lead Level (BLL) Quick Reference for Primary Care Providers

Not Yet Tested

Consider screening ALL children between ages 1-6

Need for testing can be based on risk factors

REMINDER: Medicaid requires all children to be tested at ages 1 & 2. Children who were not tested between 1 & 2 must be tested at least once between 3 & 6.

BLL <5

Review lead levels with family

Provide anticipatory guidance

REMINDER: Medicaid requires all children to be tested at ages 1 & 2. Children who were not tested between 1 & 2 must be tested at least once between 3 & 6.

BLL 5-14

Review lead levels with family

Confirm results with venous blood sample

Review venous sample with family

Perform environmental history. Consider other children who may be exposed

Consider iron sufficiency, provide nutritional counseling r/t calcium and iron

Provide anticipatory guidance

Refer to case management

FOLLOW UP: Retest venous sample within 1-3 months to ensure BLL is not rising

REMINDER: Medicaid requires all children to be tested at ages 1 & 2. Children who were not tested between 1 & 2 must be tested at least once between 3 & 6.

BLL 15-44

Review lead levels with family

Confirm results with venous blood sample

Perform environmental history. Consider other children who may be exposed

Consider if a specific evaluation of the child is necessary such as an abdominal x-ray. Gut decontamination may be needed if leaded foreign bodies are visualized in x-ray

Consider iron sufficiency, provide nutritional counseling r/t calcium and iron

Refer to case management

FOLLOW UP: Retest venous sample monthly until levels are <15, repeat every 1-3 months until levels are <5

REMINDER: Medicaid requires all children to be tested at ages 1 & 2. Children who were not tested between 1 & 2 must be tested at least once between 3 & 6.

BLL >44

Review lead levels with family

Confirm results with venous blood sample

Review venous sample with family

Any treatment at this level should be performed in consultation with an expert at Children's Hospital of Michigan in Detroit.

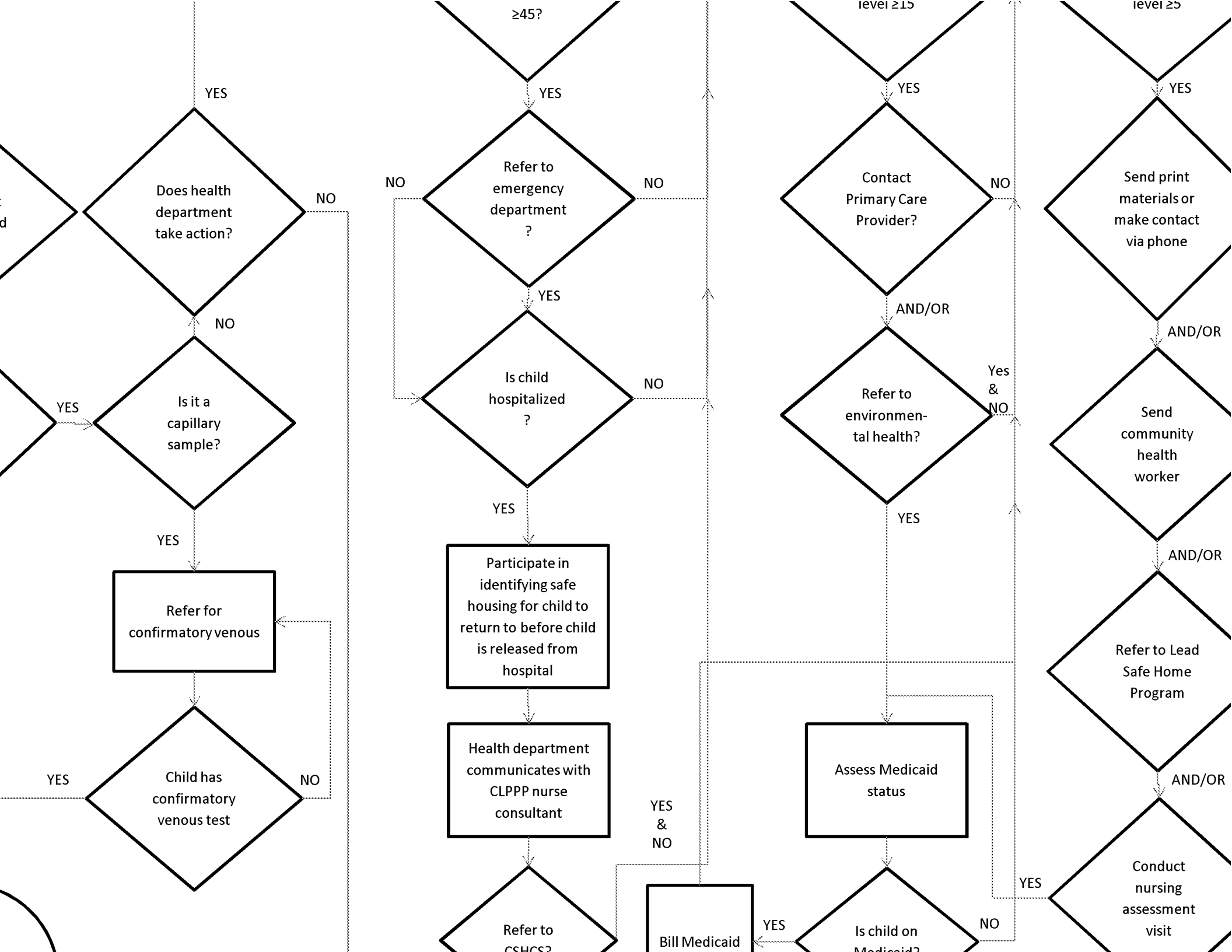
FOLLOW UP: As directed by expert. Monthly venous samples will be required.

REMINDER: Medicaid requires all children to be tested at ages 1 & 2. Children who were not tested between 1 & 2 must be tested at least once between 3 & 6.

Questions? Contact us at (888) 322-4453 or (517) 335-8885

MDHHS
Michigan Department of Health & Human Services
RICK SNYDER, GOVERNOR | NICK LYON, DIRECTOR

Childhood LEAD POISONING prevention program


≥45?
level ≥15
level ≥5
YES
NO
Does health department take action?
Refer to emergency department ?
Contact Primary Care Provider?
Send print materials or make contact via phone
AND/OR
Is it a capillary sample?
Is child hospitalized ?
Refer to environmen-tal health?
Yes & NO
Send community health worker
Refer for confirmatory venous
Participate in identifying safe housing for child to return to before child is released from hospital
Refer to Lead Safe Home Program
Child has confirmatory venous test
Health department communicates with CLPPP nurse consultant
Assess Medicaid status
YES & NO
Conduct nursing assessment visit
Refer to
Bill Medicaid
Is child on

From: ludovica.gazze@gmail.com on behalf of Ludovica Gazzè <lgazze@mit.edu>
Sent: Wednesday, June 10, 2015 4:24 PM
To: Scott, Robert L. (DCH)
Subject: Re: Children BLL data with addresses

Thank you!
Just to clarify, on 3.a: can you give me "Date of Blood Draw"? Having at least the month would help me control for seasonality, but if it's not available, year is fine.

It might take me a while for the signature, because I will have to have MIT or the NBER (National Bureau of Economic Research, this is where the data will be stored and analyzed) sign it for me.

I have not run this through IRB yet, but will as soon as I can, and will send you the approval as soon as I have it.

Ludovica Gazzè
Ph.D. Candidate
Department of Economics
Massachusetts Institute of Technology
Cell: PPI

2015-06-09 17:57 GMT-04:00 Scott, Robert L. (DCH) <ScottR9@michigan.gov>:

Ludovica,

Your data use agreement looks good. I think you said enough about data security on page 3, but if I'm wrong they'll let us know. The only thing I need to change is in 3.a. I can't give you "Date of Blood Test" (date analyzed, I assume) because we don't keep it in our database. We have it in the original files submitted by labs, but that involves thousands of files in a variety of formats.

Yes, this will need MDHHS IRB approval. Has it gone through MIT's IRB already? If so, please send me a copy. I'll submit that along with the appropriate form and the DUA to my IRB. Please also delete the line about "Date of Blood Test" and then sign, scan and send the DUA to me again.

I'll do my best to move things along. This sounds like a great study!

Bob

From: ludovica.gazze@gmail.com [mailto:ludovica.gazze@gmail.com] **On Behalf Of** Ludovica Gazzè
Sent: Wednesday, June 03, 2015 11:13 AM

To: Scott, Robert L. (DCH)
Subject: Re: Children BLL data with addresses

Thank you!
Please find attached the form, filled in but without signatures. I believe that for the actual DUA, I will also have to go through MIT Office of Sponsored Programs, and have them sign as well.

I was vague about the time period requested, since I don't know when the data collection started.

Also: let me know if I need to be more specific about the data linkage procedure, and Data Security Measures: these were not explicitly asked in the form.

Finally, I believe IRB approval might be needed (I have checked that box), but let me know if it is not the case.

Best

Ludovica Gazzè

Ph.D. Candidate
Department of Economics
Massachusetts Institute of Technology

Cell: PPI

2015-06-03 7:43 GMT-04:00 Scott, Robert L. (DCH) <ScottR9@michigan.gov>:

Yes, there is such a database, but it's in a different section. I think you could get the data, but can't say for sure. You can contact Jay Wagar (517-335-8466 or wagarj@michigan.gov) for better answers. It would be a separate request from the BLL data.

From: ludovica.gazze@gmail.com [mailto:ludovica.gazze@gmail.com] **On Behalf Of** Ludovica Gazzè
Sent: Tuesday, June 02, 2015 10:12 AM
To: Scott, Robert L. (DCH)

Subject: Re: Children BLL data with addresses

Thank you!

Before I fill this in, I have a further question:

Does Michigan have a database of lead inspections and certifications and a database of licenses to lead inspectors and lead contractors? Would it be possible to access those data? In case, should I request the data in the same form you attached, together with the BLL, or would the request go through a different system?

Thanks!

Ludovica Gazzè

Ph.D. Candidate
Department of Economics
Massachusetts Institute of Technology

Cell: PPI

2015-06-01 12:34 GMT-04:00 Scott, Robert L. (DCH) <ScottR9@michigan.gov>:

Whoops, see attached.

From: Scott, Robert L. (DCH)
Sent: Monday, June 01, 2015 11:43 AM
To: 'Ludovica Gazzè'
Subject: RE: Children BLL data with addresses

Ludovica,

I'm happy to report that the revised lead reporting rules have been filed with the Office of the Great Seal, which means they are now in effect. I apologize for not notifying you sooner—I discovered today that they were filed May 7, but I hadn't been notified as expected.

Please fill out the attached form (as an unsigned draft) and return it to me. I'll move it along pronto. Keep in mind that all data use agreements these days have to go through the Department's Office of Legal Affairs for approval, but with the revised rules in place I don't expect a problem.

Thanks,

Bob

Robert L. Scott

Childhood Lead Poisoning Prevention Program

Michigan Department of Health & Human Services

(517) 335-8178

fax (517) 335-8509

From: ludovica.gazze@gmail.com [mailto:ludovica.gazze@gmail.com] **On Behalf Of** Ludovica Gazzè
Sent: Thursday, May 28, 2015 2:08 PM

To: Scott, Robert L. (DCH)
Subject: Re: Children BLL data with addresses

Dear Bob,

are there any updates on the possibility of diffusion of children's BLL data for research purposes?

If not: is there any possibility to get aggregate data? What level of aggregation would there be? I am trying to wrap up part of my research asap, and it would be useful to have health outcomes from Michigan.

Finally, does Michigan have a database of lead inspections and certifications? Would it be possible to access it? Feel free to refer me to someone else who would be in charge of this.

Thank you very much

Best

Ludovica Gazzè

Ph.D. Candidate
Department of Economics
Massachusetts Institute of Technology

Cell: PPI

2015-03-11 15:24 GMT-04:00 Scott, Robert L. (DCH) <ScottR9@michigan.gov>:

The hearing went well, I guess. Aside from staff, only one person showed up, and he spoke in favor of the changes. No written comments were received. In other words, there was no opposition. The process still needs to grind through the remaining steps, which may still take several weeks, I'm told.

From: ludovica.gazze@gmail.com [mailto:ludovica.gazze@gmail.com] **On Behalf Of** Ludovica Gazzè
Sent: Saturday, March 07, 2015 3:26 PM
To: Scott, Robert L. (DCH)
Subject: Re: Children BLL data with addresses

Dear Bob,

I'm just writing to check about the public hearing regarding the diffusion of children's BLL data for research purposes. How did it go?

Thank you!

Best

Ludovica Gazzè

Ph.D. Candidate
Department of Economics
Massachusetts Institute of Technology

Cell: PPI

2014-12-02 10:00 GMT-05:00 Scott, Robert L. (DCH) <ScottR9@michigan.gov>:

Ludovica,

The public hearing for those rule changes is scheduled for January 30. So things are progressing, but I don't know how long it will take after the hearing. Please feel free to check back periodically to see where things stand.

Bob

Robert L. Scott

Childhood Lead Poisoning Prevention Program

Michigan Department of Community Health

(517) 335-8178

fax (517) 335-8509

From: ludovica.gazze@gmail.com [mailto:ludovica.gazze@gmail.com] **On Behalf Of** Ludovica Gazzè
Sent: Tuesday, December 02, 2014 9:52 AM
To: Scott, Robert L. (DCH)
Subject: Children BLL data with addresses

Dear Robert,

we spoke on the phone during the summer, regarding the possibility of getting children BLL data with addresses to be linked to a housing dataset for a research project on the effectiveness of lead-safe housing regulations.

You mentioned that some changes in the law might be imminent, which would allow your office to release this data, conditional on IRB approval, and measures to ensure data security.

Please let me know if there has been any update.

My phone number is PPI if you need any further clarification and prefer to talk on the phone.

Best

Ludovica

--

Ludovica Gazzè
Ph.D. Candidate
Department of Economics
Massachusetts Institute of Technology

From: Marc Edwards <edwardsm@vt.edu>
Sent: Tuesday, September 08, 2015 5:39 PM
To: Scott, Robert L. (DCH)
Subject: RE: Repeat of 2006 study request, but for Flint and Genesee County and Detroit zip codes, from January 1 2011 to present.
Attachments: DCH-1294 Data Use and Non-Disclosure Agreement 5-2015.doc; 94 DC_Water_Lead_Edwards_2009.pdf; Rapid Proposal Final.pdf

Here you go.

Best Regards,
Marc

From: Scott, Robert L. (DCH) [mailto:ScottR9@michigan.gov]
Sent: Tuesday, September 08, 2015 7:55 AM
To: Marc Edwards
Subject: RE: Repeat of 2006 study request, but for Flint and Genesee County and Detroit zip codes, from January 1 2011 to present.

Yes, sorry for the delay; I'll get you a more complete answer later today.

From: Marc Edwards [mailto:edwardsm@vt.edu]
Sent: Monday, September 07, 2015 11:40 AM
To: Scott, Robert L. (DCH) <ScottR9@michigan.gov>
Subject: FW: Repeat of 2006 study request, but for Flint and Genesee County and Detroit zip codes, from January 1 2011 to present.

Robert,

Can you confirm that you received the e-mail below, with the request for blood lead data on Flint?

Marc

From: Marc Edwards [mailto:edwardsm@vt.edu]
Sent: Wednesday, September 2, 2015 8:36 PM
To: 'scottrob@michigan.gov' <scottrob@michigan.gov>
Subject: Repeat of 2006 study request, but for Flint and Genesee County and Detroit zip codes, from January 1 2011 to present.

Hi Robert,

I would like to repeat the study I did below, but updated for Flint Michigan, Genessee Country Michigan, and Detroit. What I need is blood lead data from all Flint zip codes, Genesee County zip codes and Detroit zip codes from 2011 to present.
Please do not identify the records by name, but have an ID code for each individual that can be sorted, along with the date of the measurement, blood lead result, zip code in which the child resides, and child's birth date so I can determine the age of the subject.

The intervention of interest, is the change from Detroit water to Flint River water, in Flint Michigan. Genesee County and Detroit serve as control data sets.

If it can be provided in a format that can be read into EXCEL, that would be best.

Let me know if you need a new signed data sharing agreement, or whether our agreement from 2006 is still ok.

Best Regards,
Marc Edwards

Date: Fri, 17 Nov 2006 15:41:55 -0500
To: "Robert L. Scott" <scottrob@michigan.gov>
From: Marc Edwards <edwardsm@vt.edu>
Subject: Proposal and signed data agreement

Robert,

Attached is my signed agreement. My proposal is to do a study of potential benefits resulting from a community intervention in Lansing, MI.

Specifically, last year Lansing distributed drinking water filters and sent out enhanced flushing instructions to mitigate levels of lead in drinking water in homes with lead pipes. I am trying to determine whether this intervention had any discernable benefit on blood lead levels in the population.

To conduct this statistical test, I would like the following fields extracted from your database:

1) City of Lansing blood lead values, draw dates, and subject ID number from January 1 2001 to present.
If you do not have accessible data starting in 2001, then go back as far as you can (e.g., 2002).

2) The same data for Ingham County (which I assume includes Lansing). If it is possible to get all data from within Ingham County but excluding Lansing that would be ideal. But I could presumably delete the duplicate data between set 1 and set 2 by hand if necessary.

3) The same data for the city of Detroit MI.

The statistical comparison will examine 1) temporal changes in % elevated blood lead for Lansing before and after the intervention, and 2) cross comparisons in trends between Lansing (with intervention) and Detroit and Ingham County (without intervention).

This is a fairly straightforward test that I suspect will confirm that no significant change arose due to the intervention in Lansing, consistent with water as a minor contributor to blood lead in Lansing.

If you should have additional questions please e-mail me at this address or call me at 540 231-7236,

Regards,
Marc Edwards

At 03:14 PM 11/17/2006, Robert L. Scott wrote:
Thanks for the info. Please see attached. Just a reminder that a "proposal" is also required. It need not be particularly long or formal, but should indicate clearly the data requested, and what you intend to do with it.

DATA USE AND NON-DISCLOSURE AGREEMENT CONCERNING PROTECTED HEALTH INFORMATION OR OTHER CONFIDENTIAL INFORMATION

Michigan Department of Health and Human Services

Project Title: Flint Water Study

Data Recipient: Marc Edwards

Organization: Virginia Tech

Address: 407 Durham Hall

Blacksburg, VA 24061

Phone: 540 320 8740 **e-mail:** edwardsm@vt.edu

In accordance with this agreement, data are provided by the Michigan Department of Health and Human Services (MDHHS), **Bureau/Division** on **Date** to the Data Recipient.

The parties agree to the provisions specified in this Agreement, the Health Insurance Portability and Accountability Act (HIPAA), and all other applicable public health, research, and confidentiality laws.

SECTION 1: DATA SOURCE, PURPOSE, USE, DESCRIPTION, APPROVAL (IF HUMAN SUBJECT RESEARCH)

What is the Source of the Requested Data? *(e.g., Vital Records, Health Statistics, Cancer Surveillance, Medicaid, etc.)*

Blood Lead Surveillance Data

What is the Data Recipient's Purpose for, and Specific Use of, the Data?

1. Describe why these data are requested *(e.g., Research, Statistics, Public Health, Health Care Operations, Administration of the Medicaid Program).*

   We are researching the effects of interupted corrosion control on lead in Flint's drinking water. Increased lead in drinking water can increase the incidence of childhood lead poisoning or elevated blood lead. The Michigan DEQ has issued a press statemetn, that said that they have studied the blood lead records and that there is no increase in blood lead of Flint residents since the switch to Flint River Water Source. I want to verify their claim scientifically by repeating their study.

2. Describe how the data will be used/disclosed, or incorporate by reference and attach a copy of the research protocol, work plan, or request letter that details the purpose and use of data, etc.

   The analysis will be similar to an ecological study I conducted in Washington DC from 2000-2007. In that case the intervention was chloramination, whereas in Flilnt the intervention was changing from a non-corrosive source water to a corrosive source.

3. Describe the data requested indicating amount, type, by what medium the data will be provided, and whether the data recipient is granted access to the data warehouse or state archives.

   I previously did a similar study in 2006, and the requested data was provided to me on CD-ROM.

   a. Specify the data elements *(e.g., age, gender, etc.)* and time periods *(e.g., January 2003 through January 2005).*

      All blood lead data from all Flint zip codes, Genesee County (but not including zip codes) and Detroit zip codes from 2011 to present. Please do not identify the records by subject name, but have an ID code for each individual that can be sorted, along with the date of the measurement, blood lead result, area in which the child resides, and child's birth date so I can determine the age of the subject. Genesee Country and Detroit serve as control groups to Flint..

   b. Specify if the data requested is identifiable, de-identified, or a limited data set as defined by HIPAA.

      It would be de-identified if the zip codes for Flint are identified as Flint, zip codes for Genesse County (minus Flint) are identified as Genesse County, and Detroit zip codes are identified as Detroit. .

c. Specify the medium requested *(e.g., electronic, hard copy, etc.).*
Electronic

d. Specify if direct access to the data warehouse or state archives is requested.
No. Electronic is fine.

Research Project: *Complete this box if requested data will be used for human subjects research.*

Is Institutional Review Board (IRB) (human subjects research) approval required?	☐ YES ☒ NO
If YES, MDHHS Approval Number..... *(Attach MDHHS Approval Form)*	Approval Number
Is HIPAA Informed Consent/Authorization Waiver Required?	☐ YES ☒ NO
If YES, MDHHS Approval Number (if above IRB approval not required)..... *(Attach HIPAA Waiver Authorization, if relevant.)*	Approval Number

SECTION 2: AGREEMENT CONDITIONS

With regard to data provided under this agreement, the Data Recipient agrees to:

1. Use and disclose the data only in accordance with this agreement, or as otherwise required by law;

2. Limit access to these data only to those described and authorized in this agreement; *(MDHHS may require the specific identification of the person(s) or the agency/division/office that is permitted access. Identify if needed.)*

3. Use appropriate safeguards to prevent use or disclosure of the information other than as provided by this agreement; *(MDHHS sponsor may require description of the security procedures that will be in place and followed.)*

4. Report to the responsible MDHHS sponsor any use or disclosure of information that is not provided for by this data use agreement;

5. Ensure that any agent(s) or subcontractor(s) who access these data agree to the same restrictions and conditions that apply to the data recipient; *(MDHHS sponsor may stipulate that release of data to a subcontractor cannot be done without the written authorization of MDHHS.)*

6. Make no attempt to identify or contact the individuals, providers, or health plans within the data provided unless approved in this agreement; (*Describe any agreed upon exceptions if needed.)*

7. Data recipient must provide MDHHS at least thirty days to review and provide comments on papers, publications, or presentations that the data recipient plans to submit for publication or presentation. Data recipient agrees that it will not publish or disseminate any protected health information, personally identifiable information, or data that might make it possible, directly or indirectly, to identify an individual. Data recipient must acknowledge the MDHHS program as appropriate (e.g., source of data, etc.), assume full responsibility for the analysis and interpretation of the data, and provide a copy of the publication or presentation to MDHHS. To the extent data recipient requires technical assistance in analyzing or interpreting the data and when such assistance goes beyond providing non-manipulated data, MDHHS reserves the right to request that these activities be considered a substantial contribution to the research being conducted and that the provision of such assistance may warrant MDHHS be considered as a research collaborator or co-author in any resulting publications or presentations;

8. Return or destroy all originals and copies of any potentially identifiable information upon completion of project, or upon request, unless otherwise approved in this agreement. This includes, but is not limited to: magnetic tape, micro disk files, paper records, etc. If not returned to the MDHHS, then the data must be destroyed; e.g., use a CD/DVD shredder to destroy CD Roms, DVDs, etc., erase floppy/zip disks using a magnet, shred paper records, clean computer hard drives with a program designed to wipe a disk by overwriting, etc.;

9. Not use the data provided to engage in any method, act, or practice which constitutes a commercial solicitation or advertisement of goods, services, or real estate to consumers; and

10. Not use the data provided as a basis for legal, administrative or other actions which may affect particular individuals or establishments as a result of their specific identification in this project.

The MDHHS may cancel this agreement with proper notice.

The unauthorized use or disclosure of confidential information is punishable by imprisonment or fine or both under state and federal laws specific to the data released.

I, the data recipient, have read, understand, and agree to the above conditions.

DATA RECIPIENT SIGNATURE:

Marc Edwards	Professor
Name of Responsible Data Recipient (Type or Print)	Title
Signature of Responsible Data Recipient	Date

MDHHS SIGNATURES:

MDHHS SPONSOR

Name of Responsible MDHHS Sponsor (Type or Print)	Title
Signature of Responsible MDHHS Sponsor	Date

MDHHS RESPONSIBLE PARTY

Name of MDHHS Director, Bureau Director, or Delegated Authority (Type or Print)	Title
Signature of MDHHS Director, Bureau Director, or Delegated Authority	Date

AUTHORITY: This form is acceptable to the Michigan Department of Health and Human Services as compliant with HIPAA privacy regulations, 45 CFR Parts 160 and 164 as amended.

COMPLETION: Is required if disclosure is requested.

The Michigan Department of Health and Human Services is an equal opportunity employer, services, and programs provider.

Overview: Flint, MI, is currently suffering from a "perfect storm" attributable to out-of-control corrosion of its potable water distribution system. The corrosion is undermining water affordability for residents, financial viability of city government, water aesthetics, and hygiene/sanitation as revealed in local and national news reporting. We ***hypothesize*** that these circumstances will also create severe chemical/biological health risks for Flint residents, including elevated levels of lead and opportunistic premise plumbing pathogens (OPPPs) in drinking water. Preliminary data collected from a home of a lead poisoned child in Flint has revealed extraordinarily high levels of lead, with average concentrations over 20 minutes of water use exceeding 2,000 ppb (> 200 times the World Health Organization allowable levels for lead in potable water).

The main ***objectives*** of this research are to: 1) compare levels of chlorine, iron, fecal indicator bacteria, OPPPs, and corrosion-inducing bacteria present in water mains of a distribution system with uncontrolled corrosion (Flint) versus surrounding cities/counties still using non-corrosive water, 2) profile OPPPs occurrence in hot and cold potable water systems at these same locations, and 3) determine if there is evidence of elevated lead in Flint homes, and, if so, forensically determine the links to iron corrosion. Our team is uniquely qualified to do this work given our just published peer reviewed research on this subject and our extensive collaborations with key stakeholders in Flint.

Intellectual Merit: The four elements of the "perfect storm" currently undermining water quality (and possibly public health) in Flint include: a) chronic underinvestment in water infrastructure, b) under-appreciation of the role of corrosion control in sustaining urban potable water systems, c) increased corrosion due to higher chloride in Flint's new source water, and d) failure to appropriately monitor for lead and OPPPs. The latter two factors are amongst the most important health problems arising in modern potable water systems. The high rates of corrosion occurring in Flint are releasing high levels of iron to water and consuming chlorine disinfectant, which our most recent laboratory testing has indicated will increase lead release to water and growth of OPPPs in cold and hot water plumbing systems. The unfortunate but unique opportunity offered by Flint's current situation, provides an ideal opportunity to field test our recent discoveries regarding potentially adverse consequences of iron corrosion on chemical/microbiological water quality at field rather than laboratory scale.

Broader Impacts: This RAPID grant will directly assist residents of Flint in assessing the current safety of their potable water supply. If the results support recently issued public assurances regarding safety of water, the current problems in Flint can be considered mainly of aesthetics and perception due to very distasteful or discolored water. However, if sampling reveals widespread problems, the public will learn of the potential health threat. Since elements of the "perfect storm" afflicting Flint are occurring at some level in many other financially stressed U.S. urban centers with decaying drinking water infrastructure, this Rapid Response Research (RAPID) grant also provides an unprecedented opportunity to advance fundamental scientific and practical understanding at this emerging nexus of infrastructure-environmental engineering-public health. The general results and approach used herein can inform residents and managers of other U.S. cities, who will soon be dealing with similar problems associated with failing potable water infrastructure exacerbated by increased chloride in water due to excessive use of road salt and rising sea levels. The research also provides a compelling case study in *Citizen Science*, since the experiences of Flint parents in monitoring their children's health and environmental exposures was a trigger for our preliminary testing, and Flint consumers will be scientifically empowered by participating in fundamental research relying on collection of samples from their homes and residences. There is also a social justice implication of the research, in that these results can help inform the current policy debate regarding strategies for dealing with cites that have gone bankrupt, as well as the discussion of access to safe and affordable drinking water as a basic human right.

RAPID: Synergistic Impacts of Corrosive Water and Interrupted Corrosion Control on Chemical/Microbiological Water Quality: Flint, MI

1. Problem Statement and Objectives

Flint, MI, is currently suffering from a "perfect storm" due to out-of-control corrosion of its potable water distribution system, undermining the well-being of the community including water affordability for residents, financial viability of city government, water aesthetics, and hygiene/sanitation.[1-13] Flint's problems began in April 2014, when emergency managers hired to deal with the city's fiscal crisis determined they could save money by switching to a local river water source as opposed to purchasing water from Detroit (Table 1). As a result of the change in source water, the Larson Iron Corrosion Index was raised from 0.54 (low corrosion) to 2.3 (very high corrosion) and the chloride to sulfate mass ratio (CSMR) index for lead corrosion increased from 0.45 (low corrosion) to 1.6 (very high corrosion). Concurrently, the managers and state primacy agency attempted to save even more money by not feeding an orthophosphate corrosion inhibitor to the water supply (Table 1).

Table 1. Water quality parameters for drinking water supplied in Flint, MI before and after the April 2014 switch

Parameter	Before[1]	After[2]
pH	7.38	7.61
Hardness (mg/L as $CaCO_3$)	101	183
Alkalinity (mg/L as $CaCO_3$)	78	77
Chloride (mg/L)	11.4	32
Sulfate (mg/L)	25.2	41
CSMR[3]	0.45	1.6
Inhibitor (mg/L as P)	0.35	NONE
Larson Ratio[4]	0.5	2.3

[1]Source: City of Flint Monthly Operation Report, June 2015. Available from www.cityofflint.com
[2]Source: DWSD 2014 Water Quality Report. Available from www.dwsd.org
[3]A measure of corrosivity to lead; a value > 0.5 is a critical trigger [10]
[4]A measure of corrosivity to mild steel and iron; corrosion rate increases linearly with Larson Ratio [8]

Not surprisingly, the combined effect of more corrosive water and removal of the corrosion inhibitor unleashed unprecedented corrosion in the water main distribution system with cascading personal, economic, and public health consequences to Flint as tracked by news reports and mandatory chemical/biological monitoring of water in the distribution system mains.[1-14] ***Our recent research also predicts that these circumstances will potentially create severe chemical/biological health risks for residents, due to impacts on water within building (premise) plumbing systems that include elevated levels of lead and opportunistic premise plumbing pathogens (OPPPs).***[15-18] Because the factors impacting Flint are also occurring at some level in many other financially-stressed U.S. urban centers with decaying drinking water infrastructure, this ***Rapid Response Research (RAPID) grant provides an unprecedented opportunity to advance fundamental scientific and practical understanding at this emerging nexus of infrastructure-environmental engineering-public health.*** We view August-September 2015 as the ideal time to first sample in Flint, as more than 16 months of uncontrolled corrosion have occurred and the water remains near its seasonal peak temperature, maximizing the likelihood of serious problems with lead and OPPPs if they exist.

Our key hypothesis is that the rapid corrosion of iron water mains will dramatically increase lead release to water and growth of OPPPs as measured in consumers' homes. Mechanistically, higher iron corrosion produces both higher iron in water and lower levels of free chlorine, both of which dramatically increased lead release and OPPPs regrowth in our just published laboratory research utilizing simulated distribution systems.[15-19] The ***main objectives of this research*** are to: *1) compare levels of chlorine, iron, fecal indicator bacteria, OPPPs, and corrosion-inducing bacteria present in water mains of a distribution system with uncontrolled corrosion (Flint) versus controlled corrosion in surrounding cities/counties still using non-corrosive Detroit water, 2) profile hot and cold potable water systems at the same sampling locations in #1 for OPPPs, and 3) determine if there is evidence of elevated lead in Flint homes, and, if so, forensically determine the links to iron corrosion.*[15,17-20] The unfortunate but unique opportunity offered by Flint's current situation provides an ideal opportunity to field test our recent discoveries regarding adverse consequences of iron corrosion on OPPPs and lead concentration at the tap.

2. Review of Local Events and Intellectual Merit

Local Impacts. After the switch of water sources, residents of Flint were immediately subject to an outbreak of corrosion-related drinking water problems including flooding from large water main breaks and reported health ailments.[1-6] General Motors, a prime customer of the water system, reported that the new water was severely corroding auto parts on its assembly line and had to begin importing water, costing the city $400,000 in lost revenue.[9] The PI was also alerted by an Environmental Protection Agency volunteer to a case of childhood lead poisoning in a Flint home that was certified as "lead free."[4] Samples collected from the home exhibited classic "red water" that is occurring throughout the city (Figure 1), along with the highest sustained levels of lead in drinking water that we have encountered in over 25 years of research on the subject. Specifically, in 30 samples collected over a period of 25 minutes flushing at the kitchen faucet, lead concentrations averaged over 2,000 ppb and were as high as 13,000 ppb. For perspective, these levels are more than 200-1,300 times higher than World Health Organization standards (10 ppb) and several even exceeded the EPA criterion for "hazardous waste" of 5,000 ppb Pb. The city has also reported unspecified economic losses due to water main breaks and water losses through leaks.[3,7,11-12]

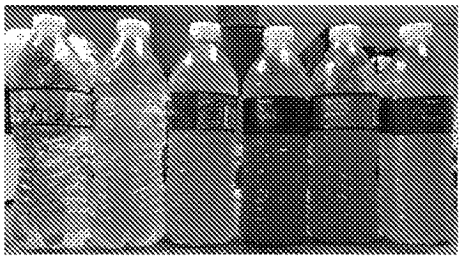


Figure 1. Drinking water samples collected from home of a child who was lead poisoned by Flint water.

The corrosion problems have also had cascading impacts on health parameters monitored under federal regulations. Because the corrosion is rapidly consuming chlorine disinfectant in the water, the city violated EPA limits for *E. coli*.[5-6] The detaching iron rust also has the potential to expose consumers to other contaminants that pose a serious public health risk, including arsenic[14] and lead that have accumulated in pipes or sorbed to iron surfaces.[15-16] Health effects reported by residents since the switch include skin rashes, hair loss, vomiting, copper poisoning, and the one confirmed case of lead poisoning.[2-4,7,13] However, the relatively small number of cases reported to date almost certainly underestimates the full extent of the problem. In response to the sampling showing high lead, the authorities who made the decision to switch water sources and stop adding corrosion inhibitor publicly stated that "anyone who is concerned about lead in the drinking water in Flint can relax" and that the water is safe,[44] but refuse to sample consumers' water without pre-flushing the plumbing for at least 5 minutes the night before sampling. The latter practice is known to miss lead in water problems.

We are also concerned about possible health effects that have not yet been investigated. For example, in March 2015 Region 5 EPA was provided reports of higher incidence of Legionnaires' disease associated with bacteria growth in premise plumbing in the Flint area.[21] Legionnaires' disease has recently been acknowledged to be the primary source of waterborne disease outbreaks (and associated deaths) in the U.S.[22] Despite that acknowledged risk, there is currently no required monitoring for this important pathogen in consumers' homes, where it proliferates and can lead to human exposure and infection in showers.[22]

Intellectual Merit. The four elements of the "perfect storm" currently undermining water quality (and possibly public health) in Flint include: a) chronic underinvestment in water infrastructure, b) under-appreciation of the role of corrosion control in sustaining urban potable water systems, c) increased corrosivity of water sources nationally due to rising chloride levels from anthropogenic pollution and/or rising sea levels, and d) failure to appropriately monitor for lead and OPPPs, which are two of the most important modern-day public health problems arising in building plumbing systems.

a) Chronic Underinvestment in Water Infrastructure. A large fraction of the nation's potable water infrastructure is on the verge of failure, and this problem has been repeatedly voted by

members of the American Society of Civil Engineers (ASCE) as the most urgent societal infrastructure challenge with an overall condition grade of "D".[23,24] Many water main distribution systems are reaching the end of their design lifetime (60-95 years), with water main breaks currently at a rate of 240,000 per year nationally and rising.[25,26] Aside from obvious public health implications associated with compromised delivery of uncontaminated drinking water to the tap, failure events can cause property damage and water loss through leaks.[27] Like many post-industrial manufacturing centers, Flint has a very large potable distribution system constructed to sustain a large consumer and industrial base that no longer exists. The projected cost to upgrade the distribution system is $1.5 billion dollars,[28] which would translate to an unbearable cost of $50,000 per existing customer in Flint.[28]

b) **Under-appreciation of the role of corrosion control in sustaining potable water systems.** Estimates by ASCE, the American Water Works Association (AWWA), the Environmental Protection Agency (EPA), the Water Infrastructure Network (WIN), and the National Academy of Corrosion Engineers (NACE) suggest that direct costs of water pipeline corrosion range between $8 billion - $36 billion annually and indirect costs are much higher.[27] Leaks result in 7 billion gallons of lost water each day with associated revenue losses of ≈ $3 billion per year for U.S. utilities.[29] Problems with leaking potable water plumbing systems in buildings (i.e. premise plumbing) also cost consumers billions of dollars each year.[30,31] Water utilities can reduce costs of potable water system corrosion and extend the lifetime of these invaluable assets by adding corrosion inhibitors, such as orthophosphate, to the water. Prior research using a relatively low corrosivity source water determined that each dollar invested in corrosion control produced more than $5 dollars in financial savings due to reduced corrosion damage and extended lifetime of pipeline infrastructure.[32] In Flint, the short-sighted decision to reduce chemical costs by removing the corrosion inhibitor and introducing corrosive water to the system may have produced tens if not hundreds of millions of dollars in corrosion damages to its existing potable water distribution system. We are also aware of many other utilities that are cutting back on their corrosion inhibitor doses due to cost-cutting pressures.

c) ***Increased corrosivity of water sources nationally due to rising chloride levels from anthropogenic pollution and/or rising sea levels.*** Chloride levels in drinking water are rising nationally in surface water due to use of road salt and seawater intrusion in coastal regions. Road salt use in winter has risen to 137 lbs per year for every American, with a doubling of salt application from 1990 to 2014 (10 vs. 22 million tons) associated with a doubling of chloride levels in northern U.S. waters as monitored by the USGS.[33,34] There is documented concern about the damage of salt application to infrastructure such as roads and bridges,[35] but rising salt levels in the Potomac (due to road salt) in 2015 also have triggered a spike in consumer complaints of red or brown water from their main distribution system.[36,37] and we are currently working with a utility in Brick, NJ that is reporting high lead in consumers' water due to higher chloride from rising sea levels near their intake as well as road salt use.[38-40] The higher corrosivity of water in Flint due to higher chloride (Table 1), therefore provides an interesting "acute" case study of higher chloride impacts that can shed light on these important national trends.

d) ***Failure of utilities and regulatory agencies to take responsibility for the two most important modern day public health problems arising in building plumbing systems (i.e., lead and OPPPs).*** For ten years EPA has acknowledged that utilities are collecting samples in a manner that "misses" worst case lead in water,[41-43] and to date they have not required utilities to change monitoring practices to better reveal problems. The EPA LCR sampling protocols have been under review since 2008 and the EPA is expected to issue new requirements sometime in 2016. Hence, sampling in Flint without "pre-flushing" to reduce lead, as revealed by the EPA

volunteer,[4] could inform modifications to the EPA LCR. Likewise, EPA's current regulations on Legionella consider only levels that might be present in water leaving the treatment plant, where it is least likely to be present, and do not yet require monitoring at the point of entry into homes or within buildings where Legionella is most likely to be present and cause disease.[21] Our proposed sampling for Legionella at these locations can therefore inform future regulation and distribution system management policies for dealing with this emerging public health risk.[19,22]

In summary, this proposed RAPID grant characterizing the occurrence of chemical/biological problems in Flint, MI homes explores a newly emerging nexus between degrading infrastructure-environmental engineering-public health that can provide insight into problems facing many cities all over the United States.

3. Approach

The ***RAPID grant objectives*** will be achieved through three phases of sampling, using analytical methods in routine use by the project team, as follows:

Phase 1. Compare levels of chlorine, iron, fecal indicator bacteria, OPPPs, and corrosion-inducing bacteria present in water mains of a distribution system with uncontrolled corrosion (Flint) versus controlled corrosion in surrounding cities/counties still using non-corrosive Detroit water. A team including the PI and at least 3 graduate students will travel to Flint and stay 3-7 days in mid-August 2015, to collect 8 distribution system samples from surrounding cities still using Detroit water, and to also sample Flint's 8 distribution system monitoring locations (Figure 1). We will stay in two hotel rooms, one located in Flint and one in a surrounding location on Detroit water, to conveniently collect samples for free chlorine at 2 hour intervals expected to correspond to lowest and highest daily demand. All of these analyses will be conducted using standard methods with the exception of testing for corrosion-inducing bacteria which will be conducted with Biological Activity Reaction Test (BART) kits. BARTs are standardized colorimetric culture kits that are semi-quantitative and include testing for Sulfate-Reducing Bacteria (SRB), Heterotrophic Aerobic Bacteria, Heterotrophic Anaerobic Bacteria, Denitrifiers, Slime Forming Bacteria, and Acid Producing Bacteria (APB). It is hypothesized that the Flint waters will have much lower levels of free chlorine, higher levels of iron, corrosion-inducing bacteria, and fecal indicator bacteria than samples collected from locations still on Detroit water.

Phase 2. Profile building hot and cold water plumbing systems for OPPPs at the same sampling locations used in Phase 1. Protocols used previously to sample for a suite of OPPPs and two host protozoa[18,20] in hot and cold water from taps and biofilms of buildings using quantitative Polymerase Chain Reaction (q-PCR) analysis, will be used to profile the hot and cold water systems for human pathogens at the same locations tested in Phase 1. Specifically, target microbes including *Legionella pneumophila, M. avium, P. aeruginosa, Acanthamoeba and Vermamoeba vermiformis* will be quantified by qPCR, and hot water samples will be cultured for *Legionella* and

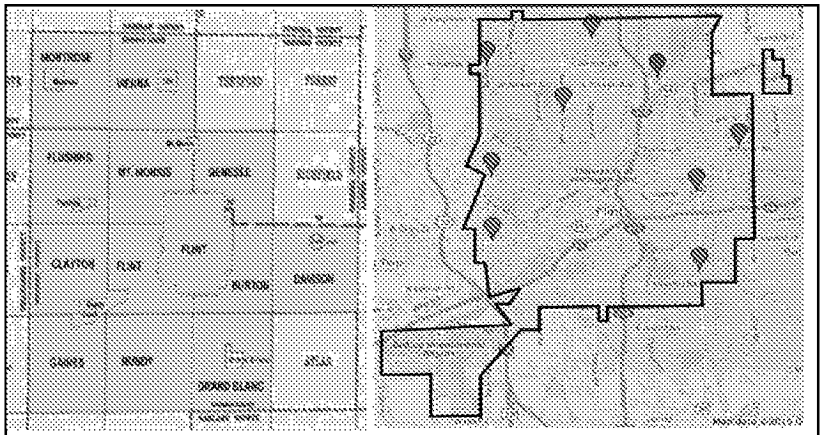


Figure 2. Blue areas indicate areas served by Detroit water before the city of Flint switched (left) and distribution of Flint monitoring stations (right).

Mycobacteria from each location. Samples collected for microbial analysis and fecal indicator bacteria (Phase 1) will be overnight shipped from Michigan via cold-pack using protocols developed by the project team on NSF Project CBET-1438328. In Flint, for comparison, at least three additional privately owned homes will be sampled for OPPPs using the same protocols as for the public buildings.

Phase 3. Determine if there is evidence of elevated lead in Flint homes. We will coordinate with several local citizen groups including the American Civil Liberties Union (ACLU), **Concerned Pastors for Social Action**, and others to sample homes in Flint for lead in water. We will prepare 300 sampling kits with instructions, to collect water samples according to standard EPA LCR protocols for shipment to community groups. Each kit will contain three bottles to sample water after standard water stagnation (> 6 hours) at typical-use flow rates, including 1) first draw standard LCR (1 liter), 2) 45 second flushing 0.5 liter sample (targeting the lead service line, if present), and 3) 5 minutes of flushing 0.25 liter sample. Each kit will have a sample form to fill out information including 1) name of person collecting sample, 2) age of home (if known), 3) mailing address of home sampled, and 4) date of sample collection. A phone number will be provided of a member of the Virginia Tech team, who can answer questions that residents have about the instructions (if any). Residents will be instructed to return the sampling kits to a centralized location according to procedures that best suit each citizen group. The sample kits will then be put into boxes provided by the project team, and shipped back to Virginia Tech with the postage paid by the RAPID grant. Assuming a response rate of 33%, 300 samples (= 0.33 X 300 X 3 bottles per kit) will be analyzed for lead, iron, copper and other constituents using the PI's Inductively Coupled Plasma Mass Spectrometer (ICP-MS). All returned kits will be analyzed, and results will be summarized in a letter to each consumer to be sent out within 1 month of receiving the samples. We will provide a phone number of a senior research scientist (Dr. Jeff Parks) that the residents can call to ask questions about their results if they have them and compile the results in a summary form for research publications and public outreach.

4. Project Management and Prior NSF Support

The senior project team (Edwards, Pruden, Falkinham) has collaborated together extensively and has a strong record of success. They will be assisted in leading the project by Dr. Brandi Clark (former NSF graduate fellow) who is a recent graduate of Virginia Tech (2015). Edwards and Clark will coordinate the Flint site visit and the lead survey. Another NSF graduate fellow (Emily Garner, formerly Emily Lipscomb) who is currently co-advised by Pruden/Edwards will assist the Flint site visit team and coordinate biological sample analysis and shipments. Pruden and Falkinham will assist in the data analysis, interpretation and write-up of the results.

5. Broader Impacts

In addition to improving practical and scientific understanding related to two of the most important problems associated with potable water and health in consumer homes (i.e., lead and OPPPs), this RAPID grant will directly assist residents of Flint in assessing the safety of their potable water supply. The results and approach used herein can inform residents and managers of other U.S. cities who will soon be dealing with similar problems associated with failing potable water infrastructure and increased corrosivity of potable water. Phase 3 of this research also provides an interesting case study in *Citizen Science* as a tool to advance scientific understanding, policy, and public health, because consumers are actively collecting samples from their homes and will be participating in National Science Foundation research. The work also has social justice implications, as the plight of Flint residents has already received national attention, and results can inform the current debate regarding access to safe, affordable water as a "right" for Americans in U.S. cities.

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From: Marc Edwards <edwardsm@vt.edu>
Sent: Friday, September 11, 2015 1:03 PM
To: Scott, Robert L. (DCH)
Subject: RE: Repeat of 2006 study request, but for Flint and Genesee County and Detroit zip codes, from January 1 2011 to present.

Yes, I think there is clearly some urgency to the situation.
MDEQ has publicly stated that your blood lead records, are showing that there is no public health concern for residents in Flint.
The levels of lead in Flint water, that we are finding in our water sampling, are certainly in a range that can cause childhood lead poisoning.
Indeed, one child has already, likely been lead poisoned from exposure to high lead in water.
I think the fact that you already have other teams working on these records, indicates a high level of interest, and urgency.
Congressional interest in the safety of the water is also very high, and this will be an important issue in deciding options for treating the water, in the weeks and months ahead.

Best Regards,

Marc

From: Scott, Robert L. (DCH) [mailto:ScottR9@michigan.gov]
Sent: Friday, September 11, 2015 12:58 PM
To: Marc Edwards
Subject: RE: Repeat of 2006 study request, but for Flint and Genesee County and Detroit zip codes, from January 1 2011 to present.

Maybe. My contact at Legal let me know the other day that he's unusually busy with other matters right now, so his review of DUAs might be delayed unless there was a specific reason for quicker action on his part.

If you are in need of a reasonably-quick turnaround—i.e., a week rather than a month or so—then please send me a paragraph explaining why. I'll pass that along with your DUA.

If you're not in a hurry, then I'm all set for now—I'll submit your DUA as is.

From: Marc Edwards [mailto:edwardsm@vt.edu]
Sent: Thursday, September 10, 2015 7:57 PM
To: Scott, Robert L. (DCH) <ScottR9@michigan.gov>
Subject: RE: Repeat of 2006 study request, but for Flint and Genesee County and Detroit zip codes, from January 1 2011 to present.

Do you need anything else from me?
Marc

From: Marc Edwards [mailto:edwardsm@vt.edu]
Sent: Tuesday, September 08, 2015 5:39 PM
To: 'Scott, Robert L. (DCH)'

Subject: RE: Repeat of 2006 study request, but for Flint and Genesee County and Detroit zip codes, from January 1 2011 to present.

Here you go.

Best Regards,
Marc

From: Scott, Robert L. (DCH) [mailto:ScottR9@michigan.gov]
Sent: Tuesday, September 08, 2015 7:55 AM
To: Marc Edwards
Subject: RE: Repeat of 2006 study request, but for Flint and Genesee County and Detroit zip codes, from January 1 2011 to present.

Yes, sorry for the delay; I'll get you a more complete answer later today.

From: Marc Edwards [mailto:edwardsm@vt.edu]
Sent: Monday, September 07, 2015 11:40 AM
To: Scott, Robert L. (DCH) <ScottR9@michigan.gov>
Subject: FW: Repeat of 2006 study request, but for Flint and Genesee County and Detroit zip codes, from January 1 2011 to present.

Robert,

Can you confirm that you received the e-mail below, with the request for blood lead data on Flint?

Marc

From: Marc Edwards [mailto:edwardsm@vt.edu]
Sent: Wednesday, September 2, 2015 8:36 PM
To: 'scottrob@michigan.gov' <scottrob@michigan.gov>
Subject: Repeat of 2006 study request, but for Flint and Genesee County and Detroit zip codes, from January 1 2011 to present.

Hi Robert,

I would like to repeat the study I did below, but updated for Flint Michigan, Genessee Country Michigan, and Detroit. What I need is blood lead data from all Flint zip codes, Genesee County zip codes and Detroit zip codes from 2011 to present.
Please do not identify the records by name, but have an ID code for each individual that can be sorted, along with the date of the measurement, blood lead result, zip code in which the child resides, and child's birth date so I can determine the age of the subject.

The intervention of interest, is the change from Detroit water to Flint River water, in Flint Michigan. Genesee County and Detroit serve as control data sets.

If it can be provided in a format that can be read into EXCEL, that would be best.

Let me know if you need a new signed data sharing agreement, or whether our agreement from 2006 is still ok.

Best Regards,

Marc Edwards

Date: Fri, 17 Nov 2006 15:41:55 -0500
To: "Robert L. Scott" <scottrob@michigan.gov>
From: Marc Edwards <edwardsm@vt.edu>
Subject: Proposal and signed data agreement

Robert,

Attached is my signed agreement. My proposal is to do a study of potential benefits resulting from a community intervention in Lansing, MI.

Specifically, last year Lansing distributed drinking water filters and sent out enhanced flushing instructions to mitigate levels of lead in drinking water in homes with lead pipes. I am trying to determine whether this intervention had any discernable benefit on blood lead levels in the population.

To conduct this statistical test, I would like the following fields extracted from your database:

1) City of Lansing blood lead values, draw dates, and subject ID number from January 1 2001 to present.
If you do not have accessible data starting in 2001, then go back as far as you can (e.g., 2002).

2) The same data for Ingham County (which I assume includes Lansing). If it is possible to get all data from within Ingham County but excluding Lansing that would be ideal. But I could presumably delete the duplicate data between set 1 and set 2 by hand if necessary.

3) The same data for the city of Detroit MI.

The statistical comparison will examine 1) temporal changes in % elevated blood lead for Lansing before and after the intervention, and 2) cross comparisons in trends between Lansing (with intervention) and Detroit and Ingham County (without intervention).

This is a fairly straightforward test that I suspect will confirm that no significant change arose due to the intervention in Lansing, consistent with water as a minor contributor to blood lead in Lansing.

If you should have additional questions please e-mail me at this address or call me at 540 231-7236,

Regards,
Marc Edwards

At 03:14 PM 11/17/2006, Robert L. Scott wrote:
Thanks for the info. Please see attached. Just a reminder that a
"proposal" is also required. It need not be particularly long or
formal, but should indicate clearly the data requested, and what you
intend to do with it.

From: Mona Hanna-Attisha <MHanna1@hurleymc.com>
Sent: Wednesday, September 23, 2015 10:13 PM
To: Scott, Robert L. (DCH)
Cc: Jenny LaChance
Subject: FW: IRBNet Board Action
Attachments: DCH-1294 Data Use and Non-Disclosure Agreement 5-2015.doc; Page_One_-_Initial_Review_Application_239579_7.doc; IRBNetDocument%20%2833%29.pdf

Bob, thank you. Attached are the two requested and completed (to the best of our knowledge) IRB application documents, as well as the IRB approval letter from our institution. Let me know if you require any further information from us. I have cc'd Jenny from our research department who can assist if we need further revisions.

Any follow-up on the EBL% for Flint kids less than 5, including recent months?

Thanks! Mona

Mona Hanna-Attisha MD MPH
Director, Pediatric Residency Program
Hurley Children's Hospital at Hurley Medical Center Assistant Professor, Department of Pediatrics and Human Development Michigan State University College of Human Medicine
Office: 810-262-7257
mhanna1@hurleymc.com

From: Scott, Robert L. (DCH) [ScottR9@michigan.gov]
Sent: Wednesday, September 23, 2015 10:53 AM
To: Mona Hanna-Attisha
Cc: Lawrence Reynolds; Peeler, Nancy (DCH)
Subject: RE: IRBNet Board Action

Mona,

I'll be happy to help with this. We'll need you to submit a DCH-1294 Data Use Agreement (attached) and an IRB Initial Review Application - Abbreviated for review by the MDHHS IRB. The latter is available at Michigan.gov/irb under "Information for New Applications." (The "Abbreviated" application is used whenever another IRB has already approved the project.) Please complete each of the two documents as far as you can, and send to me unsigned, as Word documents. I'll fill in the rest, and will send the DUA to our Legal department and the IRB app to our IRB contact. I'll ask each of them for as quick a review as possible.

Please let me know if you have questions.

Bob

Robert L. Scott
Childhood Lead Poisoning Prevention Program Michigan Department of Health & Human Services
(517) 335-8178
fax (517) 335-8509

-----Original Message-----
From: Mona Hanna-Attisha [mailto:MHanna1@hurleymc.com]
Sent: Wednesday, September 16, 2015 3:10 PM
To: Scott, Robert L. (DCH) <ScottR9@michigan.gov>
Cc: Lawrence Reynolds <lrey52@gmail.com>
Subject: FW: IRBNet Board Action

Bob, I just received IRB approval to look at the City of Flint blood lead levels. I would love to get the raw data if that is possible. Attached is my study proposal and the IRB approval.

Specific fields that we are looking for include:
MCIR ID or some sort of identifier to ensure first time lead level only Zip code Date of Birth Date of Blood lead level Lead level

Would greatly appreciate your assistance! Thanks!

Mona Hanna-Attisha MD MPH FAAP
Program Director Pediatric Residency
Hurley Children's Hospital at Hurley Medical Center Michigan State University College of Human Medicine Department of Pediatrics and Human Development Mhanna1@hurleymc.com

-----Original Message-----
From: Nicolas Lecea [mailto:no-reply@irbnet.org]
Sent: Wednesday, September 16, 2015 2:09 PM
To: Jenny LaChance; Mona Hanna-Attisha
Subject: IRBNet Board Action

Please note that Hurley Medical Center Institutional Review Board has taken the following action on IRBNet:

Project Title: [807433-1] Analysis of Pediatric Blood Lead Levels Principal Investigator: Mona Hanna-Attisha, MD MPH

Submission Type: New Project
Date Submitted: September 15, 2015

Action: APPROVED
Effective Date: September 16, 2015
Review Type: Expedited Review

Should you have any questions you may contact Nicolas Lecea at nlecea1@hurleymc.com.

Thank you,
The IRBNet Support Team

www.irbnet.org

DATA USE AND NON-DISCLOSURE AGREEMENT CONCERNING PROTECTED HEALTH INFORMATION OR OTHER CONFIDENTIAL INFORMATION

Michigan Department of Health and Human Services

Project Title: Analysis of Pediatric Blood Lead Levels in Flint, MI

Data Recipient: Mona Hanna-Attisha, MD MPH

Organization: Hurley Medical Center

Address: One Hurley Plaza

Flint, MI 48503

Phone: 810-262-7257 **e-mail:** mhanna1@hurleymc.com

In accordance with this agreement, data are provided by the Michigan Department of Health and Human Services (MDHHS), **Bureau/Division** on **Date** to the Data Recipient.

The parties agree to the provisions specified in this Agreement, the Health Insurance Portability and Accountability Act (HIPAA), and all other applicable public health, research, and confidentiality laws.

SECTION 1: DATA SOURCE, PURPOSE, USE, DESCRIPTION, APPROVAL (IF HUMAN SUBJECT RESEARCH)

What is the Source of the Requested Data? *(e.g., Vital Records, Health Statistics, Cancer Surveillance, Medicaid, etc.)*

MCIR

What is the Data Recipient's Purpose for, and Specific Use of, the Data?

1. Describe why these data are requested *(e.g., Research, Statistics, Public Health, Health Care Operations, Administration of the Medicaid Program).*

   These data are being requested for two reasons: the primary purpose is related to public health. We are looking at the impact so that measures can be implemented to address any increase in children with elevated blood levels. The data is also being for research purposes so our findings can be shared with other communities.

2. Describe how the data will be used/disclosed, or incorporate by reference and attach a copy of the research protocol, work plan, or request letter that details the purpose and use of data, etc.

   Data will be deidentified once 1) one value per person has been selected, 2) whether or not they live in the higher risk part of Flint for lead has been coded, and 3) the timing of when they had their lead level (pre/post) has been determined. Data put into SPSS will not include any identifiers.

3. Describe the data requested indicating amount, type, by what medium the data will be provided, and whether the data recipient is granted access to the data warehouse or state archives.

   Data Overview Description

   a. Specify the data elements *(e.g., age, gender, etc.)* and time periods *(e.g., January 2003 through January 2005)*.

      Time period: January 2013 through Sept 15,2015; Data Elements: medical record number, date of birth, date of blood draw, zip code, blood lead level, and primary medical doctor. Gender, race and insurnace type are also requested if available.

   b. Specify if the data requested is identifiable, de-identified, or a limited data set as defined by HIPAA.

      Identifiable

   c. Specify the medium requested *(e.g., electronic, hard copy, etc.).*

      electronic

   d. Specify if direct access to the data warehouse or state archives is requested.

Not unless necessary for this request of data

Research Project: *Complete this box if requested data will be used for human subjects research.*

Is Institutional Review Board (IRB) (human subjects research) approval required?	☒ YES ☐ NO
If YES, MDHHS Approval Number..... *(Attach MDHHS Approval Form)*	Approval Number
Is HIPAA Informed Consent/Authorization Waiver Required?	☒ YES ☐ NO
If YES, MDHHS Approval Number (if above IRB approval not required)..... *(Attach HIPAA Waiver Authorization, if relevant.)*	Approval Number

SECTION 2: AGREEMENT CONDITIONS

With regard to data provided under this agreement, the Data Recipient agrees to:

1. Use and disclose the data only in accordance with this agreement, or as otherwise required by law;

2. Limit access to these data only to those described and authorized in this agreement; *(MDHHS may require the specific identification of the person(s) or the agency/division/office that is permitted access. Identify if needed.)*

3. Use appropriate safeguards to prevent use or disclosure of the information other than as provided by this agreement; *(MDHHS sponsor may require description of the security procedures that will be in place and followed.)*

4. Report to the responsible MDHHS sponsor any use or disclosure of information that is not provided for by this data use agreement;

5. Ensure that any agent(s) or subcontractor(s) who access these data agree to the same restrictions and conditions that apply to the data recipient; *(MDHHS sponsor may stipulate that release of data to a subcontractor cannot be done without the written authorization of MDHHS.)*

6. Make no attempt to identify or contact the individuals, providers, or health plans within the data provided unless approved in this agreement; (*Describe any agreed upon exceptions if needed.)*

7. Data recipient must provide MDHHS at least thirty days to review and provide comments on papers, publications, or presentations that the data recipient plans to submit for publication or presentation. Data recipient agrees that it will not publish or disseminate any protected health information, personally identifiable information, or data that might make it possible, directly or indirectly, to identify an individual. Data recipient must acknowledge the MDHHS program as appropriate (e.g., source of data, etc.), assume full responsibility for the analysis and interpretation of the data, and provide a copy of the publication or presentation to MDHHS. To the extent data recipient requires technical assistance in analyzing or interpreting the data and when such assistance goes beyond providing non-manipulated data, MDHHS reserves the right to request that these activities be considered a substantial contribution to the research being conducted and that the provision of such assistance may warrant MDHHS be considered as a research collaborator or co-author in any resulting publications or presentations;

8. Return or destroy all originals and copies of any potentially identifiable information upon completion of project, or upon request, unless otherwise approved in this agreement. This includes, but is not limited to: magnetic tape, micro disk files, paper records, etc. If not returned to the MDHHS, then the data must be destroyed; e.g., use a CD/DVD shredder to destroy CD Roms, DVDs, etc., erase floppy/zip disks using a magnet, shred paper records, clean computer hard drives with a program designed to wipe a disk by overwriting, etc.;

9. Not use the data provided to engage in any method, act, or practice which constitutes a commercial solicitation or advertisement of goods, services, or real estate to consumers; and

10. Not use the data provided as a basis for legal, administrative or other actions which may affect particular individuals or establishments as a result of their specific identification in this project.

The MDHHS may cancel this agreement with proper notice.

The unauthorized use or disclosure of confidential information is punishable by imprisonment or fine or both under state and federal laws specific to the data released.

I, the data recipient, have read, understand, and agree to the above conditions.

DATA RECIPIENT SIGNATURE:

Name of Responsible Data Recipient (Type or Print)	Title
Signature of Responsible Data Recipient	Date

MDHHS SIGNATURES:

MDHHS SPONSOR

Name of Responsible MDHHS Sponsor (Type or Print)	Title
Signature of Responsible MDHHS Sponsor	Date

MDHHS RESPONSIBLE PARTY

Name of MDHHS Director, Bureau Director, or Delegated Authority (Type or Print)	Title
Signature of MDHHS Director, Bureau Director, or Delegated Authority	Date

AUTHORITY: This form is acceptable to the Michigan Department of Health and Human Services as compliant with HIPAA privacy regulations, 45 CFR Parts 160 and 164 as amended.

COMPLETION: Is required if disclosure is requested.

The Michigan Department of Health and Human Services is an equal opportunity employer, services, and programs provider.

From: Peeler, Nancy (DCH)
Sent: Friday, September 25, 2015 10:37 AM
To: Scott, Robert L. (DCH)
Subject: Re: question on email response regarding Flint blood lead data

I'm sitting in Zoe's quantum mechanics class, no clue what these differential equations are telling me, but I am stewing a bit about this situation. I want to say that you always do a great job, and are responsive to all data requests, and advocate to help researchers get whatever paperwork completed and turned in. That's why this feels so inappropriate to me - this isn't your fault, thus my earlier comment about apologizing less. And having said that, it probably wasn't a really helpful comment toward revising the response.

The email you received could be read as an intent to escalate and spin things, and I don't think you need to get caught up in that. A calm, fact-based response is very appropriate.

I think your first paragraph is good, but I would remove the last sentence, as I'm not sure what policies you are referencing beyond state and federal law -- and, I think the state and federal law carry enough weight that our departmental policies probably don't change much of anything about the process.

For paragraphs 2 and 3 I think I would just say state the facts, which is that both requests are in process in accordance with departmental policies - because they are. You really don't need to apologize for taking vacation, and I consider anybody's vacation time to be a normal part of doing business - none of us are expected to be at our desks every day, and there is no way to predict what might come up when we are planning to be away.

In your 4th paragraph, it looks like he is changing his data request? I appreciate your generosity in taking on responsibility to do his work for him (editing his paperwork) - your option, whether you want to do that, or request that he re-do it. I would outline the steps, clarify that you have confirmed the process which revealed the extra step, and let him know you'll watch for his response.

Finally, I might close with the piece about a small program, responsible for processing a high number of results every day or week (you sent me a number last week) in order to get them out to the professionals working directly with children and families, which IS the purpose and highest priority of our program.

I hope some of this is helpful and not too late - hope the rest of the day goes better. Thank you for all you do!

Sent from my iPad

On Sep 25, 2015, at 9:34 AM, Scott, Robert L. (DCH) <ScottR9@michigan.gov> wrote:

> Angela or Jennifer,
>
> Please see Dr. Edwards email below, and my draft response to him. I'm not very happy with him right now, but tried to respond appropriately. Given the sensitive nature of the situation, I'm checking with you first. Nancy is on annual leave, but I've CC'd her here.
>
> Is it OK to send this? Please feel free to make changes as appropriate. I'm also asking if it's OK now to share the attached PDF with Dr. Edwards and Dr. Hanna-Attisha.

Thanks,
Bob

Marc,

As you well know, the data you and Dr. Hanna-

Attisha are requesting are derived from personal health data, which of course is confidential. There are state and federal laws governing what can be shared, and how, with researchers or the public. In addition, my Department has policies on how to determine what can be shared.

I worked with you earlier this month to get data to you relatively quickly, but did not manage to complete the process before I went on annual leave for several days. I neglected to inform you that I'd be away, and I apologize for not informing you. Unfortunately we are a very small program, and there's no one else here to process your request—or Dr. Hanna-Attisha's.

Since I returned on Wednesday, my time has been largely taken up with my Department's response to the current situation in Flint. I did manage to correspond to Dr. Hanna-Attisha, and provided her with the forms she'll need for her request. I hope to submit her request to our Legal office and to our IRB contact today.

Sorry I haven't responded to your email from Monday—as I mentioned above, I was away, and then have been juggling many tasks since I returned. I think you'll be able to get approval for data with zip code identified. I'll edit your data use agreement accordingly, and will adjust it to say "limited data set" instead of "de-identified." I'll re-submit your DUA to Legal today. You will need to submit an MDHHS IRB review application (attached) because this is considered research. You should also submit a "HIPAA Waiver Request" (attached). (I wasn't aware of that when we talked earlier this month.) I don't know whether you'll need to go through an IRB review with your institution.

I've also attached a PDF that includes the numbers behind the graphs you referred to, and I'm CC'ing Dr. Hanna-Attisha so that she has it as well.

Bob

Robert L. Scott
Childhood Lead Poisoning Prevention Program
Michigan Department of Health & Human Services
(517) 335-8178
fax (517) 335-8509

From: Marc Edwards [mailto:edwardsm@vt.edu]
Sent: Thursday, September 24, 2015 8:14 PM
To: Scott, Robert L. (DCH) <ScottR9@michigan.gov>
Subject: RE: Automatic reply: New DCH-1294, time-sensitive

Dear Robert,

I just spoke to this young researcher at Hurley, and apparently, she has been unable to get access to the state blood lead records.
I have to say, it is very disturbing that the state keeps issuing these blood lead reports and statements in their press releases, and refuses to share the data backing them up with outside researchers.
Even worse, state reps are running around claiming that these reports are proof that Flint water is safe to drink.

Can you tell me why it is so difficult to get this data, and why your agency is raising so many obstacles to sharing it with everyone who asks? I note that I have been asking to see your data since MDEQ first sent it to reporters back in August, and I count 10 e-mails that I sent responding to all your questions. As of yet, you have given me nothing in response. Yet you have been sending reporters one report after another. It seems your agency is more interested in public relations than sound science.

In the meantime, can I at least be given the numbers of EBL cases and number of tests each month, that are the basis for the latest graph your agency is sending to the press...or is that top secret as well?

Marc

From: Scott, Robert L. (DCH) [mailto:ScottR9@michigan.gov]
Sent: Monday, September 21, 2015 1:21 PM
To: Marc Edwards
Subject: Automatic reply: New DCH-1294, time-sensitive

I'll be out of the office until Wednesday, Sept 23. I'll respond to your message when I return.

<Flint Testing and EBLLs_updated 092315_with notes.pdf>

<HIPAA Waiver Request Template.doc>

<DCH-1277 IRB Initial Review Application.doc>

From: Marc Edwards <edwardsm@vt.edu>
Sent: Friday, September 25, 2015 1:12 PM
To: 'Mona Hanna-Attisha';Scott, Robert L. (DCH);'Jenny LaChance'
Subject: RE: Automatic reply: New DCH-1294, time-sensitive

Mona,

When you get the data let me know. Since you are involved and have apparently requested the data already (independently), I will not be bothering Robert further.

However, I will be speaking out, about the unethical behavior of the state in not sharing the data to date, and their abusing of power to discredit the work you have done.
The second they give you the data I will stop speaking out.

Robert, I apologize to you because I know you did not have anything to do with it, but what is happening here is just wrong.

Best Regards,

Marc

From: Marc Edwards [mailto:edwardsm@vt.edu]
Sent: Friday, September 25, 2015 1:00 PM
To: 'Mona Hanna-Attisha'; 'Scott, Robert L. (DCH)'; 'Jenny LaChance'
Subject: RE: Automatic reply: New DCH-1294, time-sensitive

I understand that, and I appreciate what you are doing.

I also hope you can understand my frustration, at seeing this data given to reporters in an relatively unprocessed and unscientific format, used to support a claim that there is not a problem with lead in water in Flint.
And worst of all, seeing it used to "refute" the sound science that Mona did with her in-house data. I know you did not have anything to do with that, but I strongly feel that what is happening is unethical.
I hope you send my message to whoever is abusing the data (and the public trust, and the science method) in this way.

I will be calling the state out on this abuse, as long as it continues. I stand by my statements this is third rate and unscientific science that is being circulated by the state, and your department should have expedited Mona's requests to get access to the data. I am probably going to step aside and let her handle it from here, and as soon as you get her the data I will stop speaking out. She has proven herself to be a capable researcher.

You should also tell the team that is analyzing the data, that lead in water often peaks in the summer months, and declines in the winter months. It is clear from their one pager that they do not know the first thing about lead in water.

Marc

From: Mona Hanna-Attisha [mailto:MHanna1@hurleymc.com]
Sent: Friday, September 25, 2015 12:51 PM
To: 'Scott, Robert L. (DCH)'; Marc Edwards; Jenny LaChance
Subject: RE: Automatic reply: New DCH-1294, time-sensitive

Thanks Bob. We greatly appreciate all your assistance and your hard work!

It's interesting to note that the number of children tested in July and August of 2015 is so small as compared to the same months in previous years? Do you think those numbers capture all the tests that were done -- is there a lag time in reporting to your system?

Thanks! Mona

From: Scott, Robert L. (DCH) [mailto:ScottR9@michigan.gov]
Sent: Friday, September 25, 2015 12:44 PM
To: Marc Edwards
Cc: Mona Hanna-Attisha; Peeler, Nancy (DCH); Minicuci, Angela (DCH)
Subject: RE: Automatic reply: New DCH-1294, time-sensitive

Marc,

As you well know, the data you and Dr. Hanna-Attisha have requested are derived from personal health data, which of course is confidential. There are state and federal laws governing what can be shared, and how, with researchers or the public.

I worked with you earlier this month to get data to you relatively quickly, but we did not manage to complete the process before I went on annual leave for several days. I neglected to inform you that I'd be away. I returned on Wednesday and corresponded that day with Dr. Hanna-Attisha, providing her with the forms she'll need for her request.

Regarding your email from Monday, I think you'll be able to get approval for data with zip code identified. I'll edit your data use agreement accordingly, will adjust it to say "limited data set" instead of "de-identified," and will re-submit it to our Legal office. You will need to submit an MDHHS IRB review application (attached) because this is considered research. You should also submit a "HIPAA Waiver Request" (attached). (I wasn't aware of the Waiver Request when we talked earlier this month.) Send those documents to me, and I'll pass them on to our IRB contact. I don't know whether you'll need to go through an IRB review with your institution.

In short, both your request and Dr. Hanna-Attisha's are in process in accordance with departmental policies.

I've attached a PDF that includes the numbers behind the graphs you referred to, and I'm CC'ing Dr. Hanna-Attisha so that she has it as well.

Please keep in mind that I work for a very small program responsible for processing several thousand blood lead results every week--in order to get them out to the professionals working directly with children and families, which is the primary purpose and highest priority of our program.

Bob

Robert L. Scott
Childhood Lead Poisoning Prevention Program
Michigan Department of Health & Human Services
(517) 335-8178
fax (517) 335-8509

From: Marc Edwards [mailto:edwardsm@vt.edu]
Sent: Thursday, September 24, 2015 8:14 PM
To: Scott, Robert L. (DCH) <ScottR9@michigan.gov>
Subject: RE: Automatic reply: New DCH-1294, time-sensitive

Dear Robert,

I just spoke to this young researcher at Hurley, and apparently, she has been unable to get access to the state blood lead records.
I have to say, it is very disturbing that the state keeps issuing these blood lead reports and statements in their press releases, and refuses to share the data backing them up with outside researchers.
Even worse, state reps are running around claiming that these reports are proof that Flint water is safe to drink.

Can you tell me why it is so difficult to get this data, and why your agency is raising so many obstacles to sharing it with everyone who asks? I note that I have been asking to see your data since MDEQ first sent it to reporters back in August, and I count 10 e-mails that I sent responding to all your questions. As of yet, you have given me nothing in response. Yet you have been sending reporters one report after another. It seems your agency is more interested in public relations than sound science.

In the meantime, can I at least be given the numbers of EBL cases and number of tests each month, that are the basis for the latest graph your agency is sending to the press...or is that top secret as well?

Marc

From: Scott, Robert L. (DCH) [mailto:ScottR9@michigan.gov]
Sent: Monday, September 21, 2015 1:21 PM
To: Marc Edwards
Subject: Automatic reply: New DCH-1294, time-sensitive

I'll be out of the office until Wednesday, Sept 23. I'll respond to your message when I return.

From: Mona Hanna-Attisha <MHanna1@hurleymc.com>
Sent: Friday, September 25, 2015 4:10 PM
To: Scott, Robert L. (DCH);Jenny LaChance
Subject: RE: State data - Dr. Mona Hanna-Attisha
Attachments: IRBNetDocument 92515.pdf

Yes, we already have the IRB approval from Hurley for this modification. Attached approval letter.

Thanks Bob!

From: Scott, Robert L. (DCH) [mailto:ScottR9@michigan.gov]
Sent: Friday, September 25, 2015 4:09 PM
To: Jenny LaChance; Mona Hanna-Attisha
Subject: RE: State data - Dr. Mona Hanna-Attisha

Jenny,

As long as this request is for "research," then I don't think it will be a problem to provide addresses. You're correct, it would then be considered "identifiable." One thing that might slow it down---I believe you'd have to go back to Hurley's IRB and get approval for the change.

Bob

From: Jenny LaChance [mailto:JLachan1@hurleymc.com]
Sent: Friday, September 25, 2015 4:05 PM
To: Scott, Robert L. (DCH) <ScottR9@michigan.gov>; Mona Hanna-Attisha <MHanna1@hurleymc.com>
Subject: State data - Dr. Mona Hanna-Attisha

Hi Bob,

My name is Jenny LaChance, and I have been working with Mona on the data. We are now doing in depth GIS analysis, which involves actual address (beyond zipcode). Would adding actual address slow down the request for the State data? I believe this would not longer be a limited data set. Any advice or guidance would be truly appreciated.

Thank you so much!
Jenny

HURLEY MEDICAL CENTER

One Hurley Plaza
Flint, Michigan 48503

DATE:	September 25, 2015
TO:	Mona Hanna-Attisha, MD MPH
FROM:	Hurley Medical Center Institutional Review Board
STUDY TITLE:	[807433-3] Analysis of Pediatric Blood Lead Levels
VERSION #:	*#3, Dated 09/25/2015*
SUBMISSION TYPE:	Amendment/Modification
ACTION:	APPROVED
APPROVAL DATE:	September 25, 2015
EXPIRATION DATE:	September 15, 2016
REVIEW TYPE:	Expedited Review

Dear Dr. Hanna-Attisha:

As Chair of the Hurley Medical Institutional Review Board, an **expedited review** was conducted to consider the changes to the following documents for the above-referenced prospective human subjects research project:

- Amendment/Modification - Revised proposal (UPDATED: 09/25/2015)
- Application Form - Revised with investigator and new numbers (UPDATED: 09/25/2015)
- HIPAA Waiver - Revised for addresses (UPDATED: 09/25/2015)
- Letter - summary of changes (UPDATED: 09/25/2015)
- Other - List of variables/information requested (UPDATED: 09/25/2015)

Following my review, it was determined that this request for expedited review represents a minor modification, and the amendment to the above documents would not pose any increased risk to research participants.

This preliminary determination will be reviewed at the next full IRB meeting. Your attendance is not required.

Best wishes in your investigative research endeavors.

Sincerely,

Harland Verrill Ph.D.
Chair, Institutional Review Board

Generated on IRBNet

This letter has been electronically signed in accordance with all applicable regulations, and a copy is retained within Hurley Medical Center's records.

Generated on iPhone

From: Jenny LaChance <JLachan1@hurleymc.com>
Sent: Friday, September 25, 2015 5:03 PM
To: Scott, Robert L. (DCH);Mona Hanna-Attisha
Subject: RE: State data - Dr. Mona Hanna-Attisha
Attachments: HIPAA Waiver Request Hanna-Attisha 9 25 15.doc; DCH-1294 Hanna-Attisha 9 25 15.doc

Hi Bob,

Please see attached the revised application and draft HIPAA waiver form. Please let me know if any changes are needed. (Does Mona need to sign the Waiver now or would that be after it is reviewed?) I'm happy to make any changes.

Thanks!
Jenny

From: Jenny LaChance
Sent: Friday, September 25, 2015 4:29 PM
To: Scott, Robert L. (DCH); Mona Hanna-Attisha
Subject: RE: State data - Dr. Mona Hanna-Attisha

Hi Bob,

Thank you! I am revising the original application and completing the HIPAA waiver form now. I will send to you soon.

Thanks again,
Jenny

From: Scott, Robert L. (DCH) [ScottR9@michigan.gov]
Sent: Friday, September 25, 2015 4:09 PM
To: Jenny LaChance; Mona Hanna-Attisha
Subject: RE: State data - Dr. Mona Hanna-Attisha

Jenny,

As long as this request is for "research," then I don't think it will be a problem to provide addresses. You're correct, it would then be considered "identifiable." One thing that might slow it down—I believe you'd have to go back to Hurley's IRB and get approval for the change.

Bob

From: Jenny LaChance [mailto:JLachan1@hurleymc.com]
Sent: Friday, September 25, 2015 4:05 PM
To: Scott, Robert L. (DCH) <ScottR9@michigan.gov>; Mona Hanna-Attisha <MHanna1@hurleymc.com>
Subject: State data - Dr. Mona Hanna-Attisha

Hi Bob,

My name is Jenny LaChance, and I have been working with Mona on the data. We are now doing in depth GIS analysis, which involves actual address (beyond zipcode). Would adding actual address slow down the request for the State data? I believe this would not longer be a limited data set. Any advice or guidance would be truly appreciated.

Thank you so much!
Jenny

Study Title: Analysis of Pediatric Blood Lead Levels in Flint, MI

Responsible Department Employee: (please enter Responsible Department Employee's name here)

Primary Investigator: Mona Hanna-Attisha MD MPH

Research Staff Requiring Access to Protected Health Information (PHI):
Mona Hanna-Attisha MD, MPH; Jenny LaChance MS; Richard Sadler PhD

Name(s) of Covered Entity(ies) and Location(s) Where PHI Will Be Reviewed:
Hurley Medical Center, One Hurley Plaza, Flint, MI 48503
Division of Public Health, College of Human Medicine, Michigan State University, 200 East 1st Street Room 337, Flint, MI 48502

PHI Required and Intended Use:
Child ID number, date of birth, date of blood draw, address with zip code.

Child ID number is required so that we can remove duplicate entries when one child has multiple lead level results.
Date of birth and date of draw are needed to calculate age at time of blood draw.
Date of blood draw is also needed to determine time period in relation to water switch.
Address with zipcode is needed for GIS analysis and to determine if child lives in potentially high risk area for lead.

Does the use or disclosure of the PHI involve more than minimal risk to the privacy of the potential subjects? (please select one answer) __ YES X NO
Data will be kept very secure through the use of encrypted thumb drives (or on hospital secure computers in individual researchers' offices) and only seen by 3 researchers. Data will be with one of the researchers or in a locked office at all times. Identifiers will be removed for files for analysis as not needed and all identifiable data destroyed once not needed.

Describe your plan to destroy identifiers at the earliest opportunity consistent with conducting the research. (All identifier links must be destroyed for minimal risk research. For other research, unless there is a health or research justification for retaining the identifiers or such retention is otherwise required by law. If retention of identifiers is required, explain the reason and indicate that the identifiers will be stored and retained.)
As soon as data files and analysis are completed, files with identifiers will be destroyed. For GIS analysis, data and analysis file with address will be kept until after all work on data is complete, including dissemination and time for peer response.

Describe your plan to adequately protect the identifiers from improper use and disclosure (Check all that apply and explain other protective measures you will use):

X Names and other direct identifiers of individuals will be removed at the earliest possible time if consistent with research design

X Protected health information (PHI) will be kept in locked storage when not in use

X Records of research subjects or potential subjects will be kept separate from other patient records

X Access to records will be restricted to those persons directly involved in the research

NA Records of individuals not selected to participate in research will be destroyed as soon as possible

X If researcher discloses PHI to a third party (e.g. a research sponsor, data analyst, centralized database, etc.) researcher has received written assurances that the third party will maintain confidentiality of the PHI

(please describe additional protections to be employed here)

Describe why the study could not practicably be conducted without access to and use of the protected health information (PHI) requested:
(please provide a detailed description here)

Child ID number is required so that we can remove duplicate entries when one child has multiple lead level results.
Date of birth and date of draw are needed to calculate age at time of blood draw.
Date of blood draw is also needed to determine time period in relation to water switch.
Address with zipcode is needed for GIS analysis and to determine if child lives in potentially high risk area for lead

All of the above are needed to assess the change in lead levels in children in Flint, MI. Without each of these elements, we wouldn't be able to assess the impact.

Describe why the study could not practicably be conducted without this Waiver of Authorization:

Without the waiver, we could not identify if the child lived in an area with Flint water, if the child was younger and therefore potentially more vulnerable, if the data is unique lead result for 1 child. Finally, without the waiver we would not be able to determine if the lead value was from before or after the water switch.

Statement of the Primary Investigator:
I affirm that:

- *The requested access, use or disclosure of PHI is necessary for the purposes of the proposed research;*
- *The requested access, use or disclosure of PHI is solely for the purpose for which waiver is being requested;*

- *The waiver of authorization will not adversely affect the welfare or privacy rights of the research subjects;*
- *The benefits of research outweigh the risks to the privacy rights of the research subjects;*
- *The requested information constitutes the minimum necessary data to accomplish the goals of the research; and,*
- *The protected health information will not be re-used or disclosed to any other person or entity, except as required by law, for the authorized oversight of the research study, or for other research for which the use or disclosure of protected health information would be permitted by the HIPAA Privacy Rule.*

_____ _____

Primary Investigator's Signature **Date**

From: Mona Hanna-Attisha <MHanna1@hurleymc.com>
Sent: Friday, October 02, 2015 7:46 PM
To: Scott, Robert L. (DHHS)
Subject: Re: The requested file has been sent

Thanks bob. So it's not possible to get the real values (with decimals)?

What about levels of "undetectable" - what are they converted to?

Mona Hanna-Attisha MD MPH FAAP
Director, Pediatric Residency Program
Hurley Children's Hospital
Michigan State University

On Oct 2, 2015, at 7:36 PM, Scott, Robert L. (DHHS) <ScottR9@michigan.gov> wrote:

> Mona,
>
> The integers in your file are the values we have stored in our blood lead surveillance system; that's our current protocol.
>
> To my knowledge, the CDC's Lead program has not taken a stance on whether to store decimals or not.
>
> Bob
>
> ---
>
> **From:** Mona Hanna-Attisha <MHanna1@hurleymc.com>
> **Sent:** Friday, October 2, 2015 5:24 PM
> **To:** Peeler, Nancy (DHHS); Scott, Robert L. (DHHS); Jenny LaChance; Miller, Corinne (DHHS); LyonCallo, Sarah (DHHS); McKane, Patricia (DHHS)
> **Cc:** Travis, Rashmi (DHHS); Wells, Eden (DHHS)
> **Subject:** RE: The requested file has been sent
>
> Quick question:
> We have the data and are starting to geocode it!
> All of your lead level results are single numbers with no decimals?? It's kinda weird. All of our lab data included decimals and there was also kids with <0.5 levels (undetectable).

Does your lead data just not have decimals? Do numbers get round up or round down?

Thanks! Mona

(I do understand that it's Friday. Sorry.)

Mona Hanna-Attisha MD MPH FAAP
Program Director Pediatric Residency
Hurley Children's Hospital at Hurley Medical Center
Michigan State University College of Human Medicine
Department of Pediatrics and Human Development
Mhanna1@hurleymc.com

From: Peeler, Nancy (DHHS) [mailto:PeelerN@michigan.gov]
Sent: Friday, October 02, 2015 3:07 PM
To: Mona Hanna-Attisha; Scott, Robert L. (DHHS); Jenny LaChance
Cc: Travis, Rashmi (DHHS)
Subject: RE: The requested file has been sent
Importance: High

Good afternoon, Mona -

Today is Bob's scheduled day off. He came in to prepare and send the file, but has left for the rest of the day. I will see if I can reach him to find out what step to take to get you access to the data.

Can you give me any more detail that I can share with him, if I can reach him? It sounds like you did receive the email with the file attached, and the password (I assume via fax). If those two pieces are in place, is the issue that it won't 'unzip'?

Nancy Peeler, Manager
Early Childhood Health Section

From: Mona Hanna-Attisha [mailto:MHanna1@hurleymc.com]
Sent: Friday, October 02, 2015 2:59 PM
To: Scott, Robert L. (DHHS); Jenny LaChance
Cc: Peeler, Nancy (DHHS); Travis, Rashmi (DHHS)
Subject: RE: The requested file has been sent

We are unable to open the file that you sent. Can you try to send again or let us know how to open it another way. Thanks! We were really hoping to review today. thanks!

From: Scott, Robert L. (DHHS) [mailto:ScottR9@michigan.gov]
Sent: Friday, October 02, 2015 1:32 PM
To: Mona Hanna-Attisha; Jenny LaChance

Cc: Peeler, Nancy (DHHS); Travis, Rashmi (DHHS)
Subject: The requested file has been sent

Robert L. Scott
Childhood Lead Poisoning Prevention Program
Michigan Department of Health & Human Services
(517) 335-8178
fax (517) 335-8509

From: Tijerina, Veronica (DHHS)
Sent: Friday, November 20, 2015 11:57 AM
To: Scott, Robert L. (DHHS)
Subject: RE: Flint Master List
Attachments: Copy of Flint Retesting Master List_Veronica.xlsx

Here it is...

From: Scott, Robert L. (DHHS)
Sent: Friday, November 20, 2015 9:27 AM
To: Tijerina, Veronica (DHHS) <TijerinaV@michigan.gov>
Subject: Flint Master List

Robert L. Scott
Childhood Lead Poisoning Prevention Program
Michigan Department of Health & Human Services
(517) 335-8178
fax (517) 335-8509

Children in Flint with Elevated Blood Lead Levels

Last Updated 11/13/2015

Child ID	HHLPSS ID	Most Recent Specimen Date	PB Result	Sample Type	Last Name	First Name	Date of Birth	Guardian Last Name	Guardian First Name	Phone	Original House Number	Original Street Name	Original Apt	Original Patient City	Original Zip	House Number	Street Name	Apt	Patient City	ZIP	Provider Name	Date Child was Added to List	Date New Test Added	Status	Original Specimen Date	Original Pb Result	Original Sample Type	Status Code
																					HURLEY MEDICAL CENTER					5	C	1
																					GENESEE COMM HLTH CENTER					6	V	2
																					GRAND BLANC PEDIATRIC CLINIC					6	C	1
																					GENESEE CO HEALTH DEPT SAGINAW					6	C	1
																					KINRA, NARESH, MD					5	C	1
																					PRIME PEDS & ADOLESCENT					6	C	1
																					GENESEE CO HEALTH DEPT SAGINAW					5	C	1
																					GENESEE CO HEALTH DEPT SAGINAW					5	C	
																					HURLEY MEDICAL CENTER					11	V	
																					THE CHILDRENS OFFICE					5	C	1
																					GENESEE CO HEALTH DEPT SAGINAW					6	C	1
																					GENESEE CO HEALTH DEPT SAGINAW					7	C	1
																					GENESYS REG MED OUTREACH-CPU					5	V	2
																					HURLEY MEDICAL CENTER					10	V	2
																					HURLEY MEDICAL CENTER					5	V	2
																					GENESEE CO HEALTH DEPT SAGINAW					10	C	1
																					GENESEE CO HEALTH DEPT SAGINAW					6	C	1
																					HURLEY MEDICAL CENTER					6	V	2
																					DELROSARIO, EVELYN, MD					5	V	2
																					GENESYS REG MED OUTREACH-CPU					6	V	2
																					GENESEE CO HEALTH DEPT SAGINAW					8	C	1
																					HURLEY MEDICAL CENTER					6	C	1
																					HURLEY MEDICAL CENTER					5	V	2
																					HURLEY MEDICAL CENTER					5	V	2
																					HURLEY MEDICAL CENTER					5	V	2
																					HOLLOWAY, MILTON G, MD					17	V	2
																					GENESYS REG MED OUTREACH-CPU					8	V	2
																					HURLEY MEDICAL CENTER					6	C	1
																					HURLEY MEDICAL CENTER					14	C	3
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																					HURLEY MEDICAL CENTER					10	V	2
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																					GENESEE CO HEALTH DEPT SAGINAW					5	C	1
																					HASAN, KAMAL, DR					12	C	
																					GENESEE CO HEALTH DEPT SAGINAW					8	C	1
																					HURLEY MEDICAL CENTER					12	V	2
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																					GENESEE CO HEALTH DEPT SAGINAW					11	C	3
																					HURLEY MEDICAL CENTER					7	C	1
																					GENESEE CO HEALTH DEPT SAGINAW					5	C	1
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																					GENESEE CO HEALTH DEPT SAGINAW					8	C	1
																					GENESEE CO HEALTH DEPT SAGINAW					6	C	1
																					~~HURLEY MEDICAL CENTER~~					~~11~~	~~V~~	~~4~~
																					GENESEE CO HEALTH DEPT SAGINAW					9	C	1
																					HURLEY MEDICAL CENTER					22	V	2
																					HURLEY MEDICAL CENTER					11	V	2
																					MCLAREN MEDICAL LAB					6	v	2
																					GENESEE CO HEALTH DEPT SAGINAW					5	C	1
																					HURLEY MEDICAL CENTER					8	V	3
																					HURLEY MEDICAL CENTER					6	V	2
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																					MCLAREN MEDICAL LAB					5		
																					HURLEY MEDICAL CENTER					5	V	2
																					GENESEE CO HEALTH DEPT SAGINAW					5	C	1
																					PRIME PEDS & ADOLESCENT					5	C	1
																					GENESEE CO HEALTH DEPT SAGINAW					5	C	1
																					HURLEY MEDICAL CENTER					5	C	1
																					HURLEY MEDICAL CENTER					5	C	1
																					HURLEY MEDICAL CENTER					7	C	1
																					GENESYS REG MED OUTREACH-CPU					5	V	2
																					HURLEY MEDICAL CENTER					22	V	2
																					GENESEE CO HEALTH DEPT SAGINAW					7	C	1
																					GENESEE CO HEALTH DEPT SAGINAW					7	C	1
																					LAPEER PEDIATRICS-LAPEER					8	C	
																					HURLEY MEDICAL CENTER					6	V	2
																					GENESEE CO HEALTH DEPT SAGINAW					6	C	1
																					GENESEE CO HEALTH DEPT SAGINAW					5	C	1
																					HURLEY MEDICAL CENTER					6	V	2
																					HURLEY MEDICAL CENTER					6	V	2
																					GRAND BLANC PEDIATRIC CLINIC					5	C	1
																					GENESEE CO HEALTH DEPT SAGINAW					6	C	1
																					HASAN, KAMAL, DR					11	C	1
																					GENESEE CO HEALTH DEPT SAGINAW					5	C	1
																					~~MEMORIAL PEDIATRIC CLINIC~~					~~6~~	~~E~~	~~4~~
																					HASAN, KAMAL, DR					5	C	1
																					HASAN, KAMAL, DR					9	C	1
																					HURLEY MEDICAL CENTER					9	V	2
																					GENESEE CO HEALTH DEPT SAGINAW					8	C	1
																					HURLEY MEDICAL CENTER					5	V	2
																					HURLEY MEDICAL CENTER					8	V	2
																					GENESEE CO HEALTH DEPT SAGINAW					5	C	1
																					GENESEE CO HEALTH DEPT SAGINAW					5	C	1
																					HASAN, KAMAL, DR					5	C	1
																					~~HURLEY MEDICAL CENTER~~					~~5~~	~~V~~	~~4~~
																					GENESEE CO HEALTH DEPT SAGINAW					5	C	1
																					HURLEY MEDICAL CENTER					6	V	2
																					GENESEE CO HEALTH DEPT SAGINAW					6	C	1
																					HURLEY MEDICAL CENTER					6	V	2
																					GENESEE CO HEALTH DEPT SAGINAW					12	C	1
																					HURLEY MEDICAL CENTER					14	C	1
																					GENESYS REG MED OUTREACH-CPU					6	V	2
																					GENESEE CO HEALTH DEPT SAGINAW					5	C	1
																					HURLEY MEDICAL CENTER					11	V	2
																					ALLEGIANCE HEALTH					5	V	2
																					IMPERIAL, ALICIA F, MD -LINDEN					5	C	1
																					GENESEE CO HEALTH DEPT SAGINAW					6	C	1
																					GENESEE CO HEALTH DEPT SAGINAW					6	C	1
																					HURLEY MEDICAL CENTER					7	V	3
																					HURLEY MEDICAL CENTER					12	C	1
																					GENESEE CO HEALTH DEPT SAGINAW					5	C	1
																					HURLEY MEDICAL CENTER					5	V	2
																					HURLEY MEDICAL CENTER					5	C	1
																					HURLEY MEDICAL CENTER					7	C	1
																					HURLEY MEDICAL CENTER					6	V	2
																					GENESEE CO HEALTH DEPT SAGINAW					5	C	1
																					GENESEE CO HEALTH DEPT SAGINAW					5	C	1
																					HURLEY MEDICAL CENTER					7	V	2
																					HURLEY MEDICAL CENTER					7	C	1
																					HURLEY MEDICAL CENTER					6	V	2
																					HURLEY MEDICAL CENTER					7	C	1
																					GENESEE CO HEALTH DEPT SAGINAW					5	C	1
																					GENESEE CO HEALTH DEPT SAGINAW					5	C	1
																					HURLEY MEDICAL CENTER					5	V	2
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																					GENESEE CO HEALTH DEPT SAGINAW					6	C	1
																					HURLEY MEDICAL CENTER					7	V	2
																					~~HURLEY MEDICAL CENTER~~					~~6~~	~~V~~	3
																					WARDE MEDICAL LAB (CPU)					6	V	2
																					GENESEE CO HEALTH DEPT SAGINAW					7	C	1
																					MCLAREN MEDICAL LAB					6	V	2
																					GENESYS REG MED OUTREACH-CPU					5	V	2

PHI

PHI

PHI

HURLEY MEDICAL CENTER	5	V	2
HURLEY MEDICAL CENTER	8	V	2
HURLEY MEDICAL CENTER	18	C	2
HURLEY MEDICAL CENTER	9	V	2
HURLEY MEDICAL CENTER	7	C	1
THE CHILDRENS OFFICE	5	V	4
KIRBY, MICHAEL, MD	6	C	1
GRAND BLANC PEDIATRIC CLINIC	10	C	4
GENESEE COMMUNITY HLTH CENTER	5	V	2
HURLEY MEDICAL CENTER	8	V	2
HURLEY MEDICAL CENTER	27	V	2
HURLEY MEDICAL CENTER	5	V	2
KIRBY, MICHAEL, MD	5	C	1
HURLEY MEDICAL CENTER	9	V	2
HURLEY MEDICAL CENTER	6	V	2
GENESEE CO HEALTH DEPT SAGINAW	5	C	1
HURLEY MEDICAL CENTER	7	V	2
GENESEE CO HEALTH DEPT SAGINAW	8	C	1
GENESEE CO HEALTH DEPT SAGINAW	6	C	1
HURLEY MEDICAL CENTER	8	V	2
GENESEE CO HEALTH DEPT SAGINAW	5	C	1
GENESEE CO HEALTH DEPT SAGINAW	5	C	1
HURLEY MEDICAL CENTER	5	C	1
STOKER, JOHN, L, DO	5	V	2
HURLEY MEDICAL CENTER	23	V	2
HURLEY MEDICAL CENTER	12	C	3
HURLEY MEDICAL CENTER	8	V	2
PRIME PEDS & ADOLESCENT	10	C	1
GENESEE CO HEALTH DEPT SAGINAW	6	C	1
HURLEY MEDICAL CENTER	5	V	2
HURLEY MEDICAL CENTER	25	V	2
GENESEE CO HEALTH DEPT SAGINAW	5	E	4
HURLEY MEDICAL CENTER	5	V	2
HURLEY MEDICAL CENTER	14	C	3
GENESEE CO HEALTH DEPT SAGINAW	18	C	1
HURLEY MEDICAL CENTER	5	V	2
GENESEE CO HEALTH DEPT SAGINAW	5	C	1
PEDIATRIC ADOLESCENT CARE	6	V	2
GENESEE CO HEALTH DEPT SAGINAW	9	C	1
HURLEY MEDICAL CENTER	5	V	4
HURLEY MEDICAL CENTER	5	V	2
GENESEE CO HEALTH DEPT SAGINAW	6	C	1
HURLEY MEDICAL CENTER	5	V	2
GENESEE CO HEALTH DEPT SAGINAW	6	C	1
GENESEE COMMUNITY HLTH CENTER	12	V	3
GENESEE CO HEALTH DEPT SAGINAW	5	C	1
GENESEE CO HEALTH DEPT SAGINAW	5	C	1
HURLEY MEDICAL CENTER	5	V	2
GENESEE CO HEALTH DEPT SAGINAW	5	C	1
HURLEY MEDICAL CENTER	5	V	2
HURLEY MEDICAL CENTER	5	V	2
GENESEE CO HEALTH DEPT SAGINAW	7	C	1
HURLEY MEDICAL CENTER	9	C	1
HURLEY MEDICAL CENTER	26	E	4
MCLAREN OAKLAND LAKE ORION	6	C	1

PHI

SUMMARY:

# of children needing confirmation (BLL 5-14):	79
# of children needing confirmation (BLL >= 15):	0
# of confirmed cases needing retesting (BLL 5-14):	66
# of confirmed cases needing retesting (BLL>= 15):	7
# of confirmed cases, not currently due for retest:	6
# of children with most recent BLL <5:	8
Total:	166

Most Recent Specimen Date	PB Result	Sample Type	Provider Name	Prov Address
PHI	17	V	HOLLOWAY, MILTON G, MD	5205 NORKO DR (HOLLOWAY)
	22	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
	27	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
	25	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
	22	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
	23	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
	5	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
	7	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
	6	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
	5	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
	6	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
	5	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
	6	V	WARDE MEDICAL LAB (CPU)	300 W TEXTILE RD (BECKY W)
	9	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
	8	V	GENESYS REG MED OUTREACH-CPU	ONE GENESYS PKWY (OUTREACH)
	11	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
	8	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
	5	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
	6	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
	9	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
	6	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
	6	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
	8	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
	11	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
	5	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
	5	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
	5	V	GENESYS REG MED OUTREACH-CPU	ONE GENESYS PKWY (OUTREACH)
	8	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
	5	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
	5	V	GENESYS REG MED OUTREACH-CPU	ONE GENESYS PKWY (OUTREACH)
	9	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
	5	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
	5	V	ALLEGIANCE HEALTH	205 N EAST AVE
	6	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
	5	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
	5	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
	6	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
	6	V	PEDIATRIC ADOLESCENT CARE	G3283 BEECHER RD
	6	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
	8	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
	5	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
	5	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA

PHI

10	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
6	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
5	V	DELROSARIO, EVELYN, MD	G3514 BEECHER RD
6	V	GENESYS REG MED OUTREACH-CPU	ONE GENESYS PKWY (OUTREACH)
7	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
5	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
12	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
7	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
7	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
6	v	MCLAREN MEDICAL LAB	4000 S SAGINAW ST
5	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
5	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
6	V	GENESYS REG MED OUTREACH-CPU	ONE GENESYS PKWY (OUTREACH)
5	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
6	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
8	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
5	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
7	V	SIMMERT, JOE, DO (S BALLENGER)	2184 S BALLENGER HWY (SIMMERT)
10	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
5	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
6	V	MCLAREN MEDICAL LAB	4000 S SAGINAW ST
11	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
5	V	SIMMERT, JOE, DO (S BALLENGER)	2184 S BALLENGER HWY (SIMMERT)
5	V	STOKER, JOHN, L, DO	G5142 MILLER RD
5	V	GENESYS REG MED OUTREACH-CPU	ONE GENESYS PKWY (OUTREACH)
5	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
7	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
12	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
6	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
5	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
6	V	GENESEE COMM HLTH CENTER	422 W 4TH AVE (GCHC)

5	C	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
5	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
5	C	HASAN, KAMAL, DR	1260 N IRISH RD # A (HASAN)
9	C	HASAN, KAMAL, DR	1260 N IRISH RD # A (HASAN)
5	C	IMPERIAL, ALICIA F, MD -LINDEN	2241 S LINDEN RD (IMPERIAL)
5	C	THE CHILDRENS OFFICE	G2184 S BALLENGER HWY
8	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
5	C	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
5	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
12	C	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
6	C	GRAND BLANC PEDIATRIC CLINIC	8273 S SAGINAW # C (GBPC)
7	C	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA

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6	C	PRIME PEDS & ADOLESCENT	1335 S LINDEN RD
10	C	PRIME PEDS & ADOLESCENT	1335 S LINDEN RD
6	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
8	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
5	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
5	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
5	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
6	C	MCLAREN OAKLAND LAKE ORION	1240 S LAPEER RD STE 101A
6	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
7	C	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
14	C	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
5	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
6	C	MEMORIAL PEDIATRIC CLINIC	802 S KING STE C
5	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
5	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
6	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
5	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
7	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
5	C	GRAND BLANC PEDIATRIC CLINIC	8273 S SAGINAW # C (GBPC)
6	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
5	C	PRIME PEDS & ADOLESCENT	1335 S LINDEN RD
12	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
6	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
6	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
5	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
5	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
5	C	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
6	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
12	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
6	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
5	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
5	C	KIRBY, MICHAEL, MD	445 N FENWAY DR (KIRBY)
5	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
7	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
9	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
7	C	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
5	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
5	C	KINRA, NARESH, MD	1375 FLUSHING RD
5	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
8	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
7	C	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
7	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
5	C	HASAN, KAMAL, DR	1260 N IRISH RD # A (HASAN)
7	C	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
6	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
6	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
5	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST

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6	C	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
5	C	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
8	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
11	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
6	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
5	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
5	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
5	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
10	C	GRAND BLANC PEDIATRIC CLINIC	8273 S SAGINAW # C (GBPC)
6	C	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
6	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
5	C	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
8	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
7	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
5	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
7	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
6	C	KIRBY, MICHAEL, MD	445 N FENWAY DR (KIRBY)
5	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
5	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST

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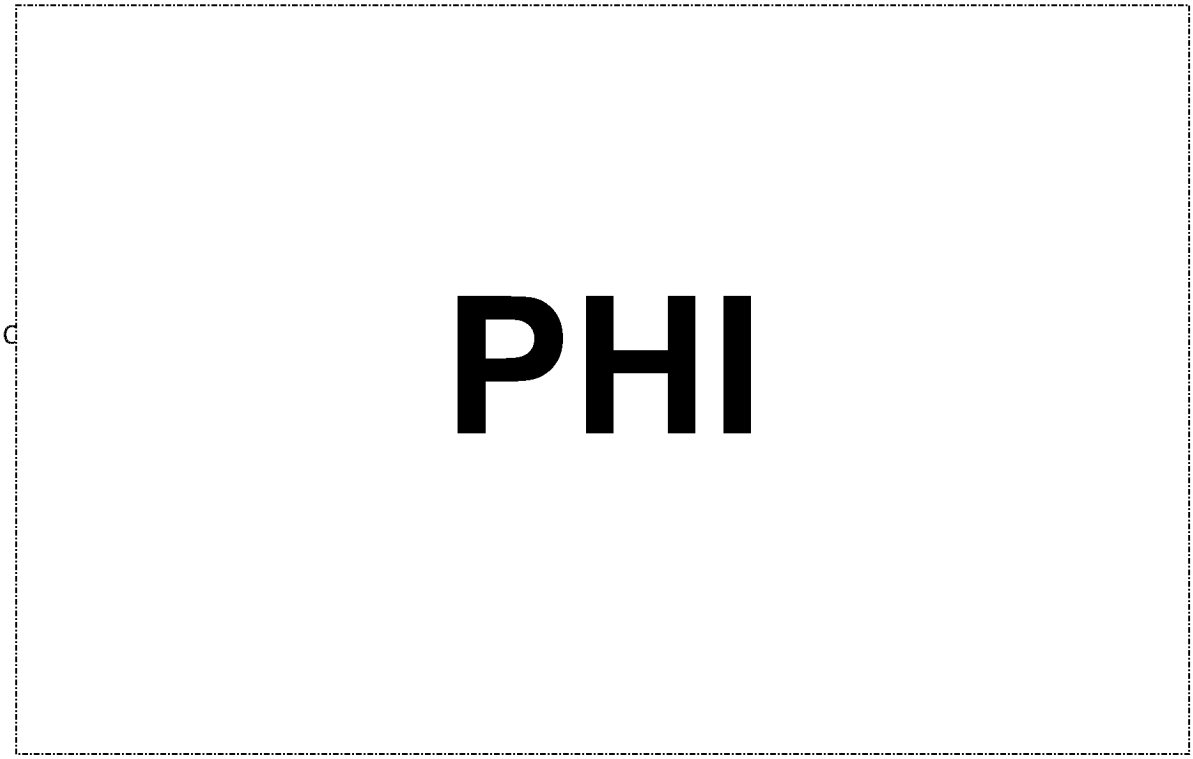

House Number | Street Name | Apt | Patient City | ZIP

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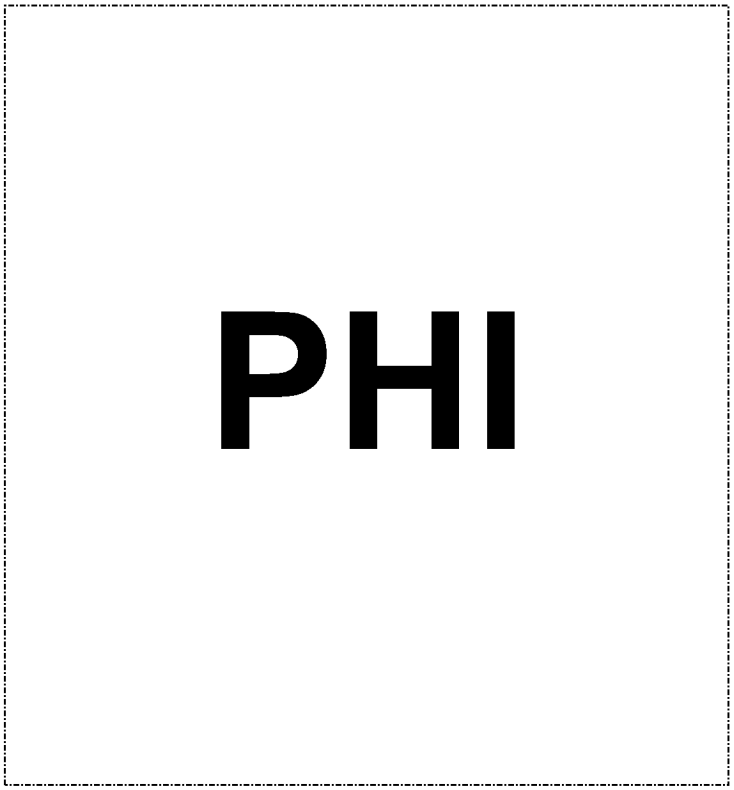
PHI

October 21, 2015

Children with Venous BLL >= 5 Due for Retesting

Most Recent Specimen Date	PB Result	Sample Type	Last Name	First Name	Date of Birth	Guardian Last Name	Guardian First Name	Phone	House Number	Street Name	Apt	Patient City	ZIP	Provider Name	Prov Address	Prov City
PHI	6	V	PHI											GENESEE COMM HLTH CENTER	422 W 4TH AVE (GCHC)	FLINT
	5	V												GENESYS REG MED OUTREACH-CPU	ONE GENESYS PKWY (OUTREACH)	GRAND BLANC
	10	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	5	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	6	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	5	V												DELROSARIO, EVELYN, MD	G3514 BEECHER RD	FLINT
	6	V												GENESYS REG MED OUTREACH-CPU	ONE GENESYS PKWY (OUTREACH)	GRAND BLANC
	5	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	5	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	5	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	17	V												HOLLOWAY, MILTON G, MD	5205 NORKO DR (HOLLOWAY)	FLINT
	8	V												GENESYS REG MED OUTREACH-CPU	ONE GENESYS PKWY (OUTREACH)	GRAND BLANC
	10	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	12	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	7	V												SIMMERT, JOE, DO (S BALLENGER)	2184 S BALLENGER HWY (SIMMERT)	FLINT
	11	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	22	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	11	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	6	v												MCLAREN MEDICAL LAB	4000 S SAGINAW ST	FLINT
	6	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	5	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	5	V												GENESYS REG MED OUTREACH-CPU	ONE GENESYS PKWY (OUTREACH)	GRAND BLANC
	22	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	6	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	6	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	6	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	9	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	5	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	8	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	5	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	6	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	6	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	6	V												GENESYS REG MED OUTREACH-CPU	ONE GENESYS PKWY (OUTREACH)	GRAND BLANC
	11	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	5	V												ALLEGIANCE HEALTH	205 N EAST AVE	JACKSON
	5	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	6	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	7	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	6	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	7	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	6	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	5	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	7	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	7	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	6	V												WARDE MEDICAL LAB (CPU)	300 W TEXTILE RD (BECKY W)	ANN ARBOR
	6	V												MCLAREN MEDICAL LAB	4000 S SAGINAW ST	FLINT
	5	V												GENESYS REG MED OUTREACH-CPU	ONE GENESYS PKWY (OUTREACH)	GRAND BLANC
	5	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	8	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	9	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	5	V												SIMMERT, JOE, DO (S BALLENGER)	2184 S BALLENGER HWY (SIMMERT)	FLINT
	8	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	27	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	5	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	9	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	6	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	7	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	8	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	5	V												STOKER, JOHN, L, DO	G5142 MILLER RD	FLINT
	23	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	8	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	5	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	25	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	5	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	5	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	6	V												PEDIATRIC ADOLESCENT CARE	G3283 BEECHER RD	FLINT
	5	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	5	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	5	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	12	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	5	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT

PHI	5 V	PHI	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	5 V		HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT

October 21, 2015

Children with Capillary BLL >= 5 Needing Confirmation

Most Recent Specimen Date	PB Result	Sample Type	Last Name	First Name	Date of Birth	Guardian Last Name	Guardian First Name	Phone	House Number	Street Name	Apt	Patient City	ZIP	Provider Name	Prov Address	Prov City
PHI	5	C	PHI											HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	6	C												GRAND BLANC PEDIATRIC CLINIC	8273 S SAGINAW # C (GBPC)	GRAND BLANC
	6	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	5	C												KINRA, NARESH, MD	1375 FLUSHING RD	FLUSHING
	6	C												PRIME PEDS & ADOLESCENT	1335 S LINDEN RD	FLINT
	5	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	5	C												THE CHILDRENS OFFICE	G2184 S BALLENGER HWY	FLINT
	7	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	6	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	8	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	6	C												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	6	C												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	8	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	5	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	11	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	7	C												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	5	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	8	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	6	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	9	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	5	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	5	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	5	C												PRIME PEDS & ADOLESCENT	1335 S LINDEN RD	FLINT
	5	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	5	C												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	5	C												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	7	C												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	7	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	7	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	6	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	5	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	5	C												GRAND BLANC PEDIATRIC CLINIC	8273 S SAGINAW # C (GBPC)	GRAND BLANC
	6	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	5	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	6	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	5	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	9	C												HASAN, KAMAL, DR	1260 N IRISH RD # A (HASAN)	DAVISON
	8	C												HASAN, KAMAL, DR	1260 N IRISH RD # A (HASAN)	DAVISON
	5	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	5	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	5	C												HASAN, KAMAL, DR	1260 N IRISH RD # A (HASAN)	DAVISON
	5	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	6	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	12	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	14	C												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	5	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	5	C												IMPERIAL, ALICIA F, MD -LINDEN	2241 S LINDEN RD (IMPERIAL)	FLINT
	6	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	6	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	12	C												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	5	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	5	C												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	7	C												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	5	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	5	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	7	C												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	7	C												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	5	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	5	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	6	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	7	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	6	C												KIRBY, MICHAEL, MD	445 N FENWAY DR (KIRBY)	FENTON
	10	C												GRAND BLANC PEDIATRIC CLINIC	8273 S SAGINAW # C (GBPC)	GRAND BLANC
	5	C												KIRBY, MICHAEL, MD	445 N FENWAY DR (KIRBY)	FENTON
	5	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	8	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	6	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	5	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	5	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	5	C												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	12	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	10	C												PRIME PEDS & ADOLESCENT	1335 S LINDEN RD	FLINT

8/12/2014	6 C	PHI	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
12/16/2014	5 C		GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
8/5/2015	6 C		GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
10/6/2014	5 C		GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
5/4/2015	5 C		GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
9/2/2014	7 C		GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
2/13/2015	6 C		MCLAREN OAKLAND LAKE ORION	1240 S LAPEER RD STE 101A	LAKE ORION

Message

From: McKane, Patricia (DHHS) [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=89BDAA1F3BE34A5E983CFC72AE4C77A0-MCKANE PATRICIA]
Sent: 12/9/2015 2:03:16 PM
To: Scott, Robert L. (DHHS) [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=1aefbcaada9a48ad8d643aa95e441df1-Scott Robert L.]; Tian, Yan (DHHS) [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=5c704d29b1f0478d9249b77823d87199-Tian Yan]
Subject: RE: 2014 lead data
Attachments: Just Dates.xlsx; Documenting the SAS code.docx; Lead 2014 by zip.xlsx; 2014 zips.xlsx

Bob,

I ran the data for 2014 and I believe that the differences are due to rounding, though I haven't quantified them yet.

I'm copying Yan because she may have a way to look at this quicker, faster and easier than us manually reviewing records.

Yan,

Bob and I analyzed 2014 by zipcode for the state and got different numbers. We have been asked to find out why.

The Just Dates excel file is from Bob- where he looked at individual level data to try to figure out if the difference could be due to the way we are categorizing age.

(You could create SAS dataset, which may make it easier to analyze. ☺)

Documenting the SAS code is my attempt to quantify each step by age group.

Lead 2014 by zip is my analysis with SAS

2014 zips is Bob's analysis

Bob has 143,123 for 2014 and I have 141,355 for children less than 6 years.

Yan, can you compare Bob's Just dates to the 2014 analytic file we created in SAS.

Also I see results that have missing for sample type so we are including them –I thought this might be a difference too.

I suspect it has to do with INTCK –do you know how it handles rounding?

Thanks,

Patti

From: Scott, Robert L. (DHHS)
Sent: Wednesday, December 09, 2015 8:25 AM
To: McKane, Patricia (DHHS) <McKaneP@michigan.gov>
Subject: RE: 2014 lead data

OK, on my way. Please see attached.

From: McKane, Patricia (DHHS)
Sent: Wednesday, December 09, 2015 8:24 AM
To: Scott, Robert L. (DHHS) <ScottR9@michigan.gov>
Subject: RE: 2014 lead data

I don't have meetings until this afternoon.

From: Scott, Robert L. (DHHS)
Sent: Wednesday, December 09, 2015 8:19 AM
To: McKane, Patricia (DHHS) <McKaneP@michigan.gov>
Subject: RE: 2014 lead data

Patti,

I've been looking at ages and dates--if you have 5 minutes or so in the next half hour, please let me know—I'll stop by.

Bob

From: McKane, Patricia (DHHS)
Sent: Monday, December 07, 2015 2:36 PM
To: Scott, Robert L. (DHHS) <ScottR9@michigan.gov>
Cc: Stanbury, Martha (DHHS) <stanburym@michigan.gov>
Subject: Re: 2014 lead data

When I ran by report date today (I check for late reports) the earliest reports were for August 2015.

I will record the numbers for duplicates at every step

Sent from my iPhone

On Dec 7, 2015, at 2:33 PM, Scott, Robert L. (DHHS) <ScottR9@michigan.gov> wrote:

The number of children I get for 2014 running it today is 143,844. (The small increase is expected as results continue to trickle in late.)

From: Scott, Robert L. (DHHS)
Sent: Monday, December 07, 2015 2:31 PM
To: Stanbury, Martha (DHHS) <stanburym@michigan.gov>; McKane, Patricia (DHHS) <McKaneP@michigan.gov>
Subject: RE: 2014 lead data

I used specimen date.

Maybe a slight difference in the way we calculated age at test? I used this: (Specimen Date – Date of Birth)/365.25 and then included all children < 6.00 years of age.

From: Stanbury, Martha (DHHS)
Sent: Monday, December 07, 2015 2:24 PM
To: Scott, Robert L. (DHHS) <ScottR9@michigan.gov>; McKane, Patricia (DHHS) <McKaneP@michigan.gov>
Subject: FW: 2014 lead data

Bob and Patti – Can you explain why Bob's total for 2014 (143,123 – see attached) is bigger than Patti's (141,355) . Is this because bob uses report date and Patti used specimen date?

From: Scott, Robert L. (DHHS)
Sent: Monday, December 07, 2015 2:06 PM
To: Stanbury, Martha (DHHS)
Cc: McKane, Patricia (DHHS); Dykema, Linda D. (DHHS)
Subject: RE: 2014 lead data

Here's what I have (please see attached).

From: Stanbury, Martha (DHHS)
Sent: Monday, December 07, 2015 2:03 PM
To: Scott, Robert L. (DHHS) <ScottR9@michigan.gov>
Cc: McKane, Patricia (DHHS) <McKaneP@michigan.gov>; Dykema, Linda D. (DHHS) <DykemaL@michigan.gov>
Subject: FW: 2014 lead data
Importance: High

Do you have this done already, but just that the small cells haven't been suppressed?

From: Dykema, Linda D. (DHHS)
Sent: Monday, December 07, 2015 1:52 PM
To: McKane, Patricia (DHHS); Lasher, Geralyn (DHHS); Eisner, Jennifer (DHHS)
Cc: Stanbury, Martha (DHHS); Miller, Corinne (DHHS); Scott, Robert L. (DHHS)
Subject: RE: 2014 lead data
Importance: High

I talked with Jennifer Eisner and here is what we need:

Only the 2014 data (not 2015 since we don't typically release a year's data before the year is completed), by zip code for all of Michigan with small cells suppressed. And only confirmed venous tests as CLPPP has done for previous years: we'll explain that we're including capillary tests in the Flint reports in an effort to capture all possible EBLL children.

Could I please have an estimate of when this can be done?

From: Dykema, Linda D. (DHHS)
Sent: Monday, December 07, 2015 12:08 PM
To: McKane, Patricia (DHHS); Lasher, Geralyn (DHHS); Eisner, Jennifer (DHHS)
Cc: Stanbury, Martha (DHHS); Miller, Corinne (DHHS); Scott, Robert L. (DHHS)
Subject: RE: 2014 lead data
Importance: High

Ok, I deleted all the chatter in-between.

I believe the request is for annual 2014 and 2015 (not by quarter) for all Michigan zip codes (suppressing cells less than 6). The data provided should match what we're reporting to the Director/Governor, so retain the highest test whether venous or capillary.

Jennifer/Geralyn: is that accurate?

From: McKane, Patricia (DHHS)
Sent: Monday, December 07, 2015 11:56 AM
To: Dykema, Linda D. (DHHS)
Cc: Stanbury, Martha (DHHS); Miller, Corinne (DHHS); Scott, Robert L. (DHHS)
Subject: Re: 2014 lead data

To clarify you want 2014 by zip code and quarter with retaining highest test? Or only highest venous test?

Im still in a meeting and may not get this done today. Will also talk to Yan to see if she is available.

Patti

Sent from my iPhone

From: Eisner, Jennifer (DHHS)
Sent: Tuesday, December 01, 2015 5:36 PM
To: Wells, Eden (DHHS); Miller, Corinne (DHHS); Moran, Susan (DHHS); Lasher, Geralyn (DHHS); Dykema, Linda D. (DHHS); Minicuci, Angela (DHHS)
Subject: FW: 2014 lead data

All –

A reporter with Bridge Magazine is requesting the statewide 2014 (and if possible, 2015) CLPPP data. Bob sent me the attached county-level info for 2014 which I have not shared yet, as it's not the final report.

We would like to touch base to make sure the data has been finalized and reviewed by epi before it's posted online.

Eden – we'll reach out to you in the morning to discuss the media request. Beyond the data, the reporter is also interested in discussing home lead investigations.

Jennifer Eisner

Public Information Officer

Michigan Department of Health and Human Services

Office: 517-241-2112 or EisnerJ@michigan.gov

Cell: PPI

From: Scott, Robert L. (DHHS)
Sent: Tuesday, December 01, 2015 12:51 PM
To: Eisner, Jennifer (DHHS) <EisnerJ@michigan.gov>
Subject: 2014 lead data

Please see three attached files.

Robert L. Scott

Childhood Lead Poisoning Prevention Program

Michigan Department of Health & Human Services

(517) 335-8178

fax (517) 335-8509

Documenting the process Sas code to create the datasets is at the end.

```
Raw data set from warehouse n= 179,374
156,069 have one test per year
23,305 duplicate tests (2-22 tests)
10,906 retained highest test per individual
Total analytic set 156,069 to 10,906= 166,975

proc freq data=mi2014;
tables age_grp;
run;
/*Raw data < 6 years n= 152,173
6-17 years n = 13,364
18 + years 13837
Total n=179,374*/
Proc freq data =nodup;
tables age_grp;
run;
/*children with one test per year
< 6 years n= 131,710
6-17 years n = 12,576
18 + years 11,783
total =156,069*/

Proc freq data =dup;
tables age_grp dupidno /nocum nocol;
run;
/*children with more than one test per year
< 6 years n= 20,463
6-17 years n = 788
18 + years n 2,054
total n = 23,305
dupidno Frequency Percent
2 19746 84.73
3 2220 9.53
4 836 3.59
5 260 1.12
6 102 0.44
7 28 0.12
8 24 0.10
9 36 0.15
10 20 0.09
11 11 0.05
22 22 0.09

*/

Proc freq data =dup2;
tables age_grp dupidno /nocum nocol;
run;
/* dup2 is dup sorted -numbers = dup*/

Proc freq data =dup3;
tables age_grp  /nocum nocol;
run;
/* dup3 retains highest test only from children/adults with duplicate tests
```

```
 < 6 years 9645
6 to 17 years 360
18 + years 901
Total N=10906;*/

proc freq data=mi2014_;
tables age_grp /nocum nocol;
run;
/* Analytic dataset
< 6 years n = 141,355
6 to 18 years n = 12,936
18 + years n = 12,684
Total n = 166,975


SAS code


libname pb 'T:\MCH Vital Records Data\Genesee Lead'; *Secured folder
accessable only by Patti, Yan, Sarah R, and Cristin;

options fmtsearch = (pb ) NOFMTERR;

/*Michigan Lead Data from 01/01/2014 to 12/31/2014*/

Data mi2014;
Set pb.mi2014;
run; *n=179,374;

data mi2014;
set mi2014;
format Specimen_date MMDDYY10.;
format date_reported MMDDYY10.;

Interval=intck('day',Specimen_date, date_reported);

If '01jan2014'd<=specimen_date <='31mar2014'd then Quarter='Q1';
else if '01apr2014'd<=specimen_date <='30jun2014'd then Quarter='Q2';
else if '01jul2014'd<=specimen_date <='30sep2014'd then Quarter='Q3';
else if '01oct2014'd<=specimen_date <='31dec2014'd then Quarter='Q4';

Age=intck('year',DATE OF BIRTH,Specimen date);
if age=. then age_grp='                    ';
else if age<6 then age_grp='1) <6 years';
else if age<18 then age_grp='2) 6 to 17 years';
else if age>=18 then age_grp='3) 18 + years';

IF PB_RESULT =.        THEN PB2 = '      ';
ELSE IF PB_RESULT < 5  THEN PB2 = '1) <5 ';
ELSE IF PB_RESULT >= 5 THEN PB2 = '2) >=5';

IF PB_RESULT =.        THEN PB4 = '        ';
ELSE IF PB_RESULT < 5  THEN PB4 = '1) <5   ';
ELSE IF PB_RESULT <15  THEN PB4 = '2) 5-14 ';
ELSE IF PB_RESULT <45  THEN PB4 = '3) 15-44';
ELSE IF PB_RESULT >=45 THEN PB4 = '4) 45+  ';
```

```
if sample_type in ('C' 'c') then sampletype='Capillary';
else if sample_type in ('V' 'v') then sampletype='Venous';
run;

/*create dataset dup with duplicate lead test results*/

proc sql;
create table dup as
select child_id, specimen_date, date_reported,pb_result, sampletype, age_grp,
PB2, PB4, patient_zip_code,quarter,county, count(*) as dupidno
from mi2014
group by  CHILD_ID
having count(*)>1;

/*create dataset nodup with no duplicate lead test results*/

proc sql;
create table nodup as
select child_id, specimen_date, date_reported,pb_result, sampletype, age_grp,
PB2, PB4, patient_zip_code, quarter, county,count(*) as dupidno
from mi2014
group by  CHILD_ID
having count(*)=1;

/*sort dataset dup by descending dupidno, child_id,  sampletype, pb_result,
specimen_date, date_reported*/

proc sort data=dup out=dup2; by descending dupidno child_id  sampletype
pb_result specimen_date date_reported; run;
*N =23305;

/*Choose the last observation for each child_id from the sorted dataset, this
lead test result is the highest value among all tested*/

data dup3;
set dup2;
by descending dupidno child_id  sampletype pb_result specimen_date
date_reported;
if last.child_ID then output;
run;
*N=10906;

/*combine dataset nodup and sorted dup dataset*/

data mi2014_;
set nodup dup3;
run;  *n =166975;

ods rtf;
proc freq data=mi2014_;
tables quarter*age_grp*PB2/nocol nocum;
ods output crosstabfreqs=Freq1;
Title 'Michigan by Quarter 2014';
run;
proc freq data=mi2014_;
tables quarter*age_grp*PB2/nocol nocum;
```

```
ods output crosstabfreqs=Freq1;
Title 'Genesee by Quarter 2014';
where county = 'GENESEE';
run;
proc freq data=mi2014_;
tables quarter*age_grp*PB2/nocol nocum;
ods output crosstabfreqs=Freq1;
Title 'Flint by Quarter 2014';
where 48508> patient_zip_code >  48500;
run;
ods rtf close;
ods rtf;
proc freq data=mi2014_;
tables patient_zip_code*PB2/nocol nocum norow nopct;
ods output crosstabfreqs=Freq1;
Title 'Michigan by zip 2014 where child age < 6 years';
where age_grp='1) <6 years';
run;
ods rtf close;
```

	A	B	C	D	E	F
1	Michigan by zip 2014 where child age < 6 years					
2						
3	The FREQ Procedure					
4						
5	**Frequency**		**Table of Patient_Zip_Code by PB2**			
6			**Patient_Zip_Code**	**PB2**		
7				**1) <5**	**2) >=5**	**Total**
8			**40291**	2	0	2
9			**48001**	140	2	142
10			**48002**	18	1	19
11			**48003**	42	0	42
12			**48005**	37	2	39
13			**48006**	45	0	45
14			**48009**	252	0	252
15			**48014**	66	1	67
16			**48015**	112	0	112
17			**48017**	123	0	123
18			**48021**	519	14	533
19			**48022**	23	0	23
20			**48023**	53	0	53
21			**48025**	120	4	124
22			**48026**	170	2	172
23			**48027**	48	2	50
24			**48028**	3	0	3
25			**48030**	270	10	280
26			**48032**	26	0	26
27			**48033**	275	4	279
28			**48034**	254	5	259
29			**48035**	409	4	413
30			**48036**	261	3	264
31			**48037**	7	1	8
32			**48038**	379	4	383
33			**48039**	101	1	102
34			**48040**	101	0	101
35			**48041**	40	2	42
36			**48042**	219	0	219
37			**48043**	153	6	159
38			**48044**	428	2	430
39			**48045**	197	2	199

	A	B	C	D	E	F
40			**48046**	2	0	2
41			**48047**	367	1	368
42			**48048**	83	0	83
43			**48049**	61	2	63
44			**48050**	12	0	12
45			**48051**	165	0	165
46			**48054**	57	1	58
47			**48059**	177	3	180
48			**48060**	1228	55	1283
49			**48061**	2	1	3
50			**48062**	84	2	86
51			**48063**	42	2	44
52			**48064**	38	0	38
53			**48065**	74	1	75
54			**48066**	628	8	636
55			**48067**	217	3	220
56			**48069**	24	0	24
57			**48070**	60	0	60
58			**48071**	421	6	427
59			**48072**	168	3	171
60			**48073**	325	6	331
61			**48074**	177	0	177
62			**48075**	434	6	440
63			**48076**	382	4	386
64			**48079**	116	2	118
65			**48080**	189	3	192
66			**48081**	184	1	185
67			**48082**	114	3	117
68			**48083**	252	5	257
69			**48084**	134	6	140
70			**48085**	189	0	189
71			**48088**	216	0	216
72			**48089**	660	15	675
73			**48090**	2	0	2
74			**48091**	607	17	624
75			**48092**	340	7	347
76			**48093**	271	2	273
77			**48094**	131	0	131
78			**48095**	32	0	32
79			**48096**	15	1	16
80			**48097**	91	1	92
81			**48098**	123	0	123

	A	B	C	D	E	F
82			**48101**	328	3	331
83			**48103**	314	2	316
84			**48104**	110	2	112
85			**48105**	170	1	171
86			**48106**	2	0	2
87			**48107**	1	0	1
88			**48108**	217	6	223
89			**48111**	573	5	578
90			**48112**	3	1	4
91			**48114**	99	0	99
92			**48116**	106	0	106
93			**48117**	72	1	73
94			**48118**	65	4	69
95			**48120**	313	4	317
96			**48121**	7	0	7
97			**48122**	295	3	298
98			**48123**	2	0	2
99			**48124**	345	3	348
100			**48125**	378	3	381
101			**48126**	1451	34	1485
102			**48127**	744	8	752
103			**48128**	157	1	158
104			**48130**	76	1	77
105			**48131**	81	1	82
106			**48133**	53	3	56
107			**48134**	303	1	304
108			**48135**	307	3	310
109			**48137**	17	1	18
110			**48138**	70	0	70
111			**48139**	2	0	2
112			**48140**	29	0	29
113			**48141**	715	11	726
114			**48143**	1	0	1
115			**48144**	66	0	66
116			**48145**	34	1	35
117			**48146**	901	13	914
118			**48150**	256	6	262
119			**48152**	346	2	348
120			**48153**	2	0	2
121			**48154**	312	2	314
122			**48157**	15	0	15
123			**48158**	39	0	39

	A	B	C	D	E	F
124			**48159**	23	0	23
125			**48160**	84	0	84
126			**48161**	368	2	370
127			**48162**	323	4	327
128			**48164**	80	0	80
129			**48165**	87	1	88
130			**48166**	149	3	152
131			**48167**	180	1	181
132			**48168**	147	2	149
133			**48169**	102	0	102
134			**48170**	197	2	199
135			**48173**	104	0	104
136			**48174**	587	4	591
137			**48175**	2	0	2
138			**48176**	94	2	96
139			**48177**	2	0	2
140			**48178**	308	4	312
141			**48179**	37	0	37
142			**48180**	1400	23	1423
143			**48182**	173	2	175
144			**48183**	503	9	512
145			**48184**	267	2	269
146			**48185**	760	18	778
147			**48186**	542	8	550
148			**48187**	430	8	438
149			**48188**	430	7	437
150			**48189**	91	0	91
151			**48190**	2	0	2
152			**48191**	23	0	23
153			**48192**	350	3	353
154			**48193**	225	13	238
155			**48195**	441	6	447
156			**48197**	665	12	677
157			**48198**	636	2	638
158			**48201**	363	14	377
159			**48202**	316	59	375
160			**48203**	627	81	708
161			**48204**	651	126	777
162			**48205**	1328	148	1476
163			**48206**	500	129	629
164			**48207**	509	38	547
165			**48208**	266	26	292

	A	B	C	D	E	F
166			**48209**	1331	112	1443
167			**48210**	1373	129	1502
168			**48211**	199	42	241
169			**48212**	1414	127	1541
170			**48213**	676	97	773
171			**48214**	484	99	583
172			**48215**	361	41	402
173			**48216**	118	13	131
174			**48217**	165	5	170
175			**48218**	262	9	271
176			**48219**	1420	51	1471
177			**48220**	251	6	257
178			**48221**	865	55	920
179			**48223**	708	28	736
180			**48224**	1399	128	1527
181			**48225**	260	5	265
182			**48226**	43	0	43
183			**48227**	1305	97	1402
184			**48228**	1942	86	2028
185			**48229**	266	8	274
186			**48230**	144	3	147
187			**48231**	2	0	2
188			**48232**	2	0	2
189			**48234**	1000	65	1065
190			**48235**	1193	41	1234
191			**48236**	251	7	258
192			**48237**	581	5	586
193			**48238**	848	121	969
194			**48239**	648	8	656
195			**48240**	374	4	378
196			**48243**	1	0	1
197			**48244**	3	0	3
198			**48264**	1	0	1
199			**48272**	1	0	1
200			**48277**	2	0	2
201			**48279**	1	0	1
202			**48280**	1	0	1
203			**48288**	1	0	1
204			**48301**	96	1	97
205			**48302**	92	1	93
206			**48304**	95	5	100
207			**48306**	130	1	131

	A	B	C	D	E	F
208			**48307**	336	4	340
209			**48308**	1	0	1
210			**48309**	147	0	147
211			**48310**	648	11	659
212			**48311**	5	0	5
213			**48312**	360	2	362
214			**48313**	368	4	372
215			**48314**	224	0	224
216			**48315**	155	0	155
217			**48316**	211	1	212
218			**48317**	336	3	339
219			**48318**	1	0	1
220			**48320**	41	0	41
221			**48322**	302	2	304
222			**48323**	136	1	137
223			**48324**	124	0	124
224			**48325**	3	0	3
225			**48326**	250	6	256
226			**48327**	240	1	241
227			**48328**	312	1	313
228			**48329**	218	5	223
229			**48331**	200	2	202
230			**48332**	1	0	1
231			**48333**	1	0	1
232			**48334**	184	4	188
233			**48335**	432	31	463
234			**48336**	363	4	367
235			**48340**	763	5	768
236			**48341**	304	11	315
237			**48342**	517	9	526
238			**48343**	1	0	1
239			**48346**	220	0	220
240			**48348**	224	2	226
241			**48350**	71	1	72
242			**48353**	25	1	26
243			**48356**	51	0	51
244			**48357**	56	0	56
245			**48359**	94	2	96
246			**48360**	90	1	91
247			**48362**	119	0	119
248			**48363**	40	0	40
249			**48367**	28	1	29

	A	B	C	D	E	F
250			**48370**	6	0	6
251			**48371**	175	0	175
252			**48374**	211	1	212
253			**48375**	289	1	290
254			**48376**	2	0	2
255			**48377**	294	1	295
256			**48380**	33	0	33
257			**48381**	108	0	108
258			**48382**	191	3	194
259			**48383**	129	1	130
260			**48386**	151	0	151
261			**48387**	1	0	1
262			**48390**	260	3	263
263			**48391**	1	0	1
264			**48393**	294	5	299
265			**48401**	12	1	13
266			**48410**	1	0	1
267			**48411**	6	0	6
268			**48412**	65	0	65
269			**48413**	112	3	115
270			**48414**	29	0	29
271			**48415**	170	0	170
272			**48416**	58	1	59
273			**48417**	47	0	47
274			**48418**	48	0	48
275			**48419**	31	0	31
276			**48420**	295	4	299
277			**48421**	72	0	72
278			**48422**	92	1	93
279			**48423**	385	7	392
280			**48426**	9	0	9
281			**48427**	28	0	28
282			**48428**	22	0	22
283			**48429**	110	5	115
284			**48430**	303	9	312
285			**48432**	15	0	15
286			**48433**	292	3	295
287			**48435**	29	0	29
288			**48436**	42	2	44
289			**48437**	3	0	3
290			**48438**	57	0	57
291			**48439**	505	6	511

	A	B	C	D	E	F
292			**48441**	41	1	42
293			**48442**	198	4	202
294			**48444**	136	9	145
295			**48445**	12	1	13
296			**48446**	345	12	357
297			**48449**	44	0	44
298			**48450**	42	1	43
299			**48451**	121	1	122
300			**48453**	72	2	74
301			**48454**	23	0	23
302			**48455**	38	2	40
303			**48456**	12	0	12
304			**48457**	136	4	140
305			**48458**	336	4	340
306			**48460**	36	1	37
307			**48461**	90	3	93
308			**48462**	98	1	99
309			**48463**	34	1	35
310			**48464**	20	1	21
311			**48465**	3	0	3
312			**48466**	21	0	21
313			**48467**	13	2	15
314			**48468**	7	0	7
315			**48469**	7	0	7
316			**48470**	5	0	5
317			**48471**	81	1	82
318			**48472**	24	0	24
319			**48473**	291	4	295
320			**48475**	18	1	19
321			**48476**	10	0	10
322			**48501**	1	0	1
323			**48502**	10	0	10
324			**48503**	460	29	489
325			**48504**	631	30	661
326			**48505**	567	29	596
327			**48506**	518	17	535
328			**48507**	736	17	753
329			**48509**	109	2	111
330			**48519**	118	3	121
331			**48529**	245	0	245
332			**48532**	377	8	385
333			**48548**	1	0	1

	A	B	C	D	E	F
334			**48601**	1131	48	1179
335			**48602**	723	50	773
336			**48603**	367	3	370
337			**48604**	146	2	148
338			**48605**	3	0	3
339			**48607**	26	3	29
340			**48609**	119	0	119
341			**48610**	24	0	24
342			**48611**	48	1	49
343			**48612**	117	0	117
344			**48613**	13	0	13
345			**48614**	18	0	18
346			**48615**	38	0	38
347			**48616**	107	3	110
348			**48617**	134	0	134
349			**48618**	42	1	43
350			**48619**	2	0	2
351			**48621**	9	1	10
352			**48622**	80	1	81
353			**48623**	136	2	138
354			**48624**	162	0	162
355			**48625**	208	2	210
356			**48626**	56	1	57
357			**48627**	2	0	2
358			**48628**	7	0	7
359			**48629**	79	0	79
360			**48631**	41	2	43
361			**48632**	55	1	56
362			**48633**	1	0	1
363			**48634**	32	0	32
364			**48635**	4	0	4
365			**48636**	0	1	1
366			**48637**	41	0	41
367			**48638**	200	6	206
368			**48640**	163	3	166
369			**48641**	1	0	1
370			**48642**	185	1	186
371			**48647**	16	0	16
372			**48649**	30	0	30
373			**48650**	70	0	70
374			**48651**	51	0	51
375			**48652**	12	0	12

	A	B	C	D	E	F
376			**48653**	60	0	60
377			**48654**	8	0	8
378			**48655**	94	1	95
379			**48656**	35	0	35
380			**48657**	40	0	40
381			**48658**	58	1	59
382			**48659**	44	0	44
383			**48661**	58	1	59
384			**48662**	12	0	12
385			**48701**	30	1	31
386			**48703**	30	0	30
387			**48705**	1	0	1
388			**48706**	519	16	535
389			**48707**	2	1	3
390			**48708**	436	28	464
391			**48714**	1	0	1
392			**48720**	10	1	11
393			**48721**	3	0	3
394			**48722**	42	0	42
395			**48723**	231	4	235
396			**48724**	9	1	10
397			**48725**	24	0	24
398			**48726**	90	1	91
399			**48727**	14	1	15
400			**48729**	16	1	17
401			**48730**	17	0	17
402			**48731**	23	1	24
403			**48732**	137	1	138
404			**48733**	25	1	26
405			**48734**	43	0	43
406			**48735**	16	0	16
407			**48737**	3	1	4
408			**48738**	3	0	3
409			**48739**	12	0	12
410			**48740**	12	1	13
411			**48741**	33	1	34
412			**48742**	9	0	9
413			**48744**	62	1	63
414			**48745**	11	0	11
415			**48746**	114	0	114
416			**48747**	22	0	22
417			**48748**	8	0	8

	A	B	C	D	E	F
418			**48749**	18	0	18
419			**48750**	73	4	77
420			**48754**	22	0	22
421			**48755**	28	0	28
422			**48756**	21	0	21
423			**48757**	59	0	59
424			**48758**	1	0	1
425			**48759**	45	2	47
426			**48760**	17	1	18
427			**48761**	4	0	4
428			**48762**	3	1	4
429			**48763**	22	0	22
430			**48764**	2	0	2
431			**48765**	8	0	8
432			**48766**	16	0	16
433			**48767**	25	0	25
434			**48768**	150	1	151
435			**48770**	7	0	7
436			**48801**	175	2	177
437			**48804**	2	0	2
438			**48806**	22	0	22
439			**48807**	6	0	6
440			**48808**	44	1	45
441			**48809**	156	6	162
442			**48811**	52	0	52
443			**48812**	4	0	4
444			**48813**	210	6	216
445			**48815**	28	0	28
446			**48816**	1	0	1
447			**48817**	111	1	112
448			**48818**	25	0	25
449			**48819**	23	1	24
450			**48820**	94	1	95
451			**48821**	35	0	35
452			**48822**	12	0	12
453			**48823**	337	9	346
454			**48827**	137	5	142
455			**48829**	49	0	49
456			**48830**	1	0	1
457			**48831**	28	0	28
458			**48832**	9	0	9
459			**48833**	2	0	2

	A	B	C	D	E	F
460			**48834**	18	2	20
461			**48835**	9	0	9
462			**48836**	107	4	111
463			**48837**	111	3	114
464			**48838**	220	5	225
465			**48840**	101	3	104
466			**48841**	14	0	14
467			**48842**	245	4	249
468			**48843**	263	1	264
469			**48844**	3	0	3
470			**48845**	5	0	5
471			**48846**	301	15	316
472			**48847**	71	2	73
473			**48848**	58	2	60
474			**48849**	60	1	61
475			**48850**	42	0	42
476			**48851**	24	0	24
477			**48852**	1	0	1
478			**48853**	7	0	7
479			**48854**	230	0	230
480			**48855**	75	0	75
481			**48856**	13	0	13
482			**48857**	32	0	32
483			**48858**	404	7	411
484			**48859**	1	0	1
485			**48860**	21	3	24
486			**48861**	12	0	12
487			**48862**	1	0	1
488			**48864**	136	3	139
489			**48865**	33	0	33
490			**48866**	69	1	70
491			**48867**	585	24	609
492			**48870**	3	0	3
493			**48871**	11	0	11
494			**48872**	94	4	98
495			**48873**	10	1	11
496			**48874**	7	0	7
497			**48875**	106	2	108
498			**48876**	41	2	43
499			**48877**	31	0	31
500			**48878**	26	0	26
501			**48879**	164	2	166

	A	B	C	D	E	F
502			**48880**	100	1	101
503			**48881**	51	1	52
504			**48883**	78	0	78
505			**48884**	59	0	59
506			**48885**	8	0	8
507			**48886**	19	0	19
508			**48888**	87	5	92
509			**48889**	12	0	12
510			**48890**	16	0	16
511			**48891**	30	0	30
512			**48892**	76	0	76
513			**48893**	51	0	51
514			**48894**	16	1	17
515			**48895**	83	0	83
516			**48896**	3	1	4
517			**48897**	9	0	9
518			**48901**	4	0	4
519			**48906**	646	29	675
520			**48908**	1	0	1
521			**48909**	70	2	72
522			**48910**	806	17	823
523			**48911**	1222	32	1254
524			**48912**	288	13	301
525			**48915**	292	16	308
526			**48916**	1	0	1
527			**48917**	394	13	407
528			**48933**	27	0	27
529			**48937**	1	0	1
530			**49001**	483	29	512
531			**49002**	201	2	203
532			**49003**	6	0	6
533			**49004**	196	2	198
534			**49005**	1	0	1
535			**49006**	273	5	278
536			**49007**	223	19	242
537			**49008**	169	4	173
538			**49009**	382	4	386
539			**49010**	242	11	253
540			**49011**	29	2	31
541			**49012**	26	0	26
542			**49013**	76	2	78
543			**49014**	399	20	419

	A	B	C	D	E	F
544			**49015**	501	12	513
545			**49016**	4	0	4
546			**49017**	333	20	353
547			**49019**	4	0	4
548			**49021**	75	0	75
549			**49022**	729	30	759
550			**49023**	9	0	9
551			**49024**	307	3	310
552			**49026**	22	1	23
553			**49027**	1	0	1
554			**49028**	97	2	99
555			**49029**	17	0	17
556			**49030**	24	1	25
557			**49031**	46	4	50
558			**49032**	32	3	35
559			**49033**	8	0	8
560			**49034**	17	0	17
561			**49036**	356	15	371
562			**49037**	579	22	601
563			**49038**	67	2	69
564			**49040**	27	1	28
565			**49041**	2	0	2
566			**49042**	82	3	85
567			**49043**	28	2	30
568			**49045**	68	1	69
569			**49046**	61	2	63
570			**49047**	178	4	182
571			**49048**	517	10	527
572			**49050**	22	1	23
573			**49051**	19	0	19
574			**49052**	11	0	11
575			**49053**	90	1	91
576			**49055**	56	2	58
577			**49056**	78	1	79
578			**49057**	119	3	122
579			**49058**	154	9	163
580			**49060**	13	1	14
581			**49061**	12	0	12
582			**49063**	1	0	1
583			**49064**	39	0	39
584			**49065**	51	2	53
585			**49066**	7	0	7

	A	B	C	D	E	F
586			**49067**	34	0	34
587			**49068**	148	7	155
588			**49070**	22	2	24
589			**49071**	76	4	80
590			**49072**	34	1	35
591			**49073**	42	8	50
592			**49074**	1	0	1
593			**49075**	6	0	6
594			**49076**	21	1	22
595			**49078**	90	3	93
596			**49079**	100	7	107
597			**49080**	148	2	150
598			**49081**	2	0	2
599			**49082**	86	3	89
600			**49083**	56	2	58
601			**49085**	81	1	82
602			**49087**	44	1	45
603			**49088**	30	1	31
604			**49089**	24	1	25
605			**49090**	145	6	151
606			**49091**	360	10	370
607			**49092**	16	0	16
608			**49093**	320	17	337
609			**49094**	56	1	57
610			**49095**	14	0	14
611			**49096**	31	1	32
612			**49097**	91	0	91
613			**49098**	58	1	59
614			**49099**	74	5	79
615			**49101**	20	0	20
616			**49102**	6	1	7
617			**49103**	139	5	144
618			**49104**	1	0	1
619			**49106**	26	1	27
620			**49107**	111	4	115
621			**49111**	58	0	58
622			**49112**	50	1	51
623			**49113**	16	1	17
624			**49115**	2	0	2
625			**49117**	22	1	23
626			**49119**	1	0	1
627			**49120**	481	7	488

	A	B	C	D	E	F
628			**49125**	9	0	9
629			**49126**	28	0	28
630			**49127**	51	2	53
631			**49128**	26	3	29
632			**49129**	1	0	1
633			**49130**	11	1	12
634			**49161**	1	0	1
635			**49201**	655	32	687
636			**49202**	500	28	528
637			**49203**	783	75	858
638			**49204**	6	0	6
639			**49220**	33	0	33
640			**49221**	556	76	632
641			**49224**	139	13	152
642			**49227**	26	1	27
643			**49228**	39	2	41
644			**49229**	31	3	34
645			**49230**	95	1	96
646			**49232**	57	2	59
647			**49233**	28	2	30
648			**49234**	30	3	33
649			**49235**	26	3	29
650			**49236**	27	1	28
651			**49237**	51	2	53
652			**49238**	24	1	25
653			**49239**	1	0	1
654			**49240**	78	0	78
655			**49241**	36	3	39
656			**49242**	279	9	288
657			**49244**	0	1	1
658			**49245**	56	1	57
659			**49246**	39	1	40
660			**49247**	72	13	85
661			**49248**	7	1	8
662			**49249**	40	1	41
663			**49250**	102	3	105
664			**49251**	104	3	107
665			**49252**	50	0	50
666			**49253**	23	1	24
667			**49254**	44	1	45
668			**49255**	23	1	24
669			**49256**	48	7	55

	A	B	C	D	E	F
670			**49259**	35	1	36
671			**49261**	4	0	4
672			**49262**	13	0	13
673			**49264**	20	0	20
674			**49265**	35	3	38
675			**49266**	63	1	64
676			**49267**	21	0	21
677			**49268**	4	2	6
678			**49269**	70	2	72
679			**49270**	52	2	54
680			**49271**	39	0	39
681			**49272**	22	0	22
682			**49274**	63	1	64
683			**49276**	5	0	5
684			**49277**	43	2	45
685			**49279**	5	0	5
686			**49281**	1	0	1
687			**49282**	10	0	10
688			**49283**	50	1	51
689			**49284**	41	3	44
690			**49285**	77	4	81
691			**49286**	116	4	120
692			**49287**	10	2	12
693			**49288**	37	1	38
694			**49289**	2	0	2
695			**49301**	138	0	138
696			**49302**	43	1	44
697			**49303**	9	0	9
698			**49304**	49	1	50
699			**49305**	22	1	23
700			**49306**	66	0	66
701			**49307**	151	0	151
702			**49309**	9	0	9
703			**49310**	19	0	19
704			**49312**	6	0	6
705			**49314**	1	0	1
706			**49315**	165	2	167
707			**49316**	156	4	160
708			**49317**	1	0	1
709			**49318**	32	0	32
710			**49319**	218	4	222
711			**49320**	4	0	4

	A	B	C	D	E	F
712			**49321**	295	2	297
713			**49322**	15	0	15
714			**49323**	42	2	44
715			**49325**	10	0	10
716			**49326**	21	0	21
717			**49327**	92	1	93
718			**49328**	20	1	21
719			**49329**	92	3	95
720			**49330**	108	3	111
721			**49331**	160	5	165
722			**49332**	19	0	19
723			**49333**	95	1	96
724			**49336**	27	1	28
725			**49337**	80	0	80
726			**49338**	20	0	20
727			**49339**	20	0	20
728			**49340**	29	0	29
729			**49341**	270	2	272
730			**49342**	14	0	14
731			**49343**	63	1	64
732			**49344**	37	0	37
733			**49345**	198	1	199
734			**49346**	26	0	26
735			**49347**	8	0	8
736			**49348**	77	0	77
737			**49349**	64	1	65
738			**49401**	82	0	82
739			**49402**	13	0	13
740			**49403**	76	3	79
741			**49404**	71	0	71
742			**49405**	15	1	16
743			**49406**	4	0	4
744			**49408**	130	0	130
745			**49410**	20	2	22
746			**49411**	18	1	19
747			**49412**	114	1	115
748			**49415**	74	0	74
749			**49416**	2	0	2
750			**49417**	426	12	438
751			**49418**	236	2	238
752			**49419**	69	1	70
753			**49420**	178	4	182

	A	B	C	D	E	F
754			**49421**	60	1	61
755			**49422**	2	1	3
756			**49423**	684	36	720
757			**49424**	681	20	701
758			**49425**	45	2	47
759			**49426**	207	2	209
760			**49428**	133	1	134
761			**49431**	236	17	253
762			**49435**	25	1	26
763			**49436**	19	1	20
764			**49437**	71	3	74
765			**49440**	26	2	28
766			**49441**	450	31	481
767			**49442**	734	74	808
768			**49443**	0	1	1
769			**49444**	512	33	545
770			**49445**	201	4	205
771			**49446**	39	1	40
772			**49448**	49	1	50
773			**49449**	36	0	36
774			**49450**	77	1	78
775			**49451**	54	2	56
776			**49452**	25	0	25
777			**49453**	13	0	13
778			**49454**	73	6	79
779			**49455**	118	2	120
780			**49456**	245	4	249
781			**49457**	121	4	125
782			**49458**	2	0	2
783			**49459**	37	0	37
784			**49460**	86	1	87
785			**49461**	82	1	83
786			**49464**	259	4	263
787			**49501**	4	0	4
788			**49503**	762	62	824
789			**49504**	735	72	807
790			**49505**	551	28	579
791			**49506**	396	37	433
792			**49507**	1156	145	1301
793			**49508**	800	29	829
794			**49509**	711	13	724
795			**49510**	1	0	1

	A	B	C	D	E	F
796			**49512**	274	4	278
797			**49514**	2	0	2
798			**49518**	1	0	1
799			**49519**	466	13	479
800			**49525**	265	5	270
801			**49534**	172	1	173
802			**49544**	125	2	127
803			**49546**	411	8	419
804			**49548**	729	19	748
805			**49601**	214	2	216
806			**49610**	1	0	1
807			**49611**	8	1	9
808			**49612**	11	0	11
809			**49613**	12	0	12
810			**49614**	24	0	24
811			**49615**	34	0	34
812			**49616**	34	0	34
813			**49617**	37	1	38
814			**49618**	3	0	3
815			**49619**	7	2	9
816			**49620**	52	1	53
817			**49621**	24	1	25
818			**49622**	27	0	27
819			**49623**	14	1	15
820			**49625**	20	1	21
821			**49626**	5	0	5
822			**49627**	1	0	1
823			**49628**	5	0	5
824			**49629**	14	0	14
825			**49630**	7	0	7
826			**49631**	87	5	92
827			**49632**	12	0	12
828			**49633**	35	0	35
829			**49635**	41	0	41
830			**49636**	5	0	5
831			**49637**	75	0	75
832			**49638**	8	0	8
833			**49639**	41	1	42
834			**49640**	21	0	21
835			**49642**	8	0	8
836			**49643**	116	0	116
837			**49644**	11	0	11

	A	B	C	D	E	F
838			**49645**	26	1	27
839			**49646**	101	0	101
840			**49648**	19	0	19
841			**49649**	115	0	115
842			**49650**	64	1	65
843			**49651**	72	1	73
844			**49653**	25	1	26
845			**49654**	1	0	1
846			**49655**	27	0	27
847			**49656**	15	0	15
848			**49657**	32	0	32
849			**49659**	121	1	122
850			**49660**	156	9	165
851			**49663**	57	0	57
852			**49664**	17	2	19
853			**49665**	44	0	44
854			**49666**	2	0	2
855			**49667**	1	0	1
856			**49668**	45	1	46
857			**49670**	17	0	17
858			**49674**	4	0	4
859			**49675**	8	0	8
860			**49676**	47	1	48
861			**49677**	105	4	109
862			**49679**	12	0	12
863			**49680**	34	0	34
864			**49682**	63	0	63
865			**49683**	29	0	29
866			**49684**	584	9	593
867			**49685**	28	0	28
868			**49686**	416	2	418
869			**49688**	28	1	29
870			**49689**	16	0	16
871			**49690**	77	1	78
872			**49696**	18	0	18
873			**49701**	13	1	14
874			**49705**	11	0	11
875			**49706**	79	0	79
876			**49707**	193	8	201
877			**49709**	23	0	23
878			**49710**	3	0	3
879			**49712**	91	1	92

	A	B	C	D	E	F
880			**49713**	26	0	26
881			**49715**	43	1	44
882			**49716**	2	0	2
883			**49718**	5	0	5
884			**49719**	9	0	9
885			**49720**	92	0	92
886			**49721**	161	4	165
887			**49722**	3	0	3
888			**49724**	10	0	10
889			**49725**	1	0	1
890			**49726**	3	0	3
891			**49727**	90	0	90
892			**49728**	2	0	2
893			**49729**	6	0	6
894			**49730**	22	0	22
895			**49733**	19	0	19
896			**49734**	8	0	8
897			**49735**	250	0	250
898			**49736**	2	0	2
899			**49738**	61	1	62
900			**49740**	53	0	53
901			**49743**	5	0	5
902			**49744**	4	0	4
903			**49745**	16	0	16
904			**49746**	35	0	35
905			**49747**	12	0	12
906			**49748**	2	0	2
907			**49749**	35	1	36
908			**49751**	17	0	17
909			**49752**	4	0	4
910			**49753**	18	0	18
911			**49755**	14	0	14
912			**49756**	29	2	31
913			**49757**	3	0	3
914			**49759**	12	0	12
915			**49760**	8	0	8
916			**49762**	1	0	1
917			**49764**	8	0	8
918			**49765**	47	1	48
919			**49766**	12	0	12
920			**49768**	1	0	1
921			**49769**	25	0	25

	A	B	C	D	E	F
922			**49770**	175	0	175
923			**49774**	15	0	15
924			**49776**	17	1	18
925			**49777**	5	0	5
926			**49779**	44	0	44
927			**49780**	17	1	18
928			**49781**	67	1	68
929			**49782**	5	0	5
930			**49783**	253	2	255
931			**49788**	73	0	73
932			**49791**	5	0	5
933			**49795**	31	1	32
934			**49796**	2	0	2
935			**49799**	23	1	24
936			**49801**	139	0	139
937			**49802**	74	0	74
938			**49805**	4	0	4
939			**49806**	2	0	2
940			**49807**	21	0	21
941			**49808**	3	0	3
942			**49812**	9	0	9
943			**49814**	8	1	9
944			**49815**	7	0	7
945			**49816**	5	0	5
946			**49817**	5	0	5
947			**49818**	6	0	6
948			**49820**	4	0	4
949			**49821**	9	1	10
950			**49827**	9	0	9
951			**49829**	224	11	235
952			**49831**	15	0	15
953			**49833**	3	0	3
954			**49834**	4	0	4
955			**49835**	5	0	5
956			**49836**	9	0	9
957			**49837**	100	3	103
958			**49838**	6	0	6
959			**49839**	4	0	4
960			**49840**	9	0	9
961			**49841**	93	2	95
962			**49845**	1	0	1
963			**49847**	14	2	16

	A	B	C	D	E	F
964			**49848**	0	1	1
965			**49849**	111	6	117
966			**49852**	3	0	3
967			**49853**	10	0	10
968			**49854**	77	1	78
969			**49855**	176	2	178
970			**49858**	127	11	138
971			**49861**	4	0	4
972			**49862**	54	0	54
973			**49863**	3	0	3
974			**49864**	1	0	1
975			**49866**	47	2	49
976			**49868**	78	0	78
977			**49870**	49	0	49
978			**49871**	2	0	2
979			**49872**	3	0	3
980			**49873**	2	0	2
981			**49874**	10	0	10
982			**49876**	11	1	12
983			**49878**	27	1	28
984			**49880**	4	0	4
985			**49881**	3	0	3
986			**49883**	1	0	1
987			**49884**	9	0	9
988			**49885**	6	1	7
989			**49886**	4	0	4
990			**49887**	18	0	18
991			**49891**	8	0	8
992			**49892**	13	0	13
993			**49893**	18	0	18
994			**49894**	6	1	7
995			**49895**	8	1	9
996			**49896**	27	1	28
997			**49901**	5	1	6
998			**49902**	3	0	3
999			**49903**	3	0	3
1000			**49905**	50	0	50
1001			**49908**	56	1	57
1002			**49911**	28	0	28
1003			**49912**	11	0	11
1004			**49913**	133	9	142
1005			**49915**	12	0	12

	A	B	C	D	E	F
1006			**49916**	39	0	39
1007			**49917**	2	0	2
1008			**49918**	1	0	1
1009			**49919**	1	0	1
1010			**49920**	50	0	50
1011			**49921**	7	0	7
1012			**49922**	11	1	12
1013			**49925**	2	0	2
1014			**49927**	2	0	2
1015			**49930**	127	1	128
1016			**49931**	109	0	109
1017			**49934**	14	0	14
1018			**49935**	63	3	66
1019			**49938**	84	2	86
1020			**49942**	1	0	1
1021			**49945**	44	2	46
1022			**49946**	71	0	71
1023			**49947**	3	0	3
1024			**49948**	4	1	5
1025			**49950**	13	1	14
1026			**49952**	3	0	3
1027			**49953**	19	0	19
1028			**49955**	9	0	9
1029			**49958**	14	0	14
1030			**49959**	4	0	4
1031			**49960**	3	0	3
1032			**49961**	1	0	1
1033			**49963**	18	1	19
1034			**49964**	2	0	2
1035			**49965**	4	0	4
1036			**49967**	1	0	1
1037			**49968**	10	0	10
1038			**49969**	23	0	23
1039			**49970**	3	0	3
1040			**49971**	6	1	7
1041			**Total**	136341	4947	141288
1042			**Frequency Missing = 67**			

	B	C	D	E	F
2	**Table of Patient_Zip_Code by PB2**				
3	**Patient_Zip_Code**	**PB2**			
4		**1) <5**	**2) >=5**	**Total**	**Incidence**
5	**48205**	1328	148	1476	10.03
6	**49507**	1156	145	1301	11.15
7	**48206**	500	129	629	20.51
8	**48210**	1373	129	1502	8.59
9	**48224**	1399	128	1527	8.38
10	**48212**	1414	127	1541	8.24
11	**48204**	651	126	777	16.22
12	**48238**	848	121	969	12.49
13	**48209**	1331	112	1443	7.76
14	**48214**	484	99	583	16.98
15	**48213**	676	97	773	12.55
16	**48227**	1305	97	1402	6.92
17	**48228**	1942	86	2028	4.24
18	**48203**	627	81	708	11.44
19	**49221**	556	76	632	12.03
20	**49203**	783	75	858	8.74
21	**49442**	734	74	808	9.16
22	**49504**	735	72	807	8.92
23	**48234**	1000	65	1065	6.10
24	**49503**	762	62	824	7.52
25	**48202**	316	59	375	15.73
26	**48060**	1228	55	1283	4.29
27	**48221**	865	55	920	5.98
28	**48219**	1420	51	1471	3.47
29	**48602**	723	50	773	6.47
30	**48601**	1131	48	1179	4.07
31	**48211**	199	42	241	17.43
32	**48215**	361	41	402	10.20
33	**48235**	1193	41	1234	3.32
34	**48207**	509	38	547	6.95
35	**49506**	396	37	433	8.55
36	**49423**	684	36	720	5.00
37	**48126**	1451	34	1485	2.29
38	**49444**	512	33	545	6.06
39	**48911**	1222	32	1254	2.55
40	**49201**	655	32	687	4.66
41	**48335**	432	31	463	6.70
42	**49441**	450	31	481	6.44
43	**48504**	631	30	661	4.54

	B	C	D	E	F
44	**49022**	729	30	759	3.95
45	**48503**	460	29	489	5.93
46	**48505**	567	29	596	4.87
47	**48906**	646	29	675	4.30
48	**49001**	483	29	512	5.66
49	**49508**	800	29	829	3.50
50	**48223**	708	28	736	3.80
51	**48708**	436	28	464	6.03
52	**49202**	500	28	528	5.30
53	**49505**	551	28	579	4.84
54	**48208**	266	26	292	8.90
55	**48867**	585	24	609	3.94
56	**48180**	1400	23	1423	1.62
57	**49037**	579	22	601	3.66
58	**49014**	399	20	419	4.77
59	**49017**	333	20	353	5.67
60	**49424**	681	20	701	2.85
61	**49007**	223	19	242	7.85
62	**49548**	729	19	748	2.54
63	**48185**	760	18	778	2.31
64	**48091**	607	17	624	2.72
65	**48506**	518	17	535	3.18
66	**48507**	736	17	753	2.26
67	**48910**	806	17	823	2.07
68	**49093**	320	17	337	5.04
69	**49431**	236	17	253	6.72
70	**48706**	519	16	535	2.99
71	**48915**	292	16	308	5.19
72	**48089**	660	15	675	2.22
73	**48846**	301	15	316	4.75
74	**49036**	356	15	371	4.04
75	**48021**	519	14	533	2.63
76	**48201**	363	14	377	3.71
77	**48146**	901	13	914	1.42
78	**48193**	225	13	238	5.46
79	**48216**	118	13	131	9.92
80	**48912**	288	13	301	4.32
81	**48917**	394	13	407	3.19
82	**49224**	139	13	152	8.55
83	**49247**	72	13	85	15.29
84	**49509**	711	13	724	1.80
85	**49519**	466	13	479	2.71

	B	C	D	E	F
86	**48197**	665	12	677	1.77
87	**48446**	345	12	357	3.36
88	**49015**	501	12	513	2.34
89	**49417**	426	12	438	2.74
90	**48141**	715	11	726	1.52
91	**48310**	648	11	659	1.67
92	**48341**	304	11	315	3.49
93	**49010**	242	11	253	4.35
94	**49829**	224	11	235	4.68
95	**49858**	127	11	138	7.97
96	**48030**	270	10	280	3.57
97	**49048**	517	10	527	1.90
98	**49091**	360	10	370	2.70
99	**48183**	503	9	512	1.76
100	**48218**	262	9	271	3.32
101	**48342**	517	9	526	1.71
102	**48430**	303	9	312	2.88
103	**48444**	136	9	145	6.21
104	**48823**	337	9	346	2.60
105	**49058**	154	9	163	5.52
106	**49242**	279	9	288	3.13
107	**49660**	156	9	165	5.45
108	**49684**	584	9	593	1.52
109	**49913**	133	9	142	6.34
110	**48066**	628	8	636	1.26
111	**48127**	744	8	752	1.06
112	**48186**	542	8	550	1.45
113	**48187**	430	8	438	1.83
114	**48229**	266	8	274	2.92
115	**48239**	648	8	656	1.22
116	**48532**	377	8	385	2.08
117	**49073**	42	8	50	16.00
118	**49546**	411	8	419	1.91
119	**49707**	193	8	201	3.98
120	**48092**	340	7	347	2.02
121	**48188**	430	7	437	1.60
122	**48236**	251	7	258	2.71
123	**48423**	385	7	392	1.79
124	**48858**	404	7	411	1.70
125	**49068**	148	7	155	4.52
126	**49079**	100	7	107	6.54
127	**49120**	481	7	488	1.43

	B	C	D	E	F
128	**49256**	48	7	55	12.73
129	**48043**	153	6	159	3.77
130	**48071**	421	6	427	1.41
131	**48073**	325	6	331	1.81
132	**48075**	434	6	440	1.36
133	**48084**	134	6	140	4.29
134	**48108**	217	6	223	2.69
135	**48150**	256	6	262	2.29
136	**48195**	441	6	447	1.34
137	**48220**	251	6	257	2.33
138	**48326**	250	6	256	2.34
139	**48439**	505	6	511	1.17
140	**48638**	200	6	206	2.91
141	**48809**	156	6	162	3.70
142	**48813**	210	6	216	2.78
143	**49090**	145	6	151	3.97
144	**49454**	73	6	79	7.59
145	**49849**	111	6	117	5.13
146	**48034**	254	5	259	1.93
147	**48083**	252	5	257	1.95
148	**48111**	573	5	578	0.87
149	**48217**	165	5	170	2.94
150	**48225**	260	5	265	1.89
151	**48237**	581	5	586	0.85
152	**48304**	95	5	100	5.00
153	**48329**	218	5	223	2.24
154	**48340**	763	5	768	0.65
155	**48393**	294	5	299	1.67
156	**48429**	110	5	115	4.35
157	**48827**	137	5	142	3.52
158	**48838**	220	5	225	2.22
159	**48888**	87	5	92	5.43
160	**49006**	273	5	278	1.80
161	**49099**	74	5	79	6.33
162	**49103**	139	5	144	3.47
163	**49331**	160	5	165	3.03
164	**49525**	265	5	270	1.85
165	**49631**	87	5	92	5.43
166	**48025**	120	4	124	3.23
167	**48033**	275	4	279	1.43
168	**48035**	409	4	413	0.97
169	**48038**	379	4	383	1.04

	B	C	D	E	F
170	**48076**	382	4	386	1.04
171	**48118**	65	4	69	5.80
172	**48120**	313	4	317	1.26
173	**48162**	323	4	327	1.22
174	**48174**	587	4	591	0.68
175	**48178**	308	4	312	1.28
176	**48240**	374	4	378	1.06
177	**48307**	336	4	340	1.18
178	**48313**	368	4	372	1.08
179	**48334**	184	4	188	2.13
180	**48336**	363	4	367	1.09
181	**48420**	295	4	299	1.34
182	**48442**	198	4	202	1.98
183	**48457**	136	4	140	2.86
184	**48458**	336	4	340	1.18
185	**48473**	291	4	295	1.36
186	**48723**	231	4	235	1.70
187	**48750**	73	4	77	5.19
188	**48836**	107	4	111	3.60
189	**48842**	245	4	249	1.61
190	**48872**	94	4	98	4.08
191	**49008**	169	4	173	2.31
192	**49009**	382	4	386	1.04
193	**49031**	46	4	50	8.00
194	**49047**	178	4	182	2.20
195	**49071**	76	4	80	5.00
196	**49107**	111	4	115	3.48
197	**49285**	77	4	81	4.94
198	**49286**	116	4	120	3.33
199	**49316**	156	4	160	2.50
200	**49319**	218	4	222	1.80
201	**49420**	178	4	182	2.20
202	**49445**	201	4	205	1.95
203	**49456**	245	4	249	1.61
204	**49457**	121	4	125	3.20
205	**49464**	259	4	263	1.52
206	**49512**	274	4	278	1.44
207	**49677**	105	4	109	3.67
208	**49721**	161	4	165	2.42
209	**48036**	261	3	264	1.14
210	**48059**	177	3	180	1.67
211	**48067**	217	3	220	1.36

	B	C	D	E	F
212	**48072**	168	3	171	1.75
213	**48080**	189	3	192	1.56
214	**48082**	114	3	117	2.56
215	**48101**	328	3	331	0.91
216	**48122**	295	3	298	1.01
217	**48124**	345	3	348	0.86
218	**48125**	378	3	381	0.79
219	**48133**	53	3	56	5.36
220	**48135**	307	3	310	0.97
221	**48166**	149	3	152	1.97
222	**48192**	350	3	353	0.85
223	**48230**	144	3	147	2.04
224	**48317**	336	3	339	0.88
225	**48382**	191	3	194	1.55
226	**48390**	260	3	263	1.14
227	**48413**	112	3	115	2.61
228	**48433**	292	3	295	1.02
229	**48461**	90	3	93	3.23
230	**48519**	118	3	121	2.48
231	**48603**	367	3	370	0.81
232	**48607**	26	3	29	10.34
233	**48616**	107	3	110	2.73
234	**48640**	163	3	166	1.81
235	**48837**	111	3	114	2.63
236	**48840**	101	3	104	2.88
237	**48860**	21	3	24	12.50
238	**48864**	136	3	139	2.16
239	**49024**	307	3	310	0.97
240	**49032**	32	3	35	8.57
241	**49042**	82	3	85	3.53
242	**49057**	119	3	122	2.46
243	**49078**	90	3	93	3.23
244	**49082**	86	3	89	3.37
245	**49128**	26	3	29	10.34
246	**49229**	31	3	34	8.82
247	**49234**	30	3	33	9.09
248	**49235**	26	3	29	10.34
249	**49241**	36	3	39	7.69
250	**49250**	102	3	105	2.86
251	**49251**	104	3	107	2.80
252	**49265**	35	3	38	7.89
253	**49284**	41	3	44	6.82

	B	C	D	E	F
254	**49329**	92	3	95	3.16
255	**49330**	108	3	111	2.70
256	**49403**	76	3	79	3.80
257	**49437**	71	3	74	4.05
258	**49837**	100	3	103	2.91
259	**49935**	63	3	66	4.55
260	**48001**	140	2	142	1.41
261	**48005**	37	2	39	5.13
262	**48026**	170	2	172	1.16
263	**48027**	48	2	50	4.00
264	**48041**	40	2	42	4.76
265	**48044**	428	2	430	0.47
266	**48045**	197	2	199	1.01
267	**48049**	61	2	63	3.17
268	**48062**	84	2	86	2.33
269	**48063**	42	2	44	4.55
270	**48079**	116	2	118	1.69
271	**48093**	271	2	273	0.73
272	**48103**	314	2	316	0.63
273	**48104**	110	2	112	1.79
274	**48152**	346	2	348	0.57
275	**48154**	312	2	314	0.64
276	**48161**	368	2	370	0.54
277	**48168**	147	2	149	1.34
278	**48170**	197	2	199	1.01
279	**48176**	94	2	96	2.08
280	**48182**	173	2	175	1.14
281	**48184**	267	2	269	0.74
282	**48198**	636	2	638	0.31
283	**48312**	360	2	362	0.55
284	**48322**	302	2	304	0.66
285	**48331**	200	2	202	0.99
286	**48348**	224	2	226	0.88
287	**48359**	94	2	96	2.08
288	**48436**	42	2	44	4.55
289	**48453**	72	2	74	2.70
290	**48455**	38	2	40	5.00
291	**48467**	13	2	15	13.33
292	**48509**	109	2	111	1.80
293	**48604**	146	2	148	1.35
294	**48623**	136	2	138	1.45
295	**48625**	208	2	210	0.95

	B	C	D	E	F
296	**48631**	41	2	43	4.65
297	**48759**	45	2	47	4.26
298	**48801**	175	2	177	1.13
299	**48834**	18	2	20	10.00
300	**48847**	71	2	73	2.74
301	**48848**	58	2	60	3.33
302	**48875**	106	2	108	1.85
303	**48876**	41	2	43	4.65
304	**48879**	164	2	166	1.20
305	**48909**	70	2	72	2.78
306	**49002**	201	2	203	0.99
307	**49004**	196	2	198	1.01
308	**49011**	29	2	31	6.45
309	**49013**	76	2	78	2.56
310	**49028**	97	2	99	2.02
311	**49038**	67	2	69	2.90
312	**49043**	28	2	30	6.67
313	**49046**	61	2	63	3.17
314	**49055**	56	2	58	3.45
315	**49065**	51	2	53	3.77
316	**49070**	22	2	24	8.33
317	**49080**	148	2	150	1.33
318	**49083**	56	2	58	3.45
319	**49127**	51	2	53	3.77
320	**49228**	39	2	41	4.88
321	**49232**	57	2	59	3.39
322	**49233**	28	2	30	6.67
323	**49237**	51	2	53	3.77
324	**49268**	4	2	6	33.33
325	**49269**	70	2	72	2.78
326	**49270**	52	2	54	3.70
327	**49277**	43	2	45	4.44
328	**49287**	10	2	12	16.67
329	**49315**	165	2	167	1.20
330	**49321**	295	2	297	0.67
331	**49323**	42	2	44	4.55
332	**49341**	270	2	272	0.74
333	**49410**	20	2	22	9.09
334	**49418**	236	2	238	0.84
335	**49425**	45	2	47	4.26
336	**49426**	207	2	209	0.96
337	**49440**	26	2	28	7.14

	B	C	D	E	F
338	**49451**	54	2	56	3.57
339	**49455**	118	2	120	1.67
340	**49544**	125	2	127	1.57
341	**49601**	214	2	216	0.93
342	**49619**	7	2	9	22.22
343	**49664**	17	2	19	10.53
344	**49686**	416	2	418	0.48
345	**49756**	29	2	31	6.45
346	**49783**	253	2	255	0.78
347	**49841**	93	2	95	2.11
348	**49847**	14	2	16	12.50
349	**49855**	176	2	178	1.12
350	**49866**	47	2	49	4.08
351	**49938**	84	2	86	2.33
352	**49945**	44	2	46	4.35
353	**48002**	18	1	19	5.26
354	**48014**	66	1	67	1.49
355	**48037**	7	1	8	12.50
356	**48039**	101	1	102	0.98
357	**48047**	367	1	368	0.27
358	**48054**	57	1	58	1.72
359	**48061**	2	1	3	33.33
360	**48065**	74	1	75	1.33
361	**48081**	184	1	185	0.54
362	**48096**	15	1	16	6.25
363	**48097**	91	1	92	1.09
364	**48105**	170	1	171	0.58
365	**48112**	3	1	4	25.00
366	**48117**	72	1	73	1.37
367	**48128**	157	1	158	0.63
368	**48130**	76	1	77	1.30
369	**48131**	81	1	82	1.22
370	**48134**	303	1	304	0.33
371	**48137**	17	1	18	5.56
372	**48145**	34	1	35	2.86
373	**48165**	87	1	88	1.14
374	**48167**	180	1	181	0.55
375	**48301**	96	1	97	1.03
376	**48302**	92	1	93	1.08
377	**48306**	130	1	131	0.76
378	**48316**	211	1	212	0.47
379	**48323**	136	1	137	0.73

	B	C	D	E	F
380	**48327**	240	1	241	0.41
381	**48328**	312	1	313	0.32
382	**48350**	71	1	72	1.39
383	**48353**	25	1	26	3.85
384	**48360**	90	1	91	1.10
385	**48367**	28	1	29	3.45
386	**48374**	211	1	212	0.47
387	**48375**	289	1	290	0.34
388	**48377**	294	1	295	0.34
389	**48383**	129	1	130	0.77
390	**48401**	12	1	13	7.69
391	**48416**	58	1	59	1.69
392	**48422**	92	1	93	1.08
393	**48441**	41	1	42	2.38
394	**48445**	12	1	13	7.69
395	**48450**	42	1	43	2.33
396	**48451**	121	1	122	0.82
397	**48460**	36	1	37	2.70
398	**48462**	98	1	99	1.01
399	**48463**	34	1	35	2.86
400	**48464**	20	1	21	4.76
401	**48471**	81	1	82	1.22
402	**48475**	18	1	19	5.26
403	**48611**	48	1	49	2.04
404	**48618**	42	1	43	2.33
405	**48621**	9	1	10	10.00
406	**48622**	80	1	81	1.23
407	**48626**	56	1	57	1.75
408	**48632**	55	1	56	1.79
409	**48636**	0	1	1	100.00
410	**48642**	185	1	186	0.54
411	**48655**	94	1	95	1.05
412	**48658**	58	1	59	1.69
413	**48661**	58	1	59	1.69
414	**48701**	30	1	31	3.23
415	**48707**	2	1	3	33.33
416	**48720**	10	1	11	9.09
417	**48724**	9	1	10	10.00
418	**48726**	90	1	91	1.10
419	**48727**	14	1	15	6.67
420	**48729**	16	1	17	5.88
421	**48731**	23	1	24	4.17

	B	C	D	E	F
422	**48732**	137	1	138	0.72
423	**48733**	25	1	26	3.85
424	**48737**	3	1	4	25.00
425	**48740**	12	1	13	7.69
426	**48741**	33	1	34	2.94
427	**48744**	62	1	63	1.59
428	**48760**	17	1	18	5.56
429	**48762**	3	1	4	25.00
430	**48768**	150	1	151	0.66
431	**48808**	44	1	45	2.22
432	**48817**	111	1	112	0.89
433	**48819**	23	1	24	4.17
434	**48820**	94	1	95	1.05
435	**48843**	263	1	264	0.38
436	**48849**	60	1	61	1.64
437	**48866**	69	1	70	1.43
438	**48873**	10	1	11	9.09
439	**48880**	100	1	101	0.99
440	**48881**	51	1	52	1.92
441	**48894**	16	1	17	5.88
442	**48896**	3	1	4	25.00
443	**49026**	22	1	23	4.35
444	**49030**	24	1	25	4.00
445	**49040**	27	1	28	3.57
446	**49045**	68	1	69	1.45
447	**49050**	22	1	23	4.35
448	**49053**	90	1	91	1.10
449	**49056**	78	1	79	1.27
450	**49060**	13	1	14	7.14
451	**49072**	34	1	35	2.86
452	**49076**	21	1	22	4.55
453	**49085**	81	1	82	1.22
454	**49087**	44	1	45	2.22
455	**49088**	30	1	31	3.23
456	**49089**	24	1	25	4.00
457	**49094**	56	1	57	1.75
458	**49096**	31	1	32	3.13
459	**49098**	58	1	59	1.69
460	**49102**	6	1	7	14.29
461	**49106**	26	1	27	3.70
462	**49112**	50	1	51	1.96
463	**49113**	16	1	17	5.88

	B	C	D	E	F
464	**49117**	22	1	23	4.35
465	**49130**	11	1	12	8.33
466	**49227**	26	1	27	3.70
467	**49230**	95	1	96	1.04
468	**49236**	27	1	28	3.57
469	**49238**	24	1	25	4.00
470	**49244**	0	1	1	100.00
471	**49245**	56	1	57	1.75
472	**49246**	39	1	40	2.50
473	**49248**	7	1	8	12.50
474	**49249**	40	1	41	2.44
475	**49253**	23	1	24	4.17
476	**49254**	44	1	45	2.22
477	**49255**	23	1	24	4.17
478	**49259**	35	1	36	2.78
479	**49266**	63	1	64	1.56
480	**49274**	63	1	64	1.56
481	**49283**	50	1	51	1.96
482	**49288**	37	1	38	2.63
483	**49302**	43	1	44	2.27
484	**49304**	49	1	50	2.00
485	**49305**	22	1	23	4.35
486	**49327**	92	1	93	1.08
487	**49328**	20	1	21	4.76
488	**49333**	95	1	96	1.04
489	**49336**	27	1	28	3.57
490	**49343**	63	1	64	1.56
491	**49345**	198	1	199	0.50
492	**49349**	64	1	65	1.54
493	**49405**	15	1	16	6.25
494	**49411**	18	1	19	5.26
495	**49412**	114	1	115	0.87
496	**49419**	69	1	70	1.43
497	**49421**	60	1	61	1.64
498	**49422**	2	1	3	33.33
499	**49428**	133	1	134	0.75
500	**49435**	25	1	26	3.85
501	**49436**	19	1	20	5.00
502	**49443**	0	1	1	100.00
503	**49446**	39	1	40	2.50
504	**49448**	49	1	50	2.00
505	**49450**	77	1	78	1.28

	B	C	D	E	F
506	**49460**	86	1	87	1.15
507	**49461**	82	1	83	1.20
508	**49534**	172	1	173	0.58
509	**49611**	8	1	9	11.11
510	**49617**	37	1	38	2.63
511	**49620**	52	1	53	1.89
512	**49621**	24	1	25	4.00
513	**49623**	14	1	15	6.67
514	**49625**	20	1	21	4.76
515	**49639**	41	1	42	2.38
516	**49645**	26	1	27	3.70
517	**49650**	64	1	65	1.54
518	**49651**	72	1	73	1.37
519	**49653**	25	1	26	3.85
520	**49659**	121	1	122	0.82
521	**49668**	45	1	46	2.17
522	**49676**	47	1	48	2.08
523	**49688**	28	1	29	3.45
524	**49690**	77	1	78	1.28
525	**49701**	13	1	14	7.14
526	**49712**	91	1	92	1.09
527	**49715**	43	1	44	2.27
528	**49738**	61	1	62	1.61
529	**49749**	35	1	36	2.78
530	**49765**	47	1	48	2.08
531	**49776**	17	1	18	5.56
532	**49780**	17	1	18	5.56
533	**49781**	67	1	68	1.47
534	**49795**	31	1	32	3.13
535	**49799**	23	1	24	4.17
536	**49814**	8	1	9	11.11
537	**49821**	9	1	10	10.00
538	**49848**	0	1	1	100.00
539	**49854**	77	1	78	1.28
540	**49876**	11	1	12	8.33
541	**49878**	27	1	28	3.57
542	**49885**	6	1	7	14.29
543	**49894**	6	1	7	14.29
544	**49895**	8	1	9	11.11
545	**49896**	27	1	28	3.57
546	**49901**	5	1	6	16.67
547	**49908**	56	1	57	1.75

	B	C	D	E	F
548	**49922**	11	1	12	8.33
549	**49930**	127	1	128	0.78
550	**49948**	4	1	5	20.00
551	**49950**	13	1	14	7.14
552	**49963**	18	1	19	5.26
553	**49971**	6	1	7	14.29
554	**40291**	2	0	2	0.00
555	**48003**	42	0	42	0.00
556	**48006**	45	0	45	0.00
557	**48009**	252	0	252	0.00
558	**48015**	112	0	112	0.00
559	**48017**	123	0	123	0.00
560	**48022**	23	0	23	0.00
561	**48023**	53	0	53	0.00
562	**48028**	3	0	3	0.00
563	**48032**	26	0	26	0.00
564	**48040**	101	0	101	0.00
565	**48042**	219	0	219	0.00
566	**48046**	2	0	2	0.00
567	**48048**	83	0	83	0.00
568	**48050**	12	0	12	0.00
569	**48051**	165	0	165	0.00
570	**48064**	38	0	38	0.00
571	**48069**	24	0	24	0.00
572	**48070**	60	0	60	0.00
573	**48074**	177	0	177	0.00
574	**48085**	189	0	189	0.00
575	**48088**	216	0	216	0.00
576	**48090**	2	0	2	0.00
577	**48094**	131	0	131	0.00
578	**48095**	32	0	32	0.00
579	**48098**	123	0	123	0.00
580	**48106**	2	0	2	0.00
581	**48107**	1	0	1	0.00
582	**48114**	99	0	99	0.00
583	**48116**	106	0	106	0.00
584	**48121**	7	0	7	0.00
585	**48123**	2	0	2	0.00
586	**48138**	70	0	70	0.00
587	**48139**	2	0	2	0.00
588	**48140**	29	0	29	0.00
589	**48143**	1	0	1	0.00

	B	C	D	E	F
590	**48144**	66	0	66	0.00
591	**48153**	2	0	2	0.00
592	**48157**	15	0	15	0.00
593	**48158**	39	0	39	0.00
594	**48159**	23	0	23	0.00
595	**48160**	84	0	84	0.00
596	**48164**	80	0	80	0.00
597	**48169**	102	0	102	0.00
598	**48173**	104	0	104	0.00
599	**48175**	2	0	2	0.00
600	**48177**	2	0	2	0.00
601	**48179**	37	0	37	0.00
602	**48189**	91	0	91	0.00
603	**48190**	2	0	2	0.00
604	**48191**	23	0	23	0.00
605	**48226**	43	0	43	0.00
606	**48231**	2	0	2	0.00
607	**48232**	2	0	2	0.00
608	**48243**	1	0	1	0.00
609	**48244**	3	0	3	0.00
610	**48264**	1	0	1	0.00
611	**48272**	1	0	1	0.00
612	**48277**	2	0	2	0.00
613	**48279**	1	0	1	0.00
614	**48280**	1	0	1	0.00
615	**48288**	1	0	1	0.00
616	**48308**	1	0	1	0.00
617	**48309**	147	0	147	0.00
618	**48311**	5	0	5	0.00
619	**48314**	224	0	224	0.00
620	**48315**	155	0	155	0.00
621	**48318**	1	0	1	0.00
622	**48320**	41	0	41	0.00
623	**48324**	124	0	124	0.00
624	**48325**	3	0	3	0.00
625	**48332**	1	0	1	0.00
626	**48333**	1	0	1	0.00
627	**48343**	1	0	1	0.00
628	**48346**	220	0	220	0.00
629	**48356**	51	0	51	0.00
630	**48357**	56	0	56	0.00
631	**48362**	119	0	119	0.00

	B	C	D	E	F
632	**48363**	40	0	40	0.00
633	**48370**	6	0	6	0.00
634	**48371**	175	0	175	0.00
635	**48376**	2	0	2	0.00
636	**48380**	33	0	33	0.00
637	**48381**	108	0	108	0.00
638	**48386**	151	0	151	0.00
639	**48387**	1	0	1	0.00
640	**48391**	1	0	1	0.00
641	**48410**	1	0	1	0.00
642	**48411**	6	0	6	0.00
643	**48412**	65	0	65	0.00
644	**48414**	29	0	29	0.00
645	**48415**	170	0	170	0.00
646	**48417**	47	0	47	0.00
647	**48418**	48	0	48	0.00
648	**48419**	31	0	31	0.00
649	**48421**	72	0	72	0.00
650	**48426**	9	0	9	0.00
651	**48427**	28	0	28	0.00
652	**48428**	22	0	22	0.00
653	**48432**	15	0	15	0.00
654	**48435**	29	0	29	0.00
655	**48437**	3	0	3	0.00
656	**48438**	57	0	57	0.00
657	**48449**	44	0	44	0.00
658	**48454**	23	0	23	0.00
659	**48456**	12	0	12	0.00
660	**48465**	3	0	3	0.00
661	**48466**	21	0	21	0.00
662	**48468**	7	0	7	0.00
663	**48469**	7	0	7	0.00
664	**48470**	5	0	5	0.00
665	**48472**	24	0	24	0.00
666	**48476**	10	0	10	0.00
667	**48501**	1	0	1	0.00
668	**48502**	10	0	10	0.00
669	**48529**	245	0	245	0.00
670	**48548**	1	0	1	0.00
671	**48605**	3	0	3	0.00
672	**48609**	119	0	119	0.00
673	**48610**	24	0	24	0.00

	B	C	D	E	F
674	**48612**	117	0	117	0.00
675	**48613**	13	0	13	0.00
676	**48614**	18	0	18	0.00
677	**48615**	38	0	38	0.00
678	**48617**	134	0	134	0.00
679	**48619**	2	0	2	0.00
680	**48624**	162	0	162	0.00
681	**48627**	2	0	2	0.00
682	**48628**	7	0	7	0.00
683	**48629**	79	0	79	0.00
684	**48633**	1	0	1	0.00
685	**48634**	32	0	32	0.00
686	**48635**	4	0	4	0.00
687	**48637**	41	0	41	0.00
688	**48641**	1	0	1	0.00
689	**48647**	16	0	16	0.00
690	**48649**	30	0	30	0.00
691	**48650**	70	0	70	0.00
692	**48651**	51	0	51	0.00
693	**48652**	12	0	12	0.00
694	**48653**	60	0	60	0.00
695	**48654**	8	0	8	0.00
696	**48656**	35	0	35	0.00
697	**48657**	40	0	40	0.00
698	**48659**	44	0	44	0.00
699	**48662**	12	0	12	0.00
700	**48703**	30	0	30	0.00
701	**48705**	1	0	1	0.00
702	**48714**	1	0	1	0.00
703	**48721**	3	0	3	0.00
704	**48722**	42	0	42	0.00
705	**48725**	24	0	24	0.00
706	**48730**	17	0	17	0.00
707	**48734**	43	0	43	0.00
708	**48735**	16	0	16	0.00
709	**48738**	3	0	3	0.00
710	**48739**	12	0	12	0.00
711	**48742**	9	0	9	0.00
712	**48745**	11	0	11	0.00
713	**48746**	114	0	114	0.00
714	**48747**	22	0	22	0.00
715	**48748**	8	0	8	0.00

	B	C	D	E	F
716	**48749**	18	0	18	0.00
717	**48754**	22	0	22	0.00
718	**48755**	28	0	28	0.00
719	**48756**	21	0	21	0.00
720	**48757**	59	0	59	0.00
721	**48758**	1	0	1	0.00
722	**48761**	4	0	4	0.00
723	**48763**	22	0	22	0.00
724	**48764**	2	0	2	0.00
725	**48765**	8	0	8	0.00
726	**48766**	16	0	16	0.00
727	**48767**	25	0	25	0.00
728	**48770**	7	0	7	0.00
729	**48804**	2	0	2	0.00
730	**48806**	22	0	22	0.00
731	**48807**	6	0	6	0.00
732	**48811**	52	0	52	0.00
733	**48812**	4	0	4	0.00
734	**48815**	28	0	28	0.00
735	**48816**	1	0	1	0.00
736	**48818**	25	0	25	0.00
737	**48821**	35	0	35	0.00
738	**48822**	12	0	12	0.00
739	**48829**	49	0	49	0.00
740	**48830**	1	0	1	0.00
741	**48831**	28	0	28	0.00
742	**48832**	9	0	9	0.00
743	**48833**	2	0	2	0.00
744	**48835**	9	0	9	0.00
745	**48841**	14	0	14	0.00
746	**48844**	3	0	3	0.00
747	**48845**	5	0	5	0.00
748	**48850**	42	0	42	0.00
749	**48851**	24	0	24	0.00
750	**48852**	1	0	1	0.00
751	**48853**	7	0	7	0.00
752	**48854**	230	0	230	0.00
753	**48855**	75	0	75	0.00
754	**48856**	13	0	13	0.00
755	**48857**	32	0	32	0.00
756	**48859**	1	0	1	0.00
757	**48861**	12	0	12	0.00

	B	C	D	E	F
758	**48862**	1	0	1	0.00
759	**48865**	33	0	33	0.00
760	**48870**	3	0	3	0.00
761	**48871**	11	0	11	0.00
762	**48874**	7	0	7	0.00
763	**48877**	31	0	31	0.00
764	**48878**	26	0	26	0.00
765	**48883**	78	0	78	0.00
766	**48884**	59	0	59	0.00
767	**48885**	8	0	8	0.00
768	**48886**	19	0	19	0.00
769	**48889**	12	0	12	0.00
770	**48890**	16	0	16	0.00
771	**48891**	30	0	30	0.00
772	**48892**	76	0	76	0.00
773	**48893**	51	0	51	0.00
774	**48895**	83	0	83	0.00
775	**48897**	9	0	9	0.00
776	**48901**	4	0	4	0.00
777	**48908**	1	0	1	0.00
778	**48916**	1	0	1	0.00
779	**48933**	27	0	27	0.00
780	**48937**	1	0	1	0.00
781	**49003**	6	0	6	0.00
782	**49005**	1	0	1	0.00
783	**49012**	26	0	26	0.00
784	**49016**	4	0	4	0.00
785	**49019**	4	0	4	0.00
786	**49021**	75	0	75	0.00
787	**49023**	9	0	9	0.00
788	**49027**	1	0	1	0.00
789	**49029**	17	0	17	0.00
790	**49033**	8	0	8	0.00
791	**49034**	17	0	17	0.00
792	**49041**	2	0	2	0.00
793	**49051**	19	0	19	0.00
794	**49052**	11	0	11	0.00
795	**49061**	12	0	12	0.00
796	**49063**	1	0	1	0.00
797	**49064**	39	0	39	0.00
798	**49066**	7	0	7	0.00
799	**49067**	34	0	34	0.00

	B	C	D	E	F
800	**49074**	1	0	1	0.00
801	**49075**	6	0	6	0.00
802	**49081**	2	0	2	0.00
803	**49092**	16	0	16	0.00
804	**49095**	14	0	14	0.00
805	**49097**	91	0	91	0.00
806	**49101**	20	0	20	0.00
807	**49104**	1	0	1	0.00
808	**49111**	58	0	58	0.00
809	**49115**	2	0	2	0.00
810	**49119**	1	0	1	0.00
811	**49125**	9	0	9	0.00
812	**49126**	28	0	28	0.00
813	**49129**	1	0	1	0.00
814	**49161**	1	0	1	0.00
815	**49204**	6	0	6	0.00
816	**49220**	33	0	33	0.00
817	**49239**	1	0	1	0.00
818	**49240**	78	0	78	0.00
819	**49252**	50	0	50	0.00
820	**49261**	4	0	4	0.00
821	**49262**	13	0	13	0.00
822	**49264**	20	0	20	0.00
823	**49267**	21	0	21	0.00
824	**49271**	39	0	39	0.00
825	**49272**	22	0	22	0.00
826	**49276**	5	0	5	0.00
827	**49279**	5	0	5	0.00
828	**49281**	1	0	1	0.00
829	**49282**	10	0	10	0.00
830	**49289**	2	0	2	0.00
831	**49301**	138	0	138	0.00
832	**49303**	9	0	9	0.00
833	**49306**	66	0	66	0.00
834	**49307**	151	0	151	0.00
835	**49309**	9	0	9	0.00
836	**49310**	19	0	19	0.00
837	**49312**	6	0	6	0.00
838	**49314**	1	0	1	0.00
839	**49317**	1	0	1	0.00
840	**49318**	32	0	32	0.00
841	**49320**	4	0	4	0.00

	B	C	D	E	F
842	**49322**	15	0	15	0.00
843	**49325**	10	0	10	0.00
844	**49326**	21	0	21	0.00
845	**49332**	19	0	19	0.00
846	**49337**	80	0	80	0.00
847	**49338**	20	0	20	0.00
848	**49339**	20	0	20	0.00
849	**49340**	29	0	29	0.00
850	**49342**	14	0	14	0.00
851	**49344**	37	0	37	0.00
852	**49346**	26	0	26	0.00
853	**49347**	8	0	8	0.00
854	**49348**	77	0	77	0.00
855	**49401**	82	0	82	0.00
856	**49402**	13	0	13	0.00
857	**49404**	71	0	71	0.00
858	**49406**	4	0	4	0.00
859	**49408**	130	0	130	0.00
860	**49415**	74	0	74	0.00
861	**49416**	2	0	2	0.00
862	**49449**	36	0	36	0.00
863	**49452**	25	0	25	0.00
864	**49453**	13	0	13	0.00
865	**49458**	2	0	2	0.00
866	**49459**	37	0	37	0.00
867	**49501**	4	0	4	0.00
868	**49510**	1	0	1	0.00
869	**49514**	2	0	2	0.00
870	**49518**	1	0	1	0.00
871	**49610**	1	0	1	0.00
872	**49612**	11	0	11	0.00
873	**49613**	12	0	12	0.00
874	**49614**	24	0	24	0.00
875	**49615**	34	0	34	0.00
876	**49616**	34	0	34	0.00
877	**49618**	3	0	3	0.00
878	**49622**	27	0	27	0.00
879	**49626**	5	0	5	0.00
880	**49627**	1	0	1	0.00
881	**49628**	5	0	5	0.00
882	**49629**	14	0	14	0.00
883	**49630**	7	0	7	0.00

	B	C	D	E	F
884	**49632**	12	0	12	0.00
885	**49633**	35	0	35	0.00
886	**49635**	41	0	41	0.00
887	**49636**	5	0	5	0.00
888	**49637**	75	0	75	0.00
889	**49638**	8	0	8	0.00
890	**49640**	21	0	21	0.00
891	**49642**	8	0	8	0.00
892	**49643**	116	0	116	0.00
893	**49644**	11	0	11	0.00
894	**49646**	101	0	101	0.00
895	**49648**	19	0	19	0.00
896	**49649**	115	0	115	0.00
897	**49654**	1	0	1	0.00
898	**49655**	27	0	27	0.00
899	**49656**	15	0	15	0.00
900	**49657**	32	0	32	0.00
901	**49663**	57	0	57	0.00
902	**49665**	44	0	44	0.00
903	**49666**	2	0	2	0.00
904	**49667**	1	0	1	0.00
905	**49670**	17	0	17	0.00
906	**49674**	4	0	4	0.00
907	**49675**	8	0	8	0.00
908	**49679**	12	0	12	0.00
909	**49680**	34	0	34	0.00
910	**49682**	63	0	63	0.00
911	**49683**	29	0	29	0.00
912	**49685**	28	0	28	0.00
913	**49689**	16	0	16	0.00
914	**49696**	18	0	18	0.00
915	**49705**	11	0	11	0.00
916	**49706**	79	0	79	0.00
917	**49709**	23	0	23	0.00
918	**49710**	3	0	3	0.00
919	**49713**	26	0	26	0.00
920	**49716**	2	0	2	0.00
921	**49718**	5	0	5	0.00
922	**49719**	9	0	9	0.00
923	**49720**	92	0	92	0.00
924	**49722**	3	0	3	0.00
925	**49724**	10	0	10	0.00

	B	C	D	E	F
926	**49725**	1	0	1	0.00
927	**49726**	3	0	3	0.00
928	**49727**	90	0	90	0.00
929	**49728**	2	0	2	0.00
930	**49729**	6	0	6	0.00
931	**49730**	22	0	22	0.00
932	**49733**	19	0	19	0.00
933	**49734**	8	0	8	0.00
934	**49735**	250	0	250	0.00
935	**49736**	2	0	2	0.00
936	**49740**	53	0	53	0.00
937	**49743**	5	0	5	0.00
938	**49744**	4	0	4	0.00
939	**49745**	16	0	16	0.00
940	**49746**	35	0	35	0.00
941	**49747**	12	0	12	0.00
942	**49748**	2	0	2	0.00
943	**49751**	17	0	17	0.00
944	**49752**	4	0	4	0.00
945	**49753**	18	0	18	0.00
946	**49755**	14	0	14	0.00
947	**49757**	3	0	3	0.00
948	**49759**	12	0	12	0.00
949	**49760**	8	0	8	0.00
950	**49762**	1	0	1	0.00
951	**49764**	8	0	8	0.00
952	**49766**	12	0	12	0.00
953	**49768**	1	0	1	0.00
954	**49769**	25	0	25	0.00
955	**49770**	175	0	175	0.00
956	**49774**	15	0	15	0.00
957	**49777**	5	0	5	0.00
958	**49779**	44	0	44	0.00
959	**49782**	5	0	5	0.00
960	**49788**	73	0	73	0.00
961	**49791**	5	0	5	0.00
962	**49796**	2	0	2	0.00
963	**49801**	139	0	139	0.00
964	**49802**	74	0	74	0.00
965	**49805**	4	0	4	0.00
966	**49806**	2	0	2	0.00
967	**49807**	21	0	21	0.00

	B	C	D	E	F
968	**49808**	3	0	3	0.00
969	**49812**	9	0	9	0.00
970	**49815**	7	0	7	0.00
971	**49816**	5	0	5	0.00
972	**49817**	5	0	5	0.00
973	**49818**	6	0	6	0.00
974	**49820**	4	0	4	0.00
975	**49827**	9	0	9	0.00
976	**49831**	15	0	15	0.00
977	**49833**	3	0	3	0.00
978	**49834**	4	0	4	0.00
979	**49835**	5	0	5	0.00
980	**49836**	9	0	9	0.00
981	**49838**	6	0	6	0.00
982	**49839**	4	0	4	0.00
983	**49840**	9	0	9	0.00
984	**49845**	1	0	1	0.00
985	**49852**	3	0	3	0.00
986	**49853**	10	0	10	0.00
987	**49861**	4	0	4	0.00
988	**49862**	54	0	54	0.00
989	**49863**	3	0	3	0.00
990	**49864**	1	0	1	0.00
991	**49868**	78	0	78	0.00
992	**49870**	49	0	49	0.00
993	**49871**	2	0	2	0.00
994	**49872**	3	0	3	0.00
995	**49873**	2	0	2	0.00
996	**49874**	10	0	10	0.00
997	**49880**	4	0	4	0.00
998	**49881**	3	0	3	0.00
999	**49883**	1	0	1	0.00
1000	**49884**	9	0	9	0.00
1001	**49886**	4	0	4	0.00
1002	**49887**	18	0	18	0.00
1003	**49891**	8	0	8	0.00
1004	**49892**	13	0	13	0.00
1005	**49893**	18	0	18	0.00
1006	**49902**	3	0	3	0.00
1007	**49903**	3	0	3	0.00
1008	**49905**	50	0	50	0.00
1009	**49911**	28	0	28	0.00

	B	C	D	E	F
1010	**49912**	11	0	11	0.00
1011	**49915**	12	0	12	0.00
1012	**49916**	39	0	39	0.00
1013	**49917**	2	0	2	0.00
1014	**49918**	1	0	1	0.00
1015	**49919**	1	0	1	0.00
1016	**49920**	50	0	50	0.00
1017	**49921**	7	0	7	0.00
1018	**49925**	2	0	2	0.00
1019	**49927**	2	0	2	0.00
1020	**49931**	109	0	109	0.00
1021	**49934**	14	0	14	0.00
1022	**49942**	1	0	1	0.00
1023	**49946**	71	0	71	0.00
1024	**49947**	3	0	3	0.00
1025	**49952**	3	0	3	0.00
1026	**49953**	19	0	19	0.00
1027	**49955**	9	0	9	0.00
1028	**49958**	14	0	14	0.00
1029	**49959**	4	0	4	0.00
1030	**49960**	3	0	3	0.00
1031	**49961**	1	0	1	0.00
1032	**49964**	2	0	2	0.00
1033	**49965**	4	0	4	0.00
1034	**49967**	1	0	1	0.00
1035	**49968**	10	0	10	0.00
1036	**49969**	23	0	23	0.00
1037	**49970**	3	0	3	0.00

	A	B	C	D	E	F
2		**Table of Patient_Zip_Code by PB2**				
3		**Patient_Zip_Code**	**PB2**			
4			**1) <5**	**2) >=5**	**Total**	**Incidence**
5	Detroit	**48206**	500	129	629	20.51
6	Dteroit/Hamtramck	**48211**	199	42	241	17.43
7	Detroit	**48214**	484	99	583	16.98
8	Detroit	**48204**	651	126	777	16.22
9	Nashville	**49073**	42	8	50	16.00
10	Detroit	**48202**	316	59	375	15.73
11	Hudson/Rollin	**49247**	72	13	85	15.29
12	Morenci/Seneca	**49256**	48	7	55	12.73
13	Detroit	**48213**	676	97	773	12.55
14	Detroit	**48238**	848	121	969	12.49
15	Adrian/Cadmus	**49221**	556	76	632	12.03
16	Highland Park/Detroit	**48203**	627	81	708	11.44
17	Grand Rapids	**49507**	1156	145	1301	11.15
18	Detroit/Grosse Pte/Grosse Pte park	**48215**	361	41	402	10.20
19	Detroit	**48205**	1328	148	1476	10.03
20	Detroit	**48216**	118	13	131	9.92
21	Muskegon	**49442**	734	74	808	9.16
22	Grand Rapids	**49504**	735	72	807	8.92
23	Detroit	**48208**	266	26	292	8.90
24	Jackson	**49203**	783	75	858	8.74
25	Detroit	**48210**	1373	129	1502	8.59
26	Albion	**49224**	139	13	152	8.55
27	Grand Rapids/East Grand Rapids	**49506**	396	37	433	8.55
28	East Lansing	**48224**	1399	128	1527	8.38
29	Detroit	**48212**	1414	127	1541	8.24
30	Menominee	**49858**	127	11	138	7.97
31	Kalamazoo	**49007**	223	19	242	7.85
32	Detroit	**48209**	1331	112	1443	7.76
33	Scottville	**49454**	73	6	79	7.59
34	Grand Rapids/Wyoming	**49503**	762	62	824	7.52
35	Detroit	**48207**	509	38	547	6.95
36	Detroit	**48227**	1305	97	1402	6.92
37	Ludington	**49431**	236	17	253	6.72
38	Farmington/Farmington Hills	**48335**	432	31	463	6.70
39	Paw Paw	**49079**	100	7	107	6.54
40		**48602**	723	50	773	6.47
41		**49441**	450	31	481	6.44
42		**49913**	133	9	142	6.34
43		**48444**	136	9	145	6.21

	A	B	C	D	E	F
44		**48234**	1000	65	1065	6.10
45		**49444**	512	33	545	6.06
46		**48708**	436	28	464	6.03
47		**48221**	865	55	920	5.98
48		**48503**	460	29	489	5.93
49		**49017**	333	20	353	5.67
50		**49001**	483	29	512	5.66
51		**49058**	154	9	163	5.52
52		**48193**	225	13	238	5.46
53		**49660**	156	9	165	5.45
54		**49202**	500	28	528	5.30
55		**48915**	292	16	308	5.19
56		**49849**	111	6	117	5.13
57		**49093**	320	17	337	5.04
58		**49423**	684	36	720	5.00
59		**48505**	567	29	596	4.87
60		**49505**	551	28	579	4.84
61		**49014**	399	20	419	4.77
62		**48846**	301	15	316	4.75
63		**49829**	224	11	235	4.68
64		**49201**	655	32	687	4.66
65		**48504**	631	30	661	4.54
66		**49068**	148	7	155	4.52
67		**49010**	242	11	253	4.35
68		**48912**	288	13	301	4.32
69		**48906**	646	29	675	4.30
70		**48060**	1228	55	1283	4.29
71		**48084**	134	6	140	4.29
72		**48228**	1942	86	2028	4.24
73		**48601**	1131	48	1179	4.07
74		**49036**	356	15	371	4.04
75		**49707**	193	8	201	3.98
76		**49090**	145	6	151	3.97
77		**49022**	729	30	759	3.95
78		**48867**	585	24	609	3.94
79		**48223**	708	28	736	3.80
80		**48043**	153	6	159	3.77
81		**48201**	363	14	377	3.71
82		**48809**	156	6	162	3.70
83		**49037**	579	22	601	3.66
84		**48030**	270	10	280	3.57
85		**49508**	800	29	829	3.50

	A	B	C	D	E	F
86		**48341**	304	11	315	3.49
87		**48219**	1420	51	1471	3.47
88		**48446**	345	12	357	3.36
89		**48235**	1193	41	1234	3.32
90		**48218**	262	9	271	3.32
91		**48917**	394	13	407	3.19
92		**48506**	518	17	535	3.18
93		**49242**	279	9	288	3.13
94		**48706**	519	16	535	2.99
95		**48229**	266	8	274	2.92
96		**48638**	200	6	206	2.91
97		**48430**	303	9	312	2.88
98		**49424**	681	20	701	2.85
99		**48813**	210	6	216	2.78
100		**49417**	426	12	438	2.74
101		**48091**	607	17	624	2.72
102		**49519**	466	13	479	2.71
103		**48236**	251	7	258	2.71
104		**49091**	360	10	370	2.70
105		**48108**	217	6	223	2.69
106		**48021**	519	14	533	2.63
107		**48823**	337	9	346	2.60
108		**48911**	1222	32	1254	2.55
109		**49548**	729	19	748	2.54
110		**48326**	250	6	256	2.34
111		**49015**	501	12	513	2.34
112		**48220**	251	6	257	2.33
113		**48185**	760	18	778	2.31
114		**48150**	256	6	262	2.29
115		**48126**	1451	34	1485	2.29
116		**48507**	736	17	753	2.26
117		**48089**	660	15	675	2.22
118		**48532**	377	8	385	2.08
119		**48910**	806	17	823	2.07
120		**48092**	340	7	347	2.02
121		**49546**	411	8	419	1.91
122		**49048**	517	10	527	1.90
123		**48187**	430	8	438	1.83
124		**48073**	325	6	331	1.81
125		**49509**	711	13	724	1.80
126		**48423**	385	7	392	1.79
127		**48197**	665	12	677	1.77

	A	B	C	D	E	F
128		**48183**	503	9	512	1.76
129		**48342**	517	9	526	1.71
130		**48858**	404	7	411	1.70
131		**48310**	648	11	659	1.67
132		**48180**	1400	23	1423	1.62
133		**48188**	430	7	437	1.60
134		**49684**	584	9	593	1.52
135		**48141**	715	11	726	1.52
136		**48186**	542	8	550	1.45
137		**49120**	481	7	488	1.43
138		**48146**	901	13	914	1.42
139		**48071**	421	6	427	1.41
140		**48075**	434	6	440	1.36
141		**48195**	441	6	447	1.34
142		**48066**	628	8	636	1.26
143		**48239**	648	8	656	1.22
144		**48439**	505	6	511	1.17
145		**48127**	744	8	752	1.06
146	Not sorted --number <6					
147		**48034**	254	5	259	1.93
148		**48083**	252	5	257	1.95
149		**48111**	573	5	578	0.87
150		**48217**	165	5	170	2.94
151		**48225**	260	5	265	1.89
152		**48237**	581	5	586	0.85
153		**48304**	95	5	100	5.00
154		**48329**	218	5	223	2.24
155		**48340**	763	5	768	0.65
156		**48393**	294	5	299	1.67
157		**48429**	110	5	115	4.35
158		**48827**	137	5	142	3.52
159		**48838**	220	5	225	2.22
160		**48888**	87	5	92	5.43
161		**49006**	273	5	278	1.80
162		**49099**	74	5	79	6.33
163		**49103**	139	5	144	3.47
164		**49331**	160	5	165	3.03
165		**49525**	265	5	270	1.85
166		**49631**	87	5	92	5.43
167		**48025**	120	4	124	3.23
168		**48033**	275	4	279	1.43
169		**48035**	409	4	413	0.97

	A	B	C	D	E	F
170		**48038**	379	4	383	1.04
171		**48076**	382	4	386	1.04
172		**48118**	65	4	69	5.80
173		**48120**	313	4	317	1.26
174		**48162**	323	4	327	1.22
175		**48174**	587	4	591	0.68
176		**48178**	308	4	312	1.28
177		**48240**	374	4	378	1.06
178		**48307**	336	4	340	1.18
179		**48313**	368	4	372	1.08
180		**48334**	184	4	188	2.13
181		**48336**	363	4	367	1.09
182		**48420**	295	4	299	1.34
183		**48442**	198	4	202	1.98
184		**48457**	136	4	140	2.86
185		**48458**	336	4	340	1.18
186		**48473**	291	4	295	1.36
187		**48723**	231	4	235	1.70
188		**48750**	73	4	77	5.19
189		**48836**	107	4	111	3.60
190		**48842**	245	4	249	1.61
191		**48872**	94	4	98	4.08
192		**49008**	169	4	173	2.31
193		**49009**	382	4	386	1.04
194		**49031**	46	4	50	8.00
195		**49047**	178	4	182	2.20
196		**49071**	76	4	80	5.00
197		**49107**	111	4	115	3.48
198		**49285**	77	4	81	4.94
199		**49286**	116	4	120	3.33
200		**49316**	156	4	160	2.50
201		**49319**	218	4	222	1.80
202		**49420**	178	4	182	2.20
203		**49445**	201	4	205	1.95
204		**49456**	245	4	249	1.61
205		**49457**	121	4	125	3.20
206		**49464**	259	4	263	1.52
207		**49512**	274	4	278	1.44
208		**49677**	105	4	109	3.67
209		**49721**	161	4	165	2.42
210		**48036**	261	3	264	1.14
211		**48059**	177	3	180	1.67

	A	B	C	D	E	F
212		**48067**	217	3	220	1.36
213		**48072**	168	3	171	1.75
214		**48080**	189	3	192	1.56
215		**48082**	114	3	117	2.56
216		**48101**	328	3	331	0.91
217		**48122**	295	3	298	1.01
218		**48124**	345	3	348	0.86
219		**48125**	378	3	381	0.79
220		**48133**	53	3	56	5.36
221		**48135**	307	3	310	0.97
222		**48166**	149	3	152	1.97
223		**48192**	350	3	353	0.85
224		**48230**	144	3	147	2.04
225		**48317**	336	3	339	0.88
226		**48382**	191	3	194	1.55
227		**48390**	260	3	263	1.14
228		**48413**	112	3	115	2.61
229		**48433**	292	3	295	1.02
230		**48461**	90	3	93	3.23
231		**48519**	118	3	121	2.48
232		**48603**	367	3	370	0.81
233		**48607**	26	3	29	10.34
234		**48616**	107	3	110	2.73
235		**48640**	163	3	166	1.81
236		**48837**	111	3	114	2.63
237		**48840**	101	3	104	2.88
238		**48860**	21	3	24	12.50
239		**48864**	136	3	139	2.16
240		**49024**	307	3	310	0.97
241		**49032**	32	3	35	8.57
242		**49042**	82	3	85	3.53
243		**49057**	119	3	122	2.46
244		**49078**	90	3	93	3.23
245		**49082**	86	3	89	3.37
246		**49128**	26	3	29	10.34
247		**49229**	31	3	34	8.82
248		**49234**	30	3	33	9.09
249		**49235**	26	3	29	10.34
250		**49241**	36	3	39	7.69
251		**49250**	102	3	105	2.86
252		**49251**	104	3	107	2.80
253		**49265**	35	3	38	7.89

	A	B	C	D	E	F
254		**49284**	41	3	44	6.82
255		**49329**	92	3	95	3.16
256		**49330**	108	3	111	2.70
257		**49403**	76	3	79	3.80
258		**49437**	71	3	74	4.05
259		**49837**	100	3	103	2.91
260		**49935**	63	3	66	4.55
261		**48001**	140	2	142	1.41
262		**48005**	37	2	39	5.13
263		**48026**	170	2	172	1.16
264		**48027**	48	2	50	4.00
265		**48041**	40	2	42	4.76
266		**48044**	428	2	430	0.47
267		**48045**	197	2	199	1.01
268		**48049**	61	2	63	3.17
269		**48062**	84	2	86	2.33
270		**48063**	42	2	44	4.55
271		**48079**	116	2	118	1.69
272		**48093**	271	2	273	0.73
273		**48103**	314	2	316	0.63
274		**48104**	110	2	112	1.79
275		**48152**	346	2	348	0.57
276		**48154**	312	2	314	0.64
277		**48161**	368	2	370	0.54
278		**48168**	147	2	149	1.34
279		**48170**	197	2	199	1.01
280		**48176**	94	2	96	2.08
281		**48182**	173	2	175	1.14
282		**48184**	267	2	269	0.74
283		**48198**	636	2	638	0.31
284		**48312**	360	2	362	0.55
285		**48322**	302	2	304	0.66
286		**48331**	200	2	202	0.99
287		**48348**	224	2	226	0.88
288		**48359**	94	2	96	2.08
289		**48436**	42	2	44	4.55
290		**48453**	72	2	74	2.70
291		**48455**	38	2	40	5.00
292		**48467**	13	2	15	13.33
293		**48509**	109	2	111	1.80
294		**48604**	146	2	148	1.35
295		**48623**	136	2	138	1.45

	A	B	C	D	E	F
296		**48625**	208	2	210	0.95
297		**48631**	41	2	43	4.65
298		**48759**	45	2	47	4.26
299		**48801**	175	2	177	1.13
300		**48834**	18	2	20	10.00
301		**48847**	71	2	73	2.74
302		**48848**	58	2	60	3.33
303		**48875**	106	2	108	1.85
304		**48876**	41	2	43	4.65
305		**48879**	164	2	166	1.20
306		**48909**	70	2	72	2.78
307		**49002**	201	2	203	0.99
308		**49004**	196	2	198	1.01
309		**49011**	29	2	31	6.45
310		**49013**	76	2	78	2.56
311		**49028**	97	2	99	2.02
312		**49038**	67	2	69	2.90
313		**49043**	28	2	30	6.67
314		**49046**	61	2	63	3.17
315		**49055**	56	2	58	3.45
316		**49065**	51	2	53	3.77
317		**49070**	22	2	24	8.33
318		**49080**	148	2	150	1.33
319		**49083**	56	2	58	3.45
320		**49127**	51	2	53	3.77
321		**49228**	39	2	41	4.88
322		**49232**	57	2	59	3.39
323		**49233**	28	2	30	6.67
324		**49237**	51	2	53	3.77
325		**49268**	4	2	6	33.33
326		**49269**	70	2	72	2.78
327		**49270**	52	2	54	3.70
328		**49277**	43	2	45	4.44
329		**49287**	10	2	12	16.67
330		**49315**	165	2	167	1.20
331		**49321**	295	2	297	0.67
332		**49323**	42	2	44	4.55
333		**49341**	270	2	272	0.74
334		**49410**	20	2	22	9.09
335		**49418**	236	2	238	0.84
336		**49425**	45	2	47	4.26
337		**49426**	207	2	209	0.96

	A	B	C	D	E	F
338		**49440**	26	2	28	7.14
339		**49451**	54	2	56	3.57
340		**49455**	118	2	120	1.67
341		**49544**	125	2	127	1.57
342		**49601**	214	2	216	0.93
343		**49619**	7	2	9	22.22
344		**49664**	17	2	19	10.53
345		**49686**	416	2	418	0.48
346		**49756**	29	2	31	6.45
347		**49783**	253	2	255	0.78
348		**49841**	93	2	95	2.11
349		**49847**	14	2	16	12.50
350		**49855**	176	2	178	1.12
351		**49866**	47	2	49	4.08
352		**49938**	84	2	86	2.33
353		**49945**	44	2	46	4.35
354		**48002**	18	1	19	5.26
355		**48014**	66	1	67	1.49
356		**48037**	7	1	8	12.50
357		**48039**	101	1	102	0.98
358		**48047**	367	1	368	0.27
359		**48054**	57	1	58	1.72
360		**48061**	2	1	3	33.33
361		**48065**	74	1	75	1.33
362		**48081**	184	1	185	0.54
363		**48096**	15	1	16	6.25
364		**48097**	91	1	92	1.09
365		**48105**	170	1	171	0.58
366		**48112**	3	1	4	25.00
367		**48117**	72	1	73	1.37
368		**48128**	157	1	158	0.63
369		**48130**	76	1	77	1.30
370		**48131**	81	1	82	1.22
371		**48134**	303	1	304	0.33
372		**48137**	17	1	18	5.56
373		**48145**	34	1	35	2.86
374		**48165**	87	1	88	1.14
375		**48167**	180	1	181	0.55
376		**48301**	96	1	97	1.03
377		**48302**	92	1	93	1.08
378		**48306**	130	1	131	0.76
379		**48316**	211	1	212	0.47

	A	B	C	D	E	F
380		**48323**	136	1	137	0.73
381		**48327**	240	1	241	0.41
382		**48328**	312	1	313	0.32
383		**48350**	71	1	72	1.39
384		**48353**	25	1	26	3.85
385		**48360**	90	1	91	1.10
386		**48367**	28	1	29	3.45
387		**48374**	211	1	212	0.47
388		**48375**	289	1	290	0.34
389		**48377**	294	1	295	0.34
390		**48383**	129	1	130	0.77
391		**48401**	12	1	13	7.69
392		**48416**	58	1	59	1.69
393		**48422**	92	1	93	1.08
394		**48441**	41	1	42	2.38
395		**48445**	12	1	13	7.69
396		**48450**	42	1	43	2.33
397		**48451**	121	1	122	0.82
398		**48460**	36	1	37	2.70
399		**48462**	98	1	99	1.01
400		**48463**	34	1	35	2.86
401		**48464**	20	1	21	4.76
402		**48471**	81	1	82	1.22
403		**48475**	18	1	19	5.26
404		**48611**	48	1	49	2.04
405		**48618**	42	1	43	2.33
406		**48621**	9	1	10	10.00
407		**48622**	80	1	81	1.23
408		**48626**	56	1	57	1.75
409		**48632**	55	1	56	1.79
410		**48636**	0	1	1	100.00
411		**48642**	185	1	186	0.54
412		**48655**	94	1	95	1.05
413		**48658**	58	1	59	1.69
414		**48661**	58	1	59	1.69
415		**48701**	30	1	31	3.23
416		**48707**	2	1	3	33.33
417		**48720**	10	1	11	9.09
418		**48724**	9	1	10	10.00
419		**48726**	90	1	91	1.10
420		**48727**	14	1	15	6.67
421		**48729**	16	1	17	5.88

	A	B	C	D	E	F
422		**48731**	23	1	24	4.17
423		**48732**	137	1	138	0.72
424		**48733**	25	1	26	3.85
425		**48737**	3	1	4	25.00
426		**48740**	12	1	13	7.69
427		**48741**	33	1	34	2.94
428		**48744**	62	1	63	1.59
429		**48760**	17	1	18	5.56
430		**48762**	3	1	4	25.00
431		**48768**	150	1	151	0.66
432		**48808**	44	1	45	2.22
433		**48817**	111	1	112	0.89
434		**48819**	23	1	24	4.17
435		**48820**	94	1	95	1.05
436		**48843**	263	1	264	0.38
437		**48849**	60	1	61	1.64
438		**48866**	69	1	70	1.43
439		**48873**	10	1	11	9.09
440		**48880**	100	1	101	0.99
441		**48881**	51	1	52	1.92
442		**48894**	16	1	17	5.88
443		**48896**	3	1	4	25.00
444		**49026**	22	1	23	4.35
445		**49030**	24	1	25	4.00
446		**49040**	27	1	28	3.57
447		**49045**	68	1	69	1.45
448		**49050**	22	1	23	4.35
449		**49053**	90	1	91	1.10
450		**49056**	78	1	79	1.27
451		**49060**	13	1	14	7.14
452		**49072**	34	1	35	2.86
453		**49076**	21	1	22	4.55
454		**49085**	81	1	82	1.22
455		**49087**	44	1	45	2.22
456		**49088**	30	1	31	3.23
457		**49089**	24	1	25	4.00
458		**49094**	56	1	57	1.75
459		**49096**	31	1	32	3.13
460		**49098**	58	1	59	1.69
461		**49102**	6	1	7	14.29
462		**49106**	26	1	27	3.70
463		**49112**	50	1	51	1.96

	A	B	C	D	E	F
464		**49113**	16	1	17	5.88
465		**49117**	22	1	23	4.35
466		**49130**	11	1	12	8.33
467		**49227**	26	1	27	3.70
468		**49230**	95	1	96	1.04
469		**49236**	27	1	28	3.57
470		**49238**	24	1	25	4.00
471		**49244**	0	1	1	100.00
472		**49245**	56	1	57	1.75
473		**49246**	39	1	40	2.50
474		**49248**	7	1	8	12.50
475		**49249**	40	1	41	2.44
476		**49253**	23	1	24	4.17
477		**49254**	44	1	45	2.22
478		**49255**	23	1	24	4.17
479		**49259**	35	1	36	2.78
480		**49266**	63	1	64	1.56
481		**49274**	63	1	64	1.56
482		**49283**	50	1	51	1.96
483		**49288**	37	1	38	2.63
484		**49302**	43	1	44	2.27
485		**49304**	49	1	50	2.00
486		**49305**	22	1	23	4.35
487		**49327**	92	1	93	1.08
488		**49328**	20	1	21	4.76
489		**49333**	95	1	96	1.04
490		**49336**	27	1	28	3.57
491		**49343**	63	1	64	1.56
492		**49345**	198	1	199	0.50
493		**49349**	64	1	65	1.54
494		**49405**	15	1	16	6.25
495		**49411**	18	1	19	5.26
496		**49412**	114	1	115	0.87
497		**49419**	69	1	70	1.43
498		**49421**	60	1	61	1.64
499		**49422**	2	1	3	33.33
500		**49428**	133	1	134	0.75
501		**49435**	25	1	26	3.85
502		**49436**	19	1	20	5.00
503		**49443**	0	1	1	100.00
504		**49446**	39	1	40	2.50
505		**49448**	49	1	50	2.00

	A	B	C	D	E	F
506		**49450**	77	1	78	1.28
507		**49460**	86	1	87	1.15
508		**49461**	82	1	83	1.20
509		**49534**	172	1	173	0.58
510		**49611**	8	1	9	11.11
511		**49617**	37	1	38	2.63
512		**49620**	52	1	53	1.89
513		**49621**	24	1	25	4.00
514		**49623**	14	1	15	6.67
515		**49625**	20	1	21	4.76
516		**49639**	41	1	42	2.38
517		**49645**	26	1	27	3.70
518		**49650**	64	1	65	1.54
519		**49651**	72	1	73	1.37
520		**49653**	25	1	26	3.85
521		**49659**	121	1	122	0.82
522		**49668**	45	1	46	2.17
523		**49676**	47	1	48	2.08
524		**49688**	28	1	29	3.45
525		**49690**	77	1	78	1.28
526		**49701**	13	1	14	7.14
527		**49712**	91	1	92	1.09
528		**49715**	43	1	44	2.27
529		**49738**	61	1	62	1.61
530		**49749**	35	1	36	2.78
531		**49765**	47	1	48	2.08
532		**49776**	17	1	18	5.56
533		**49780**	17	1	18	5.56
534		**49781**	67	1	68	1.47
535		**49795**	31	1	32	3.13
536		**49799**	23	1	24	4.17
537		**49814**	8	1	9	11.11
538		**49821**	9	1	10	10.00
539		**49848**	0	1	1	100.00
540		**49854**	77	1	78	1.28
541		**49876**	11	1	12	8.33
542		**49878**	27	1	28	3.57
543		**49885**	6	1	7	14.29
544		**49894**	6	1	7	14.29
545		**49895**	8	1	9	11.11
546		**49896**	27	1	28	3.57
547		**49901**	5	1	6	16.67

	A	B	C	D	E	F
548		**49908**	56	1	57	1.75
549		**49922**	11	1	12	8.33
550		**49930**	127	1	128	0.78
551		**49948**	4	1	5	20.00
552		**49950**	13	1	14	7.14
553		**49963**	18	1	19	5.26
554		**49971**	6	1	7	14.29
555		**40291**	2	0	2	0.00
556		**48003**	42	0	42	0.00
557		**48006**	45	0	45	0.00
558		**48009**	252	0	252	0.00
559		**48015**	112	0	112	0.00
560		**48017**	123	0	123	0.00
561		**48022**	23	0	23	0.00
562		**48023**	53	0	53	0.00
563		**48028**	3	0	3	0.00
564		**48032**	26	0	26	0.00
565		**48040**	101	0	101	0.00
566		**48042**	219	0	219	0.00
567		**48046**	2	0	2	0.00
568		**48048**	83	0	83	0.00
569		**48050**	12	0	12	0.00
570		**48051**	165	0	165	0.00
571		**48064**	38	0	38	0.00
572		**48069**	24	0	24	0.00
573		**48070**	60	0	60	0.00
574		**48074**	177	0	177	0.00
575		**48085**	189	0	189	0.00
576		**48088**	216	0	216	0.00
577		**48090**	2	0	2	0.00
578		**48094**	131	0	131	0.00
579		**48095**	32	0	32	0.00
580		**48098**	123	0	123	0.00
581		**48106**	2	0	2	0.00
582		**48107**	1	0	1	0.00
583		**48114**	99	0	99	0.00
584		**48116**	106	0	106	0.00
585		**48121**	7	0	7	0.00
586		**48123**	2	0	2	0.00
587		**48138**	70	0	70	0.00
588		**48139**	2	0	2	0.00
589		**48140**	29	0	29	0.00

	A	B	C	D	E	F
590		**48143**	1	0	1	0.00
591		**48144**	66	0	66	0.00
592		**48153**	2	0	2	0.00
593		**48157**	15	0	15	0.00
594		**48158**	39	0	39	0.00
595		**48159**	23	0	23	0.00
596		**48160**	84	0	84	0.00
597		**48164**	80	0	80	0.00
598		**48169**	102	0	102	0.00
599		**48173**	104	0	104	0.00
600		**48175**	2	0	2	0.00
601		**48177**	2	0	2	0.00
602		**48179**	37	0	37	0.00
603		**48189**	91	0	91	0.00
604		**48190**	2	0	2	0.00
605		**48191**	23	0	23	0.00
606		**48226**	43	0	43	0.00
607		**48231**	2	0	2	0.00
608		**48232**	2	0	2	0.00
609		**48243**	1	0	1	0.00
610		**48244**	3	0	3	0.00
611		**48264**	1	0	1	0.00
612		**48272**	1	0	1	0.00
613		**48277**	2	0	2	0.00
614		**48279**	1	0	1	0.00
615		**48280**	1	0	1	0.00
616		**48288**	1	0	1	0.00
617		**48308**	1	0	1	0.00
618		**48309**	147	0	147	0.00
619		**48311**	5	0	5	0.00
620		**48314**	224	0	224	0.00
621		**48315**	155	0	155	0.00
622		**48318**	1	0	1	0.00
623		**48320**	41	0	41	0.00
624		**48324**	124	0	124	0.00
625		**48325**	3	0	3	0.00
626		**48332**	1	0	1	0.00
627		**48333**	1	0	1	0.00
628		**48343**	1	0	1	0.00
629		**48346**	220	0	220	0.00
630		**48356**	51	0	51	0.00
631		**48357**	56	0	56	0.00

	A	B	C	D	E	F
632		**48362**	119	0	119	0.00
633		**48363**	40	0	40	0.00
634		**48370**	6	0	6	0.00
635		**48371**	175	0	175	0.00
636		**48376**	2	0	2	0.00
637		**48380**	33	0	33	0.00
638		**48381**	108	0	108	0.00
639		**48386**	151	0	151	0.00
640		**48387**	1	0	1	0.00
641		**48391**	1	0	1	0.00
642		**48410**	1	0	1	0.00
643		**48411**	6	0	6	0.00
644		**48412**	65	0	65	0.00
645		**48414**	29	0	29	0.00
646		**48415**	170	0	170	0.00
647		**48417**	47	0	47	0.00
648		**48418**	48	0	48	0.00
649		**48419**	31	0	31	0.00
650		**48421**	72	0	72	0.00
651		**48426**	9	0	9	0.00
652		**48427**	28	0	28	0.00
653		**48428**	22	0	22	0.00
654		**48432**	15	0	15	0.00
655		**48435**	29	0	29	0.00
656		**48437**	3	0	3	0.00
657		**48438**	57	0	57	0.00
658		**48449**	44	0	44	0.00
659		**48454**	23	0	23	0.00
660		**48456**	12	0	12	0.00
661		**48465**	3	0	3	0.00
662		**48466**	21	0	21	0.00
663		**48468**	7	0	7	0.00
664		**48469**	7	0	7	0.00
665		**48470**	5	0	5	0.00
666		**48472**	24	0	24	0.00
667		**48476**	10	0	10	0.00
668		**48501**	1	0	1	0.00
669		**48502**	10	0	10	0.00
670		**48529**	245	0	245	0.00
671		**48548**	1	0	1	0.00
672		**48605**	3	0	3	0.00
673		**48609**	119	0	119	0.00

	A	B	C	D	E	F
674		**48610**	24	0	24	0.00
675		**48612**	117	0	117	0.00
676		**48613**	13	0	13	0.00
677		**48614**	18	0	18	0.00
678		**48615**	38	0	38	0.00
679		**48617**	134	0	134	0.00
680		**48619**	2	0	2	0.00
681		**48624**	162	0	162	0.00
682		**48627**	2	0	2	0.00
683		**48628**	7	0	7	0.00
684		**48629**	79	0	79	0.00
685		**48633**	1	0	1	0.00
686		**48634**	32	0	32	0.00
687		**48635**	4	0	4	0.00
688		**48637**	41	0	41	0.00
689		**48641**	1	0	1	0.00
690		**48647**	16	0	16	0.00
691		**48649**	30	0	30	0.00
692		**48650**	70	0	70	0.00
693		**48651**	51	0	51	0.00
694		**48652**	12	0	12	0.00
695		**48653**	60	0	60	0.00
696		**48654**	8	0	8	0.00
697		**48656**	35	0	35	0.00
698		**48657**	40	0	40	0.00
699		**48659**	44	0	44	0.00
700		**48662**	12	0	12	0.00
701		**48703**	30	0	30	0.00
702		**48705**	1	0	1	0.00
703		**48714**	1	0	1	0.00
704		**48721**	3	0	3	0.00
705		**48722**	42	0	42	0.00
706		**48725**	24	0	24	0.00
707		**48730**	17	0	17	0.00
708		**48734**	43	0	43	0.00
709		**48735**	16	0	16	0.00
710		**48738**	3	0	3	0.00
711		**48739**	12	0	12	0.00
712		**48742**	9	0	9	0.00
713		**48745**	11	0	11	0.00
714		**48746**	114	0	114	0.00
715		**48747**	22	0	22	0.00

	A	B	C	D	E	F
716		**48748**	8	0	8	0.00
717		**48749**	18	0	18	0.00
718		**48754**	22	0	22	0.00
719		**48755**	28	0	28	0.00
720		**48756**	21	0	21	0.00
721		**48757**	59	0	59	0.00
722		**48758**	1	0	1	0.00
723		**48761**	4	0	4	0.00
724		**48763**	22	0	22	0.00
725		**48764**	2	0	2	0.00
726		**48765**	8	0	8	0.00
727		**48766**	16	0	16	0.00
728		**48767**	25	0	25	0.00
729		**48770**	7	0	7	0.00
730		**48804**	2	0	2	0.00
731		**48806**	22	0	22	0.00
732		**48807**	6	0	6	0.00
733		**48811**	52	0	52	0.00
734		**48812**	4	0	4	0.00
735		**48815**	28	0	28	0.00
736		**48816**	1	0	1	0.00
737		**48818**	25	0	25	0.00
738		**48821**	35	0	35	0.00
739		**48822**	12	0	12	0.00
740		**48829**	49	0	49	0.00
741		**48830**	1	0	1	0.00
742		**48831**	28	0	28	0.00
743		**48832**	9	0	9	0.00
744		**48833**	2	0	2	0.00
745		**48835**	9	0	9	0.00
746		**48841**	14	0	14	0.00
747		**48844**	3	0	3	0.00
748		**48845**	5	0	5	0.00
749		**48850**	42	0	42	0.00
750		**48851**	24	0	24	0.00
751		**48852**	1	0	1	0.00
752		**48853**	7	0	7	0.00
753		**48854**	230	0	230	0.00
754		**48855**	75	0	75	0.00
755		**48856**	13	0	13	0.00
756		**48857**	32	0	32	0.00
757		**48859**	1	0	1	0.00

	A	B	C	D	E	F
758		**48861**	12	0	12	0.00
759		**48862**	1	0	1	0.00
760		**48865**	33	0	33	0.00
761		**48870**	3	0	3	0.00
762		**48871**	11	0	11	0.00
763		**48874**	7	0	7	0.00
764		**48877**	31	0	31	0.00
765		**48878**	26	0	26	0.00
766		**48883**	78	0	78	0.00
767		**48884**	59	0	59	0.00
768		**48885**	8	0	8	0.00
769		**48886**	19	0	19	0.00
770		**48889**	12	0	12	0.00
771		**48890**	16	0	16	0.00
772		**48891**	30	0	30	0.00
773		**48892**	76	0	76	0.00
774		**48893**	51	0	51	0.00
775		**48895**	83	0	83	0.00
776		**48897**	9	0	9	0.00
777		**48901**	4	0	4	0.00
778		**48908**	1	0	1	0.00
779		**48916**	1	0	1	0.00
780		**48933**	27	0	27	0.00
781		**48937**	1	0	1	0.00
782		**49003**	6	0	6	0.00
783		**49005**	1	0	1	0.00
784		**49012**	26	0	26	0.00
785		**49016**	4	0	4	0.00
786		**49019**	4	0	4	0.00
787		**49021**	75	0	75	0.00
788		**49023**	9	0	9	0.00
789		**49027**	1	0	1	0.00
790		**49029**	17	0	17	0.00
791		**49033**	8	0	8	0.00
792		**49034**	17	0	17	0.00
793		**49041**	2	0	2	0.00
794		**49051**	19	0	19	0.00
795		**49052**	11	0	11	0.00
796		**49061**	12	0	12	0.00
797		**49063**	1	0	1	0.00
798		**49064**	39	0	39	0.00
799		**49066**	7	0	7	0.00

	A	B	C	D	E	F
800		**49067**	34	0	34	0.00
801		**49074**	1	0	1	0.00
802		**49075**	6	0	6	0.00
803		**49081**	2	0	2	0.00
804		**49092**	16	0	16	0.00
805		**49095**	14	0	14	0.00
806		**49097**	91	0	91	0.00
807		**49101**	20	0	20	0.00
808		**49104**	1	0	1	0.00
809		**49111**	58	0	58	0.00
810		**49115**	2	0	2	0.00
811		**49119**	1	0	1	0.00
812		**49125**	9	0	9	0.00
813		**49126**	28	0	28	0.00
814		**49129**	1	0	1	0.00
815		**49161**	1	0	1	0.00
816		**49204**	6	0	6	0.00
817		**49220**	33	0	33	0.00
818		**49239**	1	0	1	0.00
819		**49240**	78	0	78	0.00
820		**49252**	50	0	50	0.00
821		**49261**	4	0	4	0.00
822		**49262**	13	0	13	0.00
823		**49264**	20	0	20	0.00
824		**49267**	21	0	21	0.00
825		**49271**	39	0	39	0.00
826		**49272**	22	0	22	0.00
827		**49276**	5	0	5	0.00
828		**49279**	5	0	5	0.00
829		**49281**	1	0	1	0.00
830		**49282**	10	0	10	0.00
831		**49289**	2	0	2	0.00
832		**49301**	138	0	138	0.00
833		**49303**	9	0	9	0.00
834		**49306**	66	0	66	0.00
835		**49307**	151	0	151	0.00
836		**49309**	9	0	9	0.00
837		**49310**	19	0	19	0.00
838		**49312**	6	0	6	0.00
839		**49314**	1	0	1	0.00
840		**49317**	1	0	1	0.00
841		**49318**	32	0	32	0.00

	A	B	C	D	E	F
842		**49320**	4	0	4	0.00
843		**49322**	15	0	15	0.00
844		**49325**	10	0	10	0.00
845		**49326**	21	0	21	0.00
846		**49332**	19	0	19	0.00
847		**49337**	80	0	80	0.00
848		**49338**	20	0	20	0.00
849		**49339**	20	0	20	0.00
850		**49340**	29	0	29	0.00
851		**49342**	14	0	14	0.00
852		**49344**	37	0	37	0.00
853		**49346**	26	0	26	0.00
854		**49347**	8	0	8	0.00
855		**49348**	77	0	77	0.00
856		**49401**	82	0	82	0.00
857		**49402**	13	0	13	0.00
858		**49404**	71	0	71	0.00
859		**49406**	4	0	4	0.00
860		**49408**	130	0	130	0.00
861		**49415**	74	0	74	0.00
862		**49416**	2	0	2	0.00
863		**49449**	36	0	36	0.00
864		**49452**	25	0	25	0.00
865		**49453**	13	0	13	0.00
866		**49458**	2	0	2	0.00
867		**49459**	37	0	37	0.00
868		**49501**	4	0	4	0.00
869		**49510**	1	0	1	0.00
870		**49514**	2	0	2	0.00
871		**49518**	1	0	1	0.00
872		**49610**	1	0	1	0.00
873		**49612**	11	0	11	0.00
874		**49613**	12	0	12	0.00
875		**49614**	24	0	24	0.00
876		**49615**	34	0	34	0.00
877		**49616**	34	0	34	0.00
878		**49618**	3	0	3	0.00
879		**49622**	27	0	27	0.00
880		**49626**	5	0	5	0.00
881		**49627**	1	0	1	0.00
882		**49628**	5	0	5	0.00
883		**49629**	14	0	14	0.00

	A	B	C	D	E	F
884		**49630**	7	0	7	0.00
885		**49632**	12	0	12	0.00
886		**49633**	35	0	35	0.00
887		**49635**	41	0	41	0.00
888		**49636**	5	0	5	0.00
889		**49637**	75	0	75	0.00
890		**49638**	8	0	8	0.00
891		**49640**	21	0	21	0.00
892		**49642**	8	0	8	0.00
893		**49643**	116	0	116	0.00
894		**49644**	11	0	11	0.00
895		**49646**	101	0	101	0.00
896		**49648**	19	0	19	0.00
897		**49649**	115	0	115	0.00
898		**49654**	1	0	1	0.00
899		**49655**	27	0	27	0.00
900		**49656**	15	0	15	0.00
901		**49657**	32	0	32	0.00
902		**49663**	57	0	57	0.00
903		**49665**	44	0	44	0.00
904		**49666**	2	0	2	0.00
905		**49667**	1	0	1	0.00
906		**49670**	17	0	17	0.00
907		**49674**	4	0	4	0.00
908		**49675**	8	0	8	0.00
909		**49679**	12	0	12	0.00
910		**49680**	34	0	34	0.00
911		**49682**	63	0	63	0.00
912		**49683**	29	0	29	0.00
913		**49685**	28	0	28	0.00
914		**49689**	16	0	16	0.00
915		**49696**	18	0	18	0.00
916		**49705**	11	0	11	0.00
917		**49706**	79	0	79	0.00
918		**49709**	23	0	23	0.00
919		**49710**	3	0	3	0.00
920		**49713**	26	0	26	0.00
921		**49716**	2	0	2	0.00
922		**49718**	5	0	5	0.00
923		**49719**	9	0	9	0.00
924		**49720**	92	0	92	0.00
925		**49722**	3	0	3	0.00

	A	B	C	D	E	F
926		**49724**	10	0	10	0.00
927		**49725**	1	0	1	0.00
928		**49726**	3	0	3	0.00
929		**49727**	90	0	90	0.00
930		**49728**	2	0	2	0.00
931		**49729**	6	0	6	0.00
932		**49730**	22	0	22	0.00
933		**49733**	19	0	19	0.00
934		**49734**	8	0	8	0.00
935		**49735**	250	0	250	0.00
936		**49736**	2	0	2	0.00
937		**49740**	53	0	53	0.00
938		**49743**	5	0	5	0.00
939		**49744**	4	0	4	0.00
940		**49745**	16	0	16	0.00
941		**49746**	35	0	35	0.00
942		**49747**	12	0	12	0.00
943		**49748**	2	0	2	0.00
944		**49751**	17	0	17	0.00
945		**49752**	4	0	4	0.00
946		**49753**	18	0	18	0.00
947		**49755**	14	0	14	0.00
948		**49757**	3	0	3	0.00
949		**49759**	12	0	12	0.00
950		**49760**	8	0	8	0.00
951		**49762**	1	0	1	0.00
952		**49764**	8	0	8	0.00
953		**49766**	12	0	12	0.00
954		**49768**	1	0	1	0.00
955		**49769**	25	0	25	0.00
956		**49770**	175	0	175	0.00
957		**49774**	15	0	15	0.00
958		**49777**	5	0	5	0.00
959		**49779**	44	0	44	0.00
960		**49782**	5	0	5	0.00
961		**49788**	73	0	73	0.00
962		**49791**	5	0	5	0.00
963		**49796**	2	0	2	0.00
964		**49801**	139	0	139	0.00
965		**49802**	74	0	74	0.00
966		**49805**	4	0	4	0.00
967		**49806**	2	0	2	0.00

	A	B	C	D	E	F
968		**49807**	21	0	21	0.00
969		**49808**	3	0	3	0.00
970		**49812**	9	0	9	0.00
971		**49815**	7	0	7	0.00
972		**49816**	5	0	5	0.00
973		**49817**	5	0	5	0.00
974		**49818**	6	0	6	0.00
975		**49820**	4	0	4	0.00
976		**49827**	9	0	9	0.00
977		**49831**	15	0	15	0.00
978		**49833**	3	0	3	0.00
979		**49834**	4	0	4	0.00
980		**49835**	5	0	5	0.00
981		**49836**	9	0	9	0.00
982		**49838**	6	0	6	0.00
983		**49839**	4	0	4	0.00
984		**49840**	9	0	9	0.00
985		**49845**	1	0	1	0.00
986		**49852**	3	0	3	0.00
987		**49853**	10	0	10	0.00
988		**49861**	4	0	4	0.00
989		**49862**	54	0	54	0.00
990		**49863**	3	0	3	0.00
991		**49864**	1	0	1	0.00
992		**49868**	78	0	78	0.00
993		**49870**	49	0	49	0.00
994		**49871**	2	0	2	0.00
995		**49872**	3	0	3	0.00
996		**49873**	2	0	2	0.00
997		**49874**	10	0	10	0.00
998		**49880**	4	0	4	0.00
999		**49881**	3	0	3	0.00
1000		**49883**	1	0	1	0.00
1001		**49884**	9	0	9	0.00
1002		**49886**	4	0	4	0.00
1003		**49887**	18	0	18	0.00
1004		**49891**	8	0	8	0.00
1005		**49892**	13	0	13	0.00
1006		**49893**	18	0	18	0.00
1007		**49902**	3	0	3	0.00
1008		**49903**	3	0	3	0.00
1009		**49905**	50	0	50	0.00

	A	B	C	D	E	F
1010		**49911**	28	0	28	0.00
1011		**49912**	11	0	11	0.00
1012		**49915**	12	0	12	0.00
1013		**49916**	39	0	39	0.00
1014		**49917**	2	0	2	0.00
1015		**49918**	1	0	1	0.00
1016		**49919**	1	0	1	0.00
1017		**49920**	50	0	50	0.00
1018		**49921**	7	0	7	0.00
1019		**49925**	2	0	2	0.00
1020		**49927**	2	0	2	0.00
1021		**49931**	109	0	109	0.00
1022		**49934**	14	0	14	0.00
1023		**49942**	1	0	1	0.00
1024		**49946**	71	0	71	0.00
1025		**49947**	3	0	3	0.00
1026		**49952**	3	0	3	0.00
1027		**49953**	19	0	19	0.00
1028		**49955**	9	0	9	0.00
1029		**49958**	14	0	14	0.00
1030		**49959**	4	0	4	0.00
1031		**49960**	3	0	3	0.00
1032		**49961**	1	0	1	0.00
1033		**49964**	2	0	2	0.00
1034		**49965**	4	0	4	0.00
1035		**49967**	1	0	1	0.00
1036		**49968**	10	0	10	0.00
1037		**49969**	23	0	23	0.00
1038		**49970**	3	0	3	0.00

	A	B	C	D	E	F	G	H
1	**Children Tested for Lead Poisoning -- Calendar Year 2014**							
2	**All ZIP Codes in Michigan**							
3								
4	**Children less than Six Years of Age**							
5				Children Tested			Children Tested, by Highest Blood Lead Level (BLL)	
6	ZIP	%Pre-1950 Housing	Children less than Six Years of Age	Number of Children Tested	% Tested		< 5 ug/dL	
7	48001	25.7	660	145	22.0		143	
8	48002	25.8	219	19	8.7		18	
9	48003	24.1	388	42	10.8		42	
10	48005	32.5	294	39	13.3		37	
11	48006	28.1	295	45	15.3		45	
12	48009	39.8	1,586	253	16.0		253	
13	48014	36.9	321	69	21.5		68	
14	48015	33.4	516	108	20.9		108	
15	48017	20.9	761	123	16.2		123	
16	48021	31.4	2,569	536	20.9		521	
17	48022	21.7	174	23	13.2		23	
18	48023	16.7	330	53	16.1		53	
19	48025	14.5	907	124	13.7		120	
20	48026	7.3	811	171	21.1		169	
21	48027	29.1	213	50	23.5		48	
22	48028	32.0	26	3	11.5		3	
23	48030	36.7	1,280	285	22.3		275	
24	48032	19.7	156	26	16.7		26	
25	48033	*	821	276	33.6		272	
26	48034	7.1	809	258	31.9		253	
27	48035	5.5	2,662	416	15.6		411	
28	48036	4.7	1,465	268	18.3		265	
29	48038	0.9	2,497	374	15.0		370	
30	48039	41.7	464	101	21.8		100	
31	48040	11.3	675	101	15.0		101	
32	48041	28.0	270	42	15.6		40	
33	48042	6.2	2,366	221	9.3		221	
34	48043	40.4	1,180	158	13.4		152	
35	48044	1.6	4,252	434	10.2		432	
36	48045	11.5	1,392	197	14.2		195	
37	48047	7.8	3,062	367	12.0		366	
38	48048	15.6	767	84	11.0		84	
39	48049	14.2	335	64	19.1		62	
40	48050	33.0	80	11	13.8		11	
41	48051	5.1	1,208	165	13.7		165	
42	48054	24.9	369	58	15.7		57	
43	48059	19.4	976	182	18.6		179	
44	48060	44.7	3,627	1291	35.6		1236	

	I	J	K	L	M	N	O	P	Q	R	S	T	U
1													
2													
3													
4													
5													
6	5 to 9 ug/dL, not confirmed by venous	>= 10 ug/dL, not confirmed by venous		Confirmed 5-9 ug/dL (venous only)	Confirmed 10-14 ug/dL (venous only)	Confirmed 15-44 ug/dL (venous only)	Confirmed ≥45 ug/dL (venous only)		Total confirmed ≥ 5 µg/dL	% with confirmed BLL >= 5 ug/dL		Total ≥ 5 µg/dL, confirmed & unconfirmed*	% with BLL >= 5 ug/dL, confirmed & unconfirmed*
7	2	0		0	0	0	0		0	0.0		2	1.4
8	0	0		1	0	0	0		1	5.3		1	5.3
9	0	0		0	0	0	0		0	0.0		0	0.0
10	1	0		1	0	0	0		1	2.6		2	5.1
11	0	0		0	0	0	0		0	0.0		0	0.0
12	0	0		0	0	0	0		0	0.0		0	0.0
13	1	0		0	0	0	0		0	0.0		1	1.4
14	0	0		0	0	0	0		0	0.0		0	0.0
15	0	0		0	0	0	0		0	0.0		0	0.0
16	5	1		7	0	0	0		7	1.3		13	2.4
17	0	0		0	0	0	0		0	0.0		0	0.0
18	0	0		0	0	0	0		0	0.0		0	0.0
19	4	0		0	0	0	0		0	0.0		4	3.2
20	2	0		0	0	0	0		0	0.0		2	1.2
21	0	1		0	1	1	0		2	4.0		3	6.0
22	0	0		0	0	0	0		0	0.0		0	0.0
23	5	0		5	0	0	0		5	1.8		10	3.5
24	0	0		0	0	0	0		0	0.0		0	0.0
25	3	0		1	0	0	0		1	0.4		4	1.4
26	3	0		2	0	0	0		2	0.8		5	1.9
27	1	0		2	1	1	0		4	1.0		5	1.2
28	2	0		1	0	0	0		1	0.4		3	1.1
29	2	0		2	0	0	0		2	0.5		4	1.1
30	0	0		0	0	0	0		0	0.0		0	0.0
31	0	0		0	0	0	0		0	0.0		0	0.0
32	1	1		0	0	0	0		0	0.0		2	4.8
33	0	0		0	0	0	0		0	0.0		0	0.0
34	3	0		0	0	0	1		1	0.6		4	2.5
35	1	0		1	0	0	0		1	0.2		2	0.5
36	1	0		1	0	0	0		1	0.5		2	1.0
37	1	0		0	0	0	0		0	0.0		1	0.3
38	0	0		0	0	0	0		0	0.0		0	0.0
39	2	0		0	0	0	0		0	0.0		2	3.1
40	0	0		0	0	0	0		0	0.0		0	0.0
41	0	0		0	0	0	0		0	0.0		0	0.0
42	1	0		0	0	0	0		0	0.0		1	1.7
43	3	0		0	0	0	0		0	0.0		3	1.6
44	31	5		14	3	3	0		20	1.5		56	4.3

	A	B	C	D	E	F	G	H
45	48062	28.7	654	87	13.3		85	
46	48063	12.3	258	44	17.1		42	
47	48064	25.1	256	40	15.6		40	
48	48065	25.4	661	80	12.1		78	
49	48066	16.0	3,565	634	17.8		625	
50	48067	53.6	1,647	221	13.4		218	
51	48069	79.6	179	24	13.4		24	
52	48070	55.2	512	60	11.7		60	
53	48071	11.6	2,166	429	19.8		423	
54	48072	55.2	1,147	173	15.1		170	
55	48073	24.7	2,178	327	15.0		321	
56	48074	23.4	688	176	25.6		176	
57	48075	12.8	1,302	442	33.9		437	
58	48076	9.4	1,390	387	27.8		383	
59	48079	26.0	756	122	16.1		120	
60	48080	19.2	1,365	195	14.3		192	
61	48081	15.0	1,123	185	16.5		184	
62	48082	10.2	1,038	118	11.4		115	
63	48083	7.5	1,706	256	15.0		251	
64	48084	3.0	1,055	137	13.0		131	
65	48085	*	1,489	189	12.7		189	
66	48088	*	1,359	216	15.9		215	
67	48089	23.9	2,861	681	23.8		665	
68	48091	19.1	2,642	634	24.0		617	
69	48092	8.7	1,645	348	21.2		341	
70	48093	3.4	1,363	273	20.0		271	
71	48094	5.6	1,386	130	9.4		130	
72	48095	8.9	263	31	11.8		31	
73	48096	19.6	193	17	8.8		16	
74	48097	41.2	385	92	23.9		91	
75	48098	4.4	919	124	13.5		124	
76	48101	25.6	1,725	329	19.1		326	
77	48103	21.9	3,584	320	8.9		318	
78	48104	36.7	1,281	112	8.7		110	
79	48105	7.3	2,014	171	8.5		170	
80	48108	5.0	2,009	222	11.1		216	
81	48111	11.1	3,276	592	18.1		587	
82	48114	5.0	1,142	100	8.8		100	
83	48116	11.8	1,640	105	6.4		105	
84	48117	21.4	610	73	12.0		72	
85	48118	27.7	729	72	9.9		68	
86	48120	34.3	986	329	33.4		325	
87	48122	39.7	875	301	34.4		298	
88	48124	46.1	2,197	345	15.7		342	
89	48125	26.7	1,596	381	23.9		378	
90	48126	54.1	5,545	1526	27.5		1491	
91	48127	12.1	2,999	748	24.9		739	
92	48128	53.0	822	153	18.6		152	

	I	J	K	L	M	N	O	P	Q	R	S	T	U
45	2	0		0	0	0	0		0	0.0		2	2.3
46	2	0		0	0	0	0		0	0.0		2	4.5
47	0	0		0	0	0	0		0	0.0		0	0.0
48	2	0		0	0	0	0		0	0.0		2	2.5
49	7	0		2	0	0	0		2	0.3		9	1.4
50	3	0		0	0	0	0		0	0.0		3	1.4
51	0	0		0	0	0	0		0	0.0		0	0.0
52	0	0		0	0	0	0		0	0.0		0	0.0
53	4	0		1	1	1	0		3	0.7		7	1.6
54	1	0		2	0	0	0		2	1.2		3	1.7
55	4	0		1	0	0	0		1	0.3		5	1.5
56	0	0		0	0	0	0		0	0.0		0	0.0
57	3	0		2	0	0	0		2	0.5		5	1.1
58	1	0		2	1	1	0		4	1.0		5	1.3
59	1	0		0	1	1	0		2	1.6		3	2.5
60	2	0		1	0	0	0		1	0.5		3	1.5
61	1	0		0	0	0	0		0	0.0		1	0.5
62	0	0		3	0	0	0		3	2.5		3	2.5
63	1	1		2	1	1	0		4	1.6		6	2.3
64	3	0		3	0	0	0		3	2.2		6	4.4
65	0	0		0	0	0	0		0	0.0		0	0.0
66	1	0		0	0	0	0		0	0.0		1	0.5
67	9	3		4	0	0	0		4	0.6		16	2.3
68	11	0		5	0	0	0		5	0.8		16	2.5
69	5	1		1	0	0	0		1	0.3		7	2.0
70	0	0		1	1	1	0		3	1.1		3	1.1
71	0	0		0	0	0	0		0	0.0		0	0.0
72	0	0		0	0	0	0		0	0.0		0	0.0
73	1	0		0	0	0	0		0	0.0		1	5.9
74	1	0		0	0	0	0		0	0.0		1	1.1
75	0	0		0	0	0	0		0	0.0		0	0.0
76	3	0		0	0	0	0		0	0.0		3	0.9
77	0	1		1	0	0	0		1	0.3		2	0.6
78	0	0		1	0	0	0		1	0.9		1	0.9
79	1	0		0	0	0	0		0	0.0		1	0.6
80	4	0		2	0	0	0		2	0.9		6	2.7
81	3	1		1	0	0	0		1	0.2		5	0.8
82	0	0		0	0	0	0		0	0.0		0	0.0
83	0	0		0	0	0	0		0	0.0		0	0.0
84	0	0		1	0	0	0		1	1.4		1	1.4
85	1	0		3	0	0	0		3	4.2		4	5.6
86	1	0		3	0	0	0		3	0.9		4	1.2
87	2	0		1	0	0	0		1	0.3		3	1.0
88	0	0		3	0	0	0		3	0.9		3	0.9
89	2	0		0	0	0	0		0	0.0		2	0.5
90	6	0		24	5	5	0		34	2.2		40	2.6
91	2	0		5	1	1	0		7	0.9		9	1.2
92	1	0		0	0	0	0		0	0.0		1	0.7

	A	B	C	D	E	F	G	H
93	48130	20.9	1,138	77	6.8		76	
94	48131	35.7	524	82	15.6		81	
95	48133	26.5	372	57	15.3		55	
96	48134	13.1	1,773	308	17.4		307	
97	48135	17.6	1,813	307	16.9		304	
98	48137	24.9	299	18	6.0		17	
99	48138	19.1	421	69	16.4		69	
100	48139	31.0	7	2	28.6		2	
101	48140	36.2	174	29	16.7		29	
102	48141	19.0	2,226	743	33.4		732	
103	48143	21.7	3	2	66.7		2	
104	48144	12.4	562	68	12.1		68	
105	48145	33.6	209	36	17.2		35	
106	48146	35.2	3,089	942	30.5		926	
107	48150	13.8	1,770	265	15.0		259	
108	48152	9.3	1,686	349	20.7		347	
109	48154	7.0	1,865	315	16.9		313	
110	48157	45.8	109	15	13.8		15	
111	48158	36.1	401	39	9.7		39	
112	48159	48.2	189	23	12.2		23	
113	48160	32.2	911	89	9.8		89	
114	48161	38.7	2,040	373	18.3		371	
115	48162	28.5	2,211	329	14.9		325	
116	48164	26.3	545	77	14.1		77	
117	48165	6.1	520	89	17.1		88	
118	48166	21.0	968	151	15.6		148	
119	48167	8.9	1,240	184	14.8		183	
120	48168	*	1,566	154	9.8		151	
121	48169	15.4	1,258	104	8.3		104	
122	48170	15.7	2,512	201	8.0		199	
123	48173	18.2	913	103	11.3		102	
124	48174	15.8	2,538	602	23.7		598	
125	48176	12.2	1,298	95	7.3		93	
126	48178	7.9	2,225	311	14.0		307	
127	48179	32.7	191	35	18.3		35	
128	48180	13.8	5,287	1450	27.4		1427	
129	48182	17.3	1,358	180	13.3		178	
130	48183	9.3	2,717	505	18.6		496	
131	48184	30.4	1,249	272	21.8		270	
132	48185	4.7	3,395	791	23.3		772	
133	48186	17.9	2,943	558	19.0		549	
134	48187	2.0	3,703	438	11.8		430	
135	48188	2.6	3,692	433	11.7		426	
136	48189	15.7	966	91	9.4		91	
137	48190	70.3	5	2	40.0		2	
138	48191	30.7	290	24	8.3		24	
139	48192	37.1	1,683	360	21.4		357	
140	48193	*	943	235	24.9		224	

	I	J	K	L	M	N	O	P	Q	R	S	T	U
93	0	0		0	1	1	0		2	2.6		2	2.6
94	0	0		0	1	1	0		2	2.4		2	2.4
95	2	0		0	0	0	0		0	0.0		2	3.5
96	1	0		0	0	0	0		0	0.0		1	0.3
97	3	0		0	0	0	0		0	0.0		3	1.0
98	0	0		1	0	0	0		1	5.6		1	5.6
99	0	0		0	0	0	0		0	0.0		0	0.0
100	0	0		0	0	0	0		0	0.0		0	0.0
101	0	0		0	0	0	0		0	0.0		0	0.0
102	2	0		6	1	1	0		8	1.1		10	1.3
103	0	0		0	0	0	0		0	0.0		0	0.0
104	0	0		0	0	0	0		0	0.0		0	0.0
105	1	0		0	0	0	0		0	0.0		1	2.8
106	4	2		9	1	1	0		11	1.2		17	1.8
107	6	0		0	0	0	0		0	0.0		6	2.3
108	2	0		0	0	0	0		0	0.0		2	0.6
109	2	0		0	0	0	0		0	0.0		2	0.6
110	0	0		0	0	0	0		0	0.0		0	0.0
111	0	0		0	0	0	0		0	0.0		0	0.0
112	0	0		0	0	0	0		0	0.0		0	0.0
113	0	0		0	0	0	0		0	0.0		0	0.0
114	1	1		0	0	0	0		0	0.0		2	0.5
115	4	0		0	0	0	0		0	0.0		4	1.2
116	0	0		0	0	0	0		0	0.0		0	0.0
117	1	0		0	0	0	0		0	0.0		1	1.1
118	3	0		0	0	0	0		0	0.0		3	2.0
119	1	0		0	0	0	0		0	0.0		1	0.5
120	2	0		1	0	0	0		1	0.6		3	1.9
121	0	0		0	0	0	0		0	0.0		0	0.0
122	1	0		1	0	0	0		1	0.5		2	1.0
123	1	0		0	0	0	0		0	0.0		1	1.0
124	4	0		0	0	0	0		0	0.0		4	0.7
125	2	0		0	0	0	0		0	0.0		2	2.1
126	4	0		0	0	0	0		0	0.0		4	1.3
127	0	0		0	0	0	0		0	0.0		0	0.0
128	9	0		11	2	2	0		15	1.0		24	1.7
129	2	0		0	0	0	0		0	0.0		2	1.1
130	8	0		1	0	0	0		1	0.2		9	1.8
131	2	0		0	0	0	0		0	0.0		2	0.7
132	12	1		5	1	1	0		7	0.9		20	2.5
133	6	0		3	0	0	0		3	0.5		9	1.6
134	6	0		1	1	1	0		3	0.7		9	2.1
135	4	0		2	1	1	0		4	0.9		8	1.8
136	0	0		0	0	0	0		0	0.0		0	0.0
137	0	0		0	0	0	0		0	0.0		0	0.0
138	0	0		0	0	0	0		0	0.0		0	0.0
139	3	0		0	0	0	0		0	0.0		3	0.8
140	4	0		5	2	2	0		9	3.8		13	5.5

	A	B	C	D	E	F	G	H
141	48195	14.7	1,789	447	25.0		441	
142	48197	17.0	5,049	686	13.6		674	
143	48198	14.0	3,614	643	17.8		641	
144	48201	51.0	666	389	58.4		375	
145	48202	68.5	955	391	40.9		330	
146	48203	61.4	2,195	734	33.4		647	
147	48204	67.2	2,271	801	35.3		669	
148	48205	48.2	4,233	1540	36.4		1385	
149	48206	78.1	1,665	644	38.7		512	
150	48207	34.7	1,326	561	42.3		523	
151	48208	64.7	854	301	35.2		274	
152	48209	76.0	4,220	1497	35.5		1381	
153	48210	68.1	3,933	1559	39.6		1423	
154	48211	72.1	694	252	36.3		209	
155	48212	70.6	4,007	1584	39.5		1456	
156	48213	62.5	2,368	808	34.1		707	
157	48214	71.0	1,516	613	40.4		511	
158	48215	55.5	1,083	425	39.2		383	
159	48216	71.5	506	131	25.9		118	
160	48217	56.1	643	177	27.5		172	
161	48218	62.1	752	274	36.4		265	
162	48219	34.4	3,543	1524	43.0		1471	
163	48220	59.7	1,469	259	17.6		253	
164	48221	63.5	2,476	942	38.0		886	
165	48223	39.5	2,141	752	35.1		722	
166	48224	57.9	4,024	1591	39.5		1460	
167	48225	29.5	1,086	267	24.6		262	
168	48226	49.4	113	43	38.1		43	
169	48227	53.5	3,524	1432	40.6		1336	
170	48228	39.5	5,037	2070	41.1		1982	
171	48229	47.3	831	283	34.1		274	
172	48230	71.4	977	146	14.9		143	
173	48234	47.2	3,005	1124	37.4		1055	
174	48235	44.9	3,103	1255	40.4		1213	
175	48236	43.3	1,836	261	14.2		254	
176	48237	16.0	2,214	600	27.1		594	
177	48238	71.7	2,584	995	38.5		869	
178	48239	23.1	2,707	657	24.3		648	
179	48240	29.4	1,345	384	28.6		380	
180	48301	7.3	773	97	12.5		96	
181	48302	5.5	703	91	12.9		90	
182	48304	6.0	714	101	14.1		96	
183	48306	3.9	1,671	132	7.9		131	
184	48307	10.9	3,184	343	10.8		338	
185	48309	5.4	1,728	149	8.6		149	
186	48310	2.1	3,062	667	21.8		655	
187	48312	1.9	2,125	364	17.1		362	
188	48313	1.8	2,168	363	16.7		359	

	I	J	K	L	M	N	O	P	Q	R	S	T	U
141	5	1		0	0	0	0		0	0.0		6	1.3
142	6	1		3	0	0	0		3	0.4		10	1.5
143	1	0		0	1	1	0		2	0.3		3	0.5
144	2	1		8	2	2	0		12	3.1		15	3.9
145	9	2		35	7	7	0		49	12.5		60	15.3
146	8	2		57	14	14	0		85	11.6		95	12.9
147	21	3		77	15	15	0		107	13.4		131	16.4
148	11	1		114	19	19	0		152	9.9		164	10.6
149	16	7		80	16	16	1		113	17.5		136	21.1
150	1	1		28	6	6	0		40	7.1		42	7.5
151	5	0		17	1	1	0		19	6.3		24	8.0
152	14	0		88	11	11	0		110	7.3		124	8.3
153	19	1		88	15	15	0		118	7.6		138	8.9
154	6	1		30	5	5	0		40	15.9		47	18.7
155	31	3		76	12	12	0		100	6.3		134	8.5
156	7	1		69	15	15	1		100	12.4		108	13.4
157	9	4		64	15	15	0		94	15.3		107	17.5
158	4	0		30	4	4	0		38	8.9		42	9.9
159	6	0		3	2	2	0		7	5.3		13	9.9
160	1	0		3	1	1	0		5	2.8		6	3.4
161	2	1		5	1	1	0		7	2.6		10	3.6
162	13	1		32	5	5	0		42	2.8		56	3.7
163	1	1		3	1	1	0		5	1.9		7	2.7
164	13	2		33	6	6	0		45	4.8		60	6.4
165	6	0		16	4	4	0		24	3.2		30	4.0
166	12	2		88	18	18	1		125	7.9		139	8.7
167	1	2		2	0	0	0		2	0.7		5	1.9
168	0	0		0	0	0	0		0	0.0		0	0.0
169	20	2		57	12	12	0		81	5.7		103	7.2
170	19	6		52	8	8	0		68	3.3		93	4.5
171	5	0		4	0	0	0		4	1.4		9	3.2
172	2	0		1	0	0	0		1	0.7		3	2.1
173	13	1		46	2	2	0		50	4.4		64	5.7
174	11	1		19	6	6	0		31	2.5		43	3.4
175	3	0		0	1	1	0		2	0.8		5	1.9
176	2	1		1	1	1	0		3	0.5		6	1.0
177	34	13		62	9	9	1		81	8.1		128	12.9
178	8	0		1	0	0	0		1	0.2		9	1.4
179	3	0		0	0	0	0		0	0.0		3	0.8
180	1	0		0	0	0	0		0	0.0		1	1.0
181	0	0		0	0	0	0		0	0.0		0	0.0
182	1	0		4	0	0	0		4	4.0		5	5.0
183	0	0		1	0	0	0		1	0.8		1	0.8
184	3	0		2	0	0	0		2	0.6		5	1.5
185	0	0		0	0	0	0		0	0.0		0	0.0
186	7	1		3	0	0	1		4	0.6		12	1.8
187	2	0		0	0	0	0		0	0.0		2	0.5
188	2	0		2	0	0	0		2	0.6		4	1.1

	A	B	C	D	E	F	G	H
189	48314	4.2	1,250	222	17.8		222	
190	48315	1.8	1,400	156	11.1		156	
191	48316	2.7	1,578	209	13.2		208	
192	48317	8.4	2,167	341	15.7		338	
193	48320	41.4	382	41	10.7		41	
194	48322	0.9	1,837	298	16.2		296	
195	48323	6.6	932	137	14.7		136	
196	48324	12.6	1,121	124	11.1		124	
197	48326	10.6	1,623	259	16.0		253	
198	48327	11.0	1,699	246	14.5		245	
199	48328	22.0	2,051	316	15.4		315	
200	48329	19.4	1,737	232	13.4		227	
201	48331	1.2	1,188	199	16.8		197	
202	48334	3.9	1,064	190	17.9		186	
203	48335	4.0	1,628	475	29.2		442	
204	48336	15.7	1,720	374	21.7		369	
205	48340	21.4	2,845	774	27.2		768	
206	48341	46.4	1,267	318	25.1		307	
207	48342	42.3	1,854	539	29.1		529	
208	48346	8.4	1,505	233	15.5		233	
209	48348	5.8	1,560	232	14.9		230	
210	48350	10.6	430	75	17.4		74	
211	48353	8.1	427	26	6.1		25	
212	48356	19.4	509	51	10.0		51	
213	48357	7.9	535	56	10.5		56	
214	48359	6.4	730	96	13.2		94	
215	48360	3.6	878	96	10.9		95	
216	48362	24.4	1,096	121	11.0		121	
217	48363	13.0	259	41	15.8		41	
218	48367	19.1	282	31	11.0		30	
219	48370	18.4	68	7	10.3		7	
220	48371	15.5	1,883	178	9.5		178	
221	48374	1.3	966	211	21.8		210	
222	48375	1.0	1,507	291	19.3		290	
223	48377	5.7	1,257	292	23.2		291	
224	48380	7.4	484	32	6.6		32	
225	48381	13.6	816	107	13.1		107	
226	48382	12.4	1,599	194	12.1		191	
227	48383	8.8	939	133	14.2		132	
228	48386	14.1	1,069	150	14.0		150	
229	48390	9.9	1,512	262	17.3		259	
230	48393	2.4	1,346	306	22.7		301	
231	48401	34.3	92	13	14.1		12	
232	48412	27.7	346	64	18.5		64	
233	48413	35.9	520	115	22.1		112	
234	48414	40.4	153	29	19.0		29	
235	48415	17.4	612	170	27.8		170	
236	48416	37.6	383	59	15.4		58	

	I	J	K	L	M	N	O	P	Q	R	S	T	U
189	0	0		0	0	0	0		0	0.0		0	0.0
190	0	0		0	0	0	0		0	0.0		0	0.0
191	0	0		1	0	0	0		1	0.5		1	0.5
192	2	0		0	0	0	0		0	0.0		2	0.6
193	0	0		0	0	0	0		0	0.0		0	0.0
194	1	1		0	0	0	0		0	0.0		2	0.7
195	0	0		0	0	0	0		0	0.0		0	0.0
196	0	0		0	0	0	0		0	0.0		0	0.0
197	1	1		1	1	1	0		3	1.2		5	1.9
198	1	0		0	0	0	0		0	0.0		1	0.4
199	0	1		0	0	0	0		0	0.0		1	0.3
200	1	0		3	1	1	0		5	2.2		6	2.6
201	2	0		0	0	0	0		0	0.0		2	1.0
202	2	0		2	0	0	0		2	1.1		4	2.1
203	13	1		10	5	5	0		20	4.2		34	7.2
204	4	0		1	0	0	0		1	0.3		5	1.3
205	1	0		4	1	1	0		6	0.8		7	0.9
206	1	0		6	3	3	0		12	3.8		13	4.1
207	1	0		5	2	2	0		9	1.7		10	1.9
208	0	0		0	0	0	0		0	0.0		0	0.0
209	1	0		1	0	0	0		1	0.4		2	0.9
210	0	1		0	0	0	0		0	0.0		1	1.3
211	1	0		0	0	0	0		0	0.0		1	3.8
212	0	0		0	0	0	0		0	0.0		0	0.0
213	0	0		0	0	0	0		0	0.0		0	0.0
214	2	0		0	0	0	0		0	0.0		2	2.1
215	1	0		0	0	0	0		0	0.0		1	1.0
216	0	0		0	0	0	0		0	0.0		0	0.0
217	0	0		0	0	0	0		0	0.0		0	0.0
218	1	0		0	0	0	0		0	0.0		1	3.2
219	0	0		0	0	0	0		0	0.0		0	0.0
220	0	0		0	0	0	0		0	0.0		0	0.0
221	1	0		0	0	0	0		0	0.0		1	0.5
222	0	0		1	0	0	0		1	0.3		1	0.3
223	0	0		1	0	0	0		1	0.3		1	0.3
224	0	0		0	0	0	0		0	0.0		0	0.0
225	0	0		0	0	0	0		0	0.0		0	0.0
226	3	0		0	0	0	0		0	0.0		3	1.5
227	1	0		0	0	0	0		0	0.0		1	0.8
228	0	0		0	0	0	0		0	0.0		0	0.0
229	3	0		0	0	0	0		0	0.0		3	1.1
230	2	0		2	1	1	0		4	1.3		6	2.0
231	1	0		0	0	0	0		0	0.0		1	7.7
232	0	0		0	0	0	0		0	0.0		0	0.0
233	3	0		0	0	0	0		0	0.0		3	2.6
234	0	0		0	0	0	0		0	0.0		0	0.0
235	0	0		0	0	0	0		0	0.0		0	0.0
236	1	0		0	0	0	0		0	0.0		1	1.7

	A	B	C	D	E	F	G	H
237	48417	20.6	193	48	24.9		48	
238	48418	27.6	307	49	16.0		49	
239	48419	35.4	190	31	16.3		31	
240	48420	19.3	1,488	307	20.6		303	
241	48421	20.4	394	72	18.3		72	
242	48422	33.1	465	93	20.0		92	
243	48423	10.5	2,349	398	16.9		391	
244	48426	39.6	83	9	10.8		9	
245	48427	38.6	203	30	14.8		30	
246	48428	19.7	277	22	7.9		22	
247	48429	29.7	581	115	19.8		110	
248	48430	17.2	2,532	319	12.6		310	
249	48432	45.3	33	15	45.5		15	
250	48433	14.4	1,657	299	18.0		296	
251	48434	44.6	4	0	0.0		0	
252	48435	24.8	159	30	18.9		30	
253	48436	19.9	233	45	19.3		43	
254	48437	36.4	31	3	9.7		3	
255	48438	16.7	401	59	14.7		59	
256	48439	6.7	3,877	522	13.5		516	
257	48440	100.0	15	0	0.0		0	
258	48441	42.0	252	42	16.7		41	
259	48442	18.5	1,529	211	13.8		207	
260	48444	29.0	731	145	19.8		136	
261	48445	34.3	90	13	14.4		12	
262	48446	20.0	1,938	360	18.6		348	
263	48449	17.1	206	44	21.4		44	
264	48450	28.9	229	44	19.2		43	
265	48451	16.3	1,105	125	11.3		124	
266	48453	37.6	393	74	18.8		72	
267	48454	34.5	88	23	26.1		23	
268	48455	16.9	443	40	9.0		38	
269	48456	51.6	65	12	18.5		12	
270	48457	21.7	551	142	25.8		138	
271	48458	18.5	1,640	353	21.5		349	
272	48460	34.9	146	38	26.0		37	
273	48461	21.5	635	93	14.6		90	
274	48462	14.2	765	103	13.5		102	
275	48463	21.5	250	35	14.0		34	
276	48464	27.8	124	21	16.9		20	
277	48465	33.9	41	3	7.3		3	
278	48466	41.0	103	21	20.4		21	
279	48467	22.4	95	15	15.8		13	
280	48468	31.1	58	7	12.1		7	
281	48469	24.8	65	7	10.8		7	
282	48470	44.7	53	5	9.4		5	
283	48471	29.7	389	82	21.1		81	
284	48472	49.5	156	24	15.4		24	

	I	J	K	L	M	N	O	P	Q	R	S	T	U
237	0	0		0	0	0	0		0	0.0		0	0.0
238	0	0		0	0	0	0		0	0.0		0	0.0
239	0	0		0	0	0	0		0	0.0		0	0.0
240	3	1		0	0	0	0		0	0.0		4	1.3
241	0	0		0	0	0	0		0	0.0		0	0.0
242	1	0		0	0	0	0		0	0.0		1	1.1
243	5	1		1	0	0	0		1	0.3		7	1.8
244	0	0		0	0	0	0		0	0.0		0	0.0
245	0	0		0	0	0	0		0	0.0		0	0.0
246	0	0		0	0	0	0		0	0.0		0	0.0
247	1	0		3	1	1	0		5	4.3		6	5.2
248	8	1		0	0	0	0		0	0.0		9	2.8
249	0	0		0	0	0	0		0	0.0		0	0.0
250	3	0		0	0	0	0		0	0.0		3	1.0
251	0	0		0	0	0	0		0	---		0	---
252	0	0		0	0	0	0		0	0.0		0	0.0
253	0	1		1	0	0	0		1	2.2		2	4.4
254	0	0		0	0	0	0		0	0.0		0	0.0
255	0	0		0	0	0	0		0	0.0		0	0.0
256	6	0		0	0	0	0		0	0.0		6	1.1
257	0	0		0	0	0	0		0	---		0	---
258	1	0		0	0	0	0		0	0.0		1	2.4
259	3	0		1	0	0	0		1	0.5		4	1.9
260	6	1		1	0	0	0		1	0.7		8	5.5
261	1	0		0	0	0	0		0	0.0		1	7.7
262	9	1		2	0	0	0		2	0.6		12	3.3
263	0	0		0	0	0	0		0	0.0		0	0.0
264	1	0		0	0	0	0		0	0.0		1	2.3
265	1	0		0	0	0	0		0	0.0		1	0.8
266	0	0		1	1	1	0		3	4.1		3	4.1
267	0	0		0	0	0	0		0	0.0		0	0.0
268	1	1		0	0	0	0		0	0.0		2	5.0
269	0	0		0	0	0	0		0	0.0		0	0.0
270	3	0		1	0	0	0		1	0.7		4	2.8
271	1	0		2	1	1	0		4	1.1		5	1.4
272	1	0		0	0	0	0		0	0.0		1	2.6
273	3	0		0	0	0	0		0	0.0		3	3.2
274	0	0		1	0	0	0		1	1.0		1	1.0
275	1	0		0	0	0	0		0	0.0		1	2.9
276	1	0		0	0	0	0		0	0.0		1	4.8
277	0	0		0	0	0	0		0	0.0		0	0.0
278	0	0		0	0	0	0		0	0.0		0	0.0
279	1	0		1	0	0	0		1	6.7		2	13.3
280	0	0		0	0	0	0		0	0.0		0	0.0
281	0	0		0	0	0	0		0	0.0		0	0.0
282	0	0		0	0	0	0		0	0.0		0	0.0
283	1	0		0	0	0	0		0	0.0		1	1.2
284	0	0		0	0	0	0		0	0.0		0	0.0

	A	B	C	D	E	F	G	H
285	48473	14.1	1,482	299	20.2		295	
286	48475	39.9	185	19	10.3		18	
287	48476	59.8	35	10	28.6		10	
288	48502	69.8	25	10	40.0		10	
289	48503	49.1	2,111	502	23.8		473	
290	48504	31.2	2,733	672	24.6		642	
291	48505	38.2	2,419	604	25.0		575	
292	48506	31.2	2,604	550	21.1		533	
293	48507	20.9	2,913	764	26.2		747	
294	48509	20.0	551	111	20.1		109	
295	48519	14.9	490	126	25.7		123	
296	48529	30.0	908	251	27.6		251	
297	48532	14.5	1,322	393	29.7		385	
298	48601	36.4	3,543	1184	33.4		1136	
299	48602	59.9	2,819	776	27.5		725	
300	48603	7.6	1,627	372	22.9		369	
301	48604	26.7	675	149	22.1		147	
302	48607	74.4	85	30	35.3		27	
303	48609	12.9	634	120	18.9		120	
304	48610	7.9	138	25	18.1		25	
305	48611	21.9	460	49	10.7		48	
306	48612	11.6	528	118	22.3		118	
307	48613	24.9	93	13	14.0		13	
308	48614	25.3	113	18	15.9		18	
309	48615	40.3	236	38	16.1		38	
310	48616	31.2	521	110	21.1		107	
311	48617	23.9	778	136	17.5		136	
312	48618	29.3	358	43	12.0		42	
313	48619	37.2	17	2	11.8		2	
314	48620	10.4	*	0	---		0	
315	48621	15.6	78	10	12.8		9	
316	48622	13.1	437	81	18.5		80	
317	48623	18.6	935	138	14.8		136	
318	48624	15.8	959	162	16.9		162	
319	48625	10.2	809	208	25.7		206	
320	48626	22.7	333	57	17.1		56	
321	48627	26.8	6	2	33.3		2	
322	48628	14.3	106	7	6.6		7	
323	48629	15.7	380	79	20.8		79	
324	48630	49.4	2	0	0.0		0	
325	48631	27.2	284	43	15.1		41	
326	48632	13.8	301	57	18.9		56	
327	48633	22.7	4	1	25.0		1	
328	48634	25.2	256	31	12.1		31	
329	48635	23.4	70	4	5.7		4	
330	48636	19.1	42	1	2.4		0	
331	48637	35.3	213	41	19.2		41	
332	48638	*	805	208	25.8		202	

	I	J	K	L	M	N	O	P	Q	R	S	T	U
285	4	0		0	0	0	0		0	0.0		4	1.3
286	0	0		0	1	1	0		2	10.5		2	10.5
287	0	0		0	0	0	0		0	0.0		0	0.0
288	0	0		0	0	0	0		0	0.0		0	0.0
289	9	3		11	4	4	0		19	3.8		31	6.2
290	16	1		12	1	1	0		14	2.1		31	4.6
291	11	1		14	1	1	0		16	2.6		28	4.6
292	8	1		7	1	1	0		9	1.6		18	3.3
293	12	0		3	1	1	0		5	0.7		17	2.2
294	1	0		1	0	0	0		1	0.9		2	1.8
295	3	0		0	0	0	0		0	0.0		3	2.4
296	0	0		0	0	0	0		0	0.0		0	0.0
297	4	1		3	0	0	0		3	0.8		8	2.0
298	27	3		13	3	3	0		19	1.6		49	4.1
299	31	4		11	3	3	0		17	2.2		52	6.7
300	2	1		0	0	0	0		0	0.0		3	0.8
301	2	0		0	0	0	0		0	0.0		2	1.3
302	1	0		0	1	1	0		2	6.7		3	10.0
303	0	0		0	0	0	0		0	0.0		0	0.0
304	0	0		0	0	0	0		0	0.0		0	0.0
305	0	0		1	0	0	0		1	2.0		1	2.0
306	0	0		0	0	0	0		0	0.0		0	0.0
307	0	0		0	0	0	0		0	0.0		0	0.0
308	0	0		0	0	0	0		0	0.0		0	0.0
309	0	0		0	0	0	0		0	0.0		0	0.0
310	2	0		0	0	0	0		0	0.0		2	1.8
311	0	0		0	0	0	0		0	0.0		0	0.0
312	0	0		0	1	1	0		2	4.7		2	4.7
313	0	0		0	0	0	0		0	0.0		0	0.0
314	0	0		0	0	0	0		0	---		0	---
315	0	1		0	0	0	0		0	0.0		1	10.0
316	1	0		0	0	0	0		0	0.0		1	1.2
317	2	0		0	0	0	0		0	0.0		2	1.4
318	0	0		0	0	0	0		0	0.0		0	0.0
319	2	0		0	0	0	0		0	0.0		2	1.0
320	1	0		0	0	0	0		0	0.0		1	1.8
321	0	0		0	0	0	0		0	0.0		0	0.0
322	0	0		0	0	0	0		0	0.0		0	0.0
323	0	0		0	0	0	0		0	0.0		0	0.0
324	0	0		0	0	0	0		0	---		0	---
325	2	0		0	0	0	0		0	0.0		2	4.7
326	1	0		0	0	0	0		0	0.0		1	1.8
327	0	0		0	0	0	0		0	0.0		0	0.0
328	0	0		0	0	0	0		0	0.0		0	0.0
329	0	0		0	0	0	0		0	0.0		0	0.0
330	1	0		0	0	0	0		0	0.0		1	100.0
331	0	0		0	0	0	0		0	0.0		0	0.0
332	5	0		1	0	0	0		1	0.5		6	2.9

	A	B	C	D	E	F	G	H
333	48640	21.4	2,199	170	7.7		167	
334	48642	11.3	2,359	191	8.1		190	
335	48647	23.2	335	16	4.8		16	
336	48649	35.6	81	30	37.0		30	
337	48650	21.6	475	70	14.7		70	
338	48651	13.8	220	51	23.2		51	
339	48652	13.6	86	12	14.0		12	
340	48653	18.1	520	60	11.5		60	
341	48654	15.2	127	8	6.3		8	
342	48655	29.5	419	97	23.2		96	
343	48656	10.8	170	35	20.6		35	
344	48657	10.5	449	40	8.9		40	
345	48658	24.3	350	59	16.9		58	
346	48659	24.7	197	44	22.3		44	
347	48661	19.7	659	59	9.0		58	
348	48662	44.8	103	12	11.7		12	
349	48701	47.5	131	31	23.7		30	
350	48703	21.1	151	29	19.2		29	
351	48705	19.5	12	1	8.3		1	
352	48706	33.5	2,707	546	20.2		529	
353	48708	59.1	2,246	472	21.0		444	
354	48720	57.8	40	11	27.5		10	
355	48721	15.0	17	3	17.6		3	
356	48722	17.1	214	42	19.6		42	
357	48723	31.4	809	238	29.4		234	
358	48724	47.5	26	10	38.5		9	
359	48725	14.8	105	24	22.9		24	
360	48726	37.7	474	90	19.0		89	
361	48727	33.2	84	15	17.9		14	
362	48728	24.5	7	0	0.0		0	
363	48729	33.3	111	17	15.3		16	
364	48730	29.3	212	17	8.0		17	
365	48731	44.5	125	24	19.2		23	
366	48732	22.5	700	140	20.0		139	
367	48733	46.4	120	26	21.7		25	
368	48734	20.2	396	44	11.1		44	
369	48735	48.0	88	16	18.2		16	
370	48737	19.2	38	4	10.5		3	
371	48738	22.6	47	3	6.4		3	
372	48739	19.0	173	12	6.9		12	
373	48740	24.2	109	13	11.9		12	
374	48741	32.3	152	35	23.0		34	
375	48742	19.9	55	9	16.4		9	
376	48743	26.1	1	0	0.0		0	
377	48744	30.3	291	63	21.6		62	
378	48745	21.4	51	11	21.6		11	
379	48746	22.1	532	115	21.6		115	
380	48747	44.3	94	22	23.4		22	

	I	J	K	L	M	N	O	P	Q	R	S	T	U
333	2	0		1	0	0	0		1	0.6		3	1.8
334	0	0		1	0	0	0		1	0.5		1	0.5
335	0	0		0	0	0	0		0	0.0		0	0.0
336	0	0		0	0	0	0		0	0.0		0	0.0
337	0	0		0	0	0	0		0	0.0		0	0.0
338	0	0		0	0	0	0		0	0.0		0	0.0
339	0	0		0	0	0	0		0	0.0		0	0.0
340	0	0		0	0	0	0		0	0.0		0	0.0
341	0	0		0	0	0	0		0	0.0		0	0.0
342	1	0		0	0	0	0		0	0.0		1	1.0
343	0	0		0	0	0	0		0	0.0		0	0.0
344	0	0		0	0	0	0		0	0.0		0	0.0
345	1	0		0	0	0	0		0	0.0		1	1.7
346	0	0		0	0	0	0		0	0.0		0	0.0
347	0	0		1	0	0	0		1	1.7		1	1.7
348	0	0		0	0	0	0		0	0.0		0	0.0
349	1	0		0	0	0	0		0	0.0		1	3.2
350	0	0		0	0	0	0		0	0.0		0	0.0
351	0	0		0	0	0	0		0	0.0		0	0.0
352	12	1		1	1	1	0		3	0.5		16	2.9
353	15	1		8	2	2	1		13	2.8		29	6.1
354	0	0		1	0	0	0		1	9.1		1	9.1
355	0	0		0	0	0	0		0	0.0		0	0.0
356	0	0		0	0	0	0		0	0.0		0	0.0
357	3	0		0	1	1	0		2	0.8		5	2.1
358	1	0		0	0	0	0		0	0.0		1	10.0
359	0	0		0	0	0	0		0	0.0		0	0.0
360	1	0		0	0	0	0		0	0.0		1	1.1
361	0	0		0	1	1	0		2	13.3		2	13.3
362	0	0		0	0	0	0		0	---		0	---
363	1	0		0	0	0	0		0	0.0		1	5.9
364	0	0		0	0	0	0		0	0.0		0	0.0
365	1	0		0	0	0	0		0	0.0		1	4.2
366	1	0		0	0	0	0		0	0.0		1	0.7
367	1	0		0	0	0	0		0	0.0		1	3.8
368	0	0		0	0	0	0		0	0.0		0	0.0
369	0	0		0	0	0	0		0	0.0		0	0.0
370	1	0		0	0	0	0		0	0.0		1	25.0
371	0	0		0	0	0	0		0	0.0		0	0.0
372	0	0		0	0	0	0		0	0.0		0	0.0
373	1	0		0	0	0	0		0	0.0		1	7.7
374	1	0		0	0	0	0		0	0.0		1	2.9
375	0	0		0	0	0	0		0	0.0		0	0.0
376	0	0		0	0	0	0		0	---		0	---
377	1	0		0	0	0	0		0	0.0		1	1.6
378	0	0		0	0	0	0		0	0.0		0	0.0
379	0	0		0	0	0	0		0	0.0		0	0.0
380	0	0		0	0	0	0		0	0.0		0	0.0

	A	B	C	D	E	F	G	H
381	48748	16.8	66	8	12.1		8	
382	48749	15.4	57	18	31.6		18	
383	48750	14.0	475	77	16.2		73	
384	48754	50.0	62	22	35.5		22	
385	48755	27.3	153	30	19.6		30	
386	48756	14.5	322	21	6.5		21	
387	48757	30.8	239	60	25.1		60	
388	48759	43.8	209	47	22.5		45	
389	48760	23.3	119	18	15.1		17	
390	48761	18.4	27	4	14.8		4	
391	48762	25.6	39	4	10.3		3	
392	48763	25.3	232	22	9.5		22	
393	48765	27.6	34	8	23.5		8	
394	48766	22.9	64	17	26.6		17	
395	48767	59.1	151	24	15.9		24	
396	48768	30.5	634	150	23.7		149	
397	48770	27.8	99	7	7.1		7	
398	48801	36.0	965	177	18.3		175	
399	48804	*	*	2	---		2	
400	48806	44.2	95	23	24.2		23	
401	48807	37.0	61	6	9.8		6	
402	48808	19.9	391	45	11.5		44	
403	48809	35.7	862	165	19.1		159	
404	48811	49.8	290	52	17.9		52	
405	48813	36.7	1,515	216	14.3		210	
406	48815	41.4	210	28	13.3		28	
407	48817	35.4	442	116	26.2		115	
408	48818	32.0	180	25	13.9		25	
409	48819	34.4	207	24	11.6		23	
410	48820	15.5	1,215	97	8.0		96	
411	48821	19.2	268	35	13.1		35	
412	48822	33.4	152	12	7.9		12	
413	48823	13.8	2,121	348	16.4		339	
414	48827	30.7	1,134	142	12.5		137	
415	48829	34.9	229	50	21.8		50	
416	48830	44.4	*	1	---		1	
417	48831	52.7	241	28	11.6		28	
418	48832	24.1	89	9	10.1		9	
419	48834	32.8	147	20	13.6		18	
420	48835	45.2	253	10	4.0		10	
421	48836	26.2	1,158	111	9.6		107	
422	48837	27.3	1,248	115	9.2		112	
423	48838	24.4	1,485	227	15.3		222	
424	48840	8.5	669	104	15.5		101	
425	48841	54.9	50	14	28.0		14	
426	48842	11.4	1,582	252	15.9		248	
427	48843	15.8	3,324	268	8.1		267	
428	48845	53.1	60	5	8.3		5	

	I	J	K	L	M	N	O	P	Q	R	S	T	U
381	0	0		0	0	0	0		0	0.0		0	0.0
382	0	0		0	0	0	0		0	0.0		0	0.0
383	3	0		1	0	0	0		1	1.3		4	5.2
384	0	0		0	0	0	0		0	0.0		0	0.0
385	0	0		0	0	0	0		0	0.0		0	0.0
386	0	0		0	0	0	0		0	0.0		0	0.0
387	0	0		0	0	0	0		0	0.0		0	0.0
388	2	0		0	0	0	0		0	0.0		2	4.3
389	1	0		0	0	0	0		0	0.0		1	5.6
390	0	0		0	0	0	0		0	0.0		0	0.0
391	1	0		0	0	0	0		0	0.0		1	25.0
392	0	0		0	0	0	0		0	0.0		0	0.0
393	0	0		0	0	0	0		0	0.0		0	0.0
394	0	0		0	0	0	0		0	0.0		0	0.0
395	0	0		0	0	0	0		0	0.0		0	0.0
396	1	0		0	0	0	0		0	0.0		1	0.7
397	0	0		0	0	0	0		0	0.0		0	0.0
398	1	0		1	0	0	0		1	0.6		2	1.1
399	0	0		0	0	0	0		0	0.0		0	0.0
400	0	0		0	0	0	0		0	0.0		0	0.0
401	0	0		0	0	0	0		0	0.0		0	0.0
402	0	0		1	0	0	0		1	2.2		1	2.2
403	3	0		2	0	0	0		2	1.2		5	3.0
404	0	0		0	0	0	0		0	0.0		0	0.0
405	4	1		1	0	0	0		1	0.5		6	2.8
406	0	0		0	0	0	0		0	0.0		0	0.0
407	1	0		0	0	0	0		0	0.0		1	0.9
408	0	0		0	0	0	0		0	0.0		0	0.0
409	0	0		0	0	0	0		0	0.0		0	0.0
410	0	0		1	0	0	0		1	1.0		1	1.0
411	0	0		0	0	0	0		0	0.0		0	0.0
412	0	0		0	0	0	0		0	0.0		0	0.0
413	8	0		1	0	0	0		1	0.3		9	2.6
414	5	0		0	0	0	0		0	0.0		5	3.5
415	0	0		0	0	0	0		0	0.0		0	0.0
416	0	0		0	0	0	0		0	0.0		0	0.0
417	0	0		0	0	0	0		0	0.0		0	0.0
418	0	0		0	0	0	0		0	0.0		0	0.0
419	1	0		0	1	1	0		2	10.0		3	15.0
420	0	0		0	0	0	0		0	0.0		0	0.0
421	1	0		2	1	1	0		4	3.6		5	4.5
422	3	0		0	0	0	0		0	0.0		3	2.6
423	4	0		1	0	0	0		1	0.4		5	2.2
424	2	0		1	0	0	0		1	1.0		3	2.9
425	0	0		0	0	0	0		0	0.0		0	0.0
426	4	0		0	0	0	0		0	0.0		4	1.6
427	0	0		1	0	0	0		1	0.4		1	0.4
428	0	0		0	0	0	0		0	0.0		0	0.0

	A	B	C	D	E	F	G	H
429	48846	42.1	1,373	317	23.1		302	
430	48847	47.3	395	74	18.7		72	
431	48848	22.5	523	59	11.3		57	
432	48849	44.5	441	61	13.8		60	
433	48850	30.6	336	42	12.5		42	
434	48851	31.6	185	27	14.6		27	
435	48852	79.1	15	1	6.7		1	
436	48853	61.1	59	7	11.9		7	
437	48854	27.7	1,174	233	19.8		233	
438	48855	*	1,087	76	7.0		76	
439	48856	61.4	76	13	17.1		13	
440	48857	31.8	184	32	17.4		32	
441	48858	17.0	2,693	419	15.6		412	
442	48860	42.0	106	24	22.6		21	
443	48861	41.3	114	12	10.5		12	
444	48864	6.4	1,210	140	11.6		137	
445	48865	29.3	122	33	27.0		33	
446	48866	43.5	367	70	19.1		69	
447	48867	42.9	2,012	616	30.6		592	
448	48870	*	11	3	27.3		3	
449	48871	31.4	126	11	8.7		11	
450	48872	25.6	574	98	17.1		94	
451	48873	46.0	133	11	8.3		10	
452	48874	79.0	22	6	27.3		6	
453	48875	35.1	869	111	12.8		109	
454	48876	18.0	374	43	11.5		41	
455	48877	22.9	166	31	18.7		31	
456	48878	35.9	155	26	16.8		26	
457	48879	38.6	1,387	166	12.0		164	
458	48880	35.1	566	101	17.8		100	
459	48881	31.3	422	52	12.3		51	
460	48883	25.1	567	78	13.8		78	
461	48884	30.5	304	59	19.4		59	
462	48885	36.5	66	8	12.1		8	
463	48886	23.2	151	20	13.2		20	
464	48888	26.2	426	93	21.8		88	
465	48889	35.3	77	12	15.6		12	
466	48890	42.3	164	16	9.8		16	
467	48891	24.1	199	30	15.1		30	
468	48892	33.3	330	77	23.3		77	
469	48893	10.3	421	52	12.4		52	
470	48894	39.4	188	18	9.6		17	
471	48895	26.0	750	84	11.2		84	
472	48896	44.9	23	4	17.4		3	
473	48897	55.5	99	9	9.1		9	
474	48906	39.6	2,458	679	27.6		650	
475	48910	37.7	3,059	827	27.0		810	
476	48911	8.3	3,773	1257	33.3		1223	

	I	J	K	L	M	N	O	P	Q	R	S	T	U
429	12	1		2	0	0	0		2	0.6		15	4.7
430	2	0		0	0	0	0		0	0.0		2	2.7
431	1	0		0	1	1	0		2	3.4		3	5.1
432	1	0		0	0	0	0		0	0.0		1	1.6
433	0	0		0	0	0	0		0	0.0		0	0.0
434	0	0		0	0	0	0		0	0.0		0	0.0
435	0	0		0	0	0	0		0	0.0		0	0.0
436	0	0		0	0	0	0		0	0.0		0	0.0
437	0	0		0	0	0	0		0	0.0		0	0.0
438	0	0		0	0	0	0		0	0.0		0	0.0
439	0	0		0	0	0	0		0	0.0		0	0.0
440	0	0		0	0	0	0		0	0.0		0	0.0
441	7	0		0	0	0	0		0	0.0		7	1.7
442	3	0		0	0	0	0		0	0.0		3	12.5
443	0	0		0	0	0	0		0	0.0		0	0.0
444	2	0		1	0	0	0		1	0.7		3	2.1
445	0	0		0	0	0	0		0	0.0		0	0.0
446	0	0		1	0	0	0		1	1.4		1	1.4
447	13	2		9	0	0	0		9	1.5		24	3.9
448	0	0		0	0	0	0		0	0.0		0	0.0
449	0	0		0	0	0	0		0	0.0		0	0.0
450	2	0		2	0	0	0		2	2.0		4	4.1
451	1	0		0	0	0	0		0	0.0		1	9.1
452	0	0		0	0	0	0		0	0.0		0	0.0
453	0	0		2	0	0	0		2	1.8		2	1.8
454	1	1		0	0	0	0		0	0.0		2	4.7
455	0	0		0	0	0	0		0	0.0		0	0.0
456	0	0		0	0	0	0		0	0.0		0	0.0
457	0	0		2	0	0	0		2	1.2		2	1.2
458	1	0		0	0	0	0		0	0.0		1	1.0
459	0	1		0	0	0	0		0	0.0		1	1.9
460	0	0		0	0	0	0		0	0.0		0	0.0
461	0	0		0	0	0	0		0	0.0		0	0.0
462	0	0		0	0	0	0		0	0.0		0	0.0
463	0	0		0	0	0	0		0	0.0		0	0.0
464	2	0		3	0	0	0		3	3.2		5	5.4
465	0	0		0	0	0	0		0	0.0		0	0.0
466	0	0		0	0	0	0		0	0.0		0	0.0
467	0	0		0	0	0	0		0	0.0		0	0.0
468	0	0		0	0	0	0		0	0.0		0	0.0
469	0	0		0	0	0	0		0	0.0		0	0.0
470	0	0		1	0	0	0		1	5.6		1	5.6
471	0	0		0	0	0	0		0	0.0		0	0.0
472	0	0		1	0	0	0		1	25.0		1	25.0
473	0	0		0	0	0	0		0	0.0		0	0.0
474	20	1		3	4	4	0		11	1.6		32	4.7
475	9	2		4	2	2	0		8	1.0		19	2.3
476	22	1		6	3	3	0		12	1.0		35	2.8

	A	B	C	D	E	F	G	H
477	48912	48.3	1,219	301	24.7		288	
478	48915	61.2	889	309	34.8		293	
479	48917	9.6	2,040	409	20.0		396	
480	48933	42.8	118	27	22.9		27	
481	49001	44.5	2,232	515	23.1		485	
482	49002	13.4	1,531	205	13.4		203	
483	49004	22.5	1,203	199	16.5		197	
484	49006	15.1	1,359	276	20.3		271	
485	49007	61.2	838	245	29.2		226	
486	49008	32.6	1,019	174	17.1		170	
487	49009	7.5	2,965	390	13.2		386	
488	49010	31.7	1,339	258	19.3		247	
489	49011	43.1	142	31	21.8		29	
490	49012	32.0	165	27	16.4		27	
491	49013	33.1	487	79	16.2		77	
492	49014	32.3	1,652	419	25.4		399	
493	49015	30.1	2,230	519	23.3		507	
494	49017	39.0	1,430	353	24.7		333	
495	49021	36.5	443	77	17.4		77	
496	49022	34.2	3,136	773	24.6		742	
497	49024	4.5	2,295	312	13.6		309	
498	49026	33.1	153	23	15.0		22	
499	49027	70.5	15	1	6.7		1	
500	49028	38.9	562	99	17.6		97	
501	49029	48.3	104	17	16.3		17	
502	49030	44.3	269	26	9.7		25	
503	49031	32.0	547	51	9.3		46	
504	49032	39.4	230	35	15.2		32	
505	49033	33.4	82	9	11.0		9	
506	49034	39.6	141	17	12.1		17	
507	49036	32.0	1,739	374	21.5		359	
508	49037	*	2,157	612	28.4		590	
509	49038	30.2	618	71	11.5		69	
510	49040	37.0	266	28	10.5		27	
511	49042	41.1	394	84	21.3		81	
512	49043	31.0	212	30	14.2		28	
513	49045	39.3	429	70	16.3		69	
514	49046	25.1	428	62	14.5		60	
515	49047	36.8	1,165	187	16.1		183	
516	49048	*	2,350	535	22.8		524	
517	49050	26.1	85	23	27.1		22	
518	49051	30.1	160	19	11.9		19	
519	49052	53.0	70	11	15.7		11	
520	49053	24.7	553	90	16.3		89	
521	49055	21.8	402	58	14.4		56	
522	49056	28.4	312	82	26.3		81	
523	49057	35.1	674	123	18.2		120	
524	49058	34.4	1,432	163	11.4		154	

	I	J	K	L	M	N	O	P	Q	R	S	T	U
477	8	0		4	0	0	0		4	1.3		12	4.0
478	13	0		2	1	1	0		4	1.3		17	5.5
479	8	0		3	1	1	0		5	1.2		13	3.2
480	0	0		0	0	0	0		0	0.0		0	0.0
481	16	3		9	0	0	1		10	1.9		29	5.6
482	2	0		0	0	0	0		0	0.0		2	1.0
483	0	1		1	0	0	0		1	0.5		2	1.0
484	3	1		1	0	0	0		1	0.4		5	1.8
485	11	1		3	3	3	0		9	3.7		21	8.6
486	2	0		2	0	0	0		2	1.1		4	2.3
487	2	0		1	1	1	0		3	0.8		5	1.3
488	11	0		0	0	0	0		0	0.0		11	4.3
489	1	0		0	0	0	0		0	0.0		1	3.2
490	0	0		0	0	0	0		0	0.0		0	0.0
491	0	0		1	0	0	0		1	1.3		1	1.3
492	6	0		10	3	3	0		16	3.8		22	5.3
493	6	0		6	0	0	0		6	1.2		12	2.3
494	7	0		9	3	3	0		15	4.2		22	6.2
495	0	0		0	0	0	0		0	0.0		0	0.0
496	9	3		13	3	3	0		19	2.5		31	4.0
497	3	0		0	0	0	0		0	0.0		3	1.0
498	1	0		0	0	0	0		0	0.0		1	4.3
499	0	0		0	0	0	0		0	0.0		0	0.0
500	2	0		0	0	0	0		0	0.0		2	2.0
501	0	0		0	0	0	0		0	0.0		0	0.0
502	0	0		0	1	1	0		2	7.7		2	7.7
503	3	0		2	0	0	0		2	3.9		5	9.8
504	2	0		1	0	0	0		1	2.9		3	8.6
505	0	0		0	0	0	0		0	0.0		0	0.0
506	0	0		0	0	0	0		0	0.0		0	0.0
507	10	1		1	3	3	0		7	1.9		18	4.8
508	4	0		15	0	0	0		15	2.5		19	3.1
509	1	0		1	0	0	0		1	1.4		2	2.8
510	0	0		1	0	0	0		1	3.6		1	3.6
511	2	0		0	1	1	0		2	2.4		4	4.8
512	0	1		0	0	0	0		0	0.0		1	3.3
513	1	0		0	0	0	0		0	0.0		1	1.4
514	2	0		0	0	0	0		0	0.0		2	3.2
515	2	1		1	0	0	0		1	0.5		4	2.1
516	6	1		4	0	0	0		4	0.7		11	2.1
517	1	0		0	0	0	0		0	0.0		1	4.3
518	0	0		0	0	0	0		0	0.0		0	0.0
519	0	0		0	0	0	0		0	0.0		0	0.0
520	1	0		0	0	0	0		0	0.0		1	1.1
521	1	0		1	0	0	0		1	1.7		2	3.4
522	0	1		0	0	0	0		0	0.0		1	1.2
523	1	0		2	0	0	0		2	1.6		3	2.4
524	7	0		1	1	1	0		3	1.8		10	6.1

	A	B	C	D	E	F	G	H
525	49060	40.1	88	14	15.9		13	
526	49061	35.5	107	12	11.2		12	
527	49064	33.3	276	39	14.1		39	
528	49065	22.9	449	54	12.0		52	
529	49066	62.9	63	7	11.1		7	
530	49067	40.8	298	35	11.7		35	
531	49068	38.6	972	157	16.2		150	
532	49070	34.4	210	24	11.4		22	
533	49071	11.4	720	80	11.1		76	
534	49072	37.4	230	34	14.8		33	
535	49073	45.8	383	51	13.3		42	
536	49075	12.5	11	7	63.6		7	
537	49076	36.9	278	22	7.9		21	
538	49078	35.8	612	95	15.5		92	
539	49079	29.5	1,056	109	10.3		102	
540	49080	25.4	1,168	154	13.2		152	
541	49082	39.0	602	88	14.6		85	
542	49083	20.3	452	59	13.1		57	
543	49085	28.8	1,430	82	5.7		81	
544	49087	26.0	431	45	10.4		44	
545	49088	31.4	270	31	11.5		30	
546	49089	41.7	142	25	17.6		24	
547	49090	33.2	954	154	16.1		148	
548	49091	33.0	1,880	370	19.7		360	
549	49092	50.9	145	16	11.0		16	
550	49093	33.8	1,480	340	23.0		323	
551	49094	45.3	295	57	19.3		56	
552	49095	24.4	108	14	13.0		14	
553	49096	44.5	262	32	12.2		31	
554	49097	30.6	757	92	12.2		92	
555	49098	38.6	461	61	13.2		60	
556	49099	26.0	351	80	22.8		75	
557	49101	29.0	208	20	9.6		20	
558	49102	42.3	91	7	7.7		6	
559	49103	24.2	751	144	19.2		139	
560	49106	18.3	272	27	9.9		26	
561	49107	35.6	731	115	15.7		111	
562	49111	34.8	225	59	26.2		59	
563	49112	21.0	730	51	7.0		50	
564	49113	44.5	127	17	13.4		16	
565	49115	42.5	7	2	28.6		2	
566	49116	59.5	14	0	0.0		0	
567	49117	30.2	197	24	12.2		23	
568	49119	64.3	11	1	9.1		1	
569	49120	33.8	2,812	487	17.3		480	
570	49125	52.7	96	9	9.4		9	
571	49126	26.9	95	28	29.5		28	
572	49127	13.0	714	54	7.6		52	

	I	J	K	L	M	N	O	P	Q	R	S	T	U
525	0	0		1	0	0	0		1	7.1		1	7.1
526	0	0		0	0	0	0		0	0.0		0	0.0
527	0	0		0	0	0	0		0	0.0		0	0.0
528	0	0		2	0	0	0		2	3.7		2	3.7
529	0	0		0	0	0	0		0	0.0		0	0.0
530	0	0		0	0	0	0		0	0.0		0	0.0
531	1	0		5	1	1	0		7	4.5		8	5.1
532	2	0		0	0	0	0		0	0.0		2	8.3
533	2	0		2	0	0	0		2	2.5		4	5.0
534	1	0		0	0	0	0		0	0.0		1	2.9
535	8	0		1	0	0	0		1	2.0		9	17.6
536	0	0		0	0	0	0		0	0.0		0	0.0
537	1	0		0	0	0	0		0	0.0		1	4.5
538	1	0		2	0	0	0		2	2.1		3	3.2
539	0	0		6	1	1	0		8	7.3		8	7.3
540	1	1		0	0	0	0		0	0.0		2	1.3
541	3	0		0	0	0	0		0	0.0		3	3.4
542	1	0		1	0	0	0		1	1.7		2	3.4
543	0	0		1	0	0	0		1	1.2		1	1.2
544	0	0		1	0	0	0		1	2.2		1	2.2
545	1	0		0	0	0	0		0	0.0		1	3.2
546	1	0		0	0	0	0		0	0.0		1	4.0
547	3	0		3	0	0	0		3	1.9		6	3.9
548	7	1		1	0	0	0		1	0.3		9	2.4
549	0	0		0	0	0	0		0	0.0		0	0.0
550	10	3		4	0	0	0		4	1.2		17	5.0
551	1	0		0	0	0	0		0	0.0		1	1.8
552	0	0		0	0	0	0		0	0.0		0	0.0
553	0	1		0	0	0	0		0	0.0		1	3.1
554	0	0		0	0	0	0		0	0.0		0	0.0
555	0	0		1	0	0	0		1	1.6		1	1.6
556	5	0		0	0	0	0		0	0.0		5	6.3
557	0	0		0	0	0	0		0	0.0		0	0.0
558	1	0		0	0	0	0		0	0.0		1	14.3
559	3	0		1	0	0	0		1	0.7		4	2.8
560	0	0		0	0	0	0		0	0.0		0	0.0
561	1	1		1	1	1	0		3	2.6		5	4.3
562	0	0		0	0	0	0		0	0.0		0	0.0
563	0	0		0	1	1	0		2	3.9		2	3.9
564	1	0		0	0	0	0		0	0.0		1	5.9
565	0	0		0	0	0	0		0	0.0		0	0.0
566	0	0		0	0	0	0		0	---		0	---
567	1	0		0	0	0	0		0	0.0		1	4.2
568	0	0		0	0	0	0		0	0.0		0	0.0
569	5	1		1	0	0	0		1	0.2		7	1.4
570	0	0		0	0	0	0		0	0.0		0	0.0
571	0	0		0	0	0	0		0	0.0		0	0.0
572	2	0		0	0	0	0		0	0.0		2	3.7

	A	B	C	D	E	F	G	H
573	49128	42.8	212	29	13.7		26	
574	49129	53.1	27	1	3.7		1	
575	49130	19.9	83	12	14.5		11	
576	49201	26.9	2,651	693	26.1		661	
577	49202	46.2	1,986	536	27.0		508	
578	49203	46.1	3,407	858	25.2		783	
579	49220	33.9	145	33	22.8		33	
580	49221	37.2	2,982	638	21.4		560	
581	49224	45.8	1,065	153	14.4		139	
582	49227	45.3	95	27	28.4		26	
583	49228	55.7	392	45	11.5		43	
584	49229	49.3	181	35	19.3		32	
585	49230	22.4	506	96	19.0		95	
586	49232	35.9	289	59	20.4		57	
587	49233	28.1	174	30	17.2		28	
588	49234	38.3	119	32	26.9		29	
589	49235	49.6	151	28	18.5		25	
590	49236	35.8	312	28	9.0		27	
591	49237	36.9	196	53	27.0		51	
592	49238	54.6	153	26	17.0		25	
593	49240	27.8	587	79	13.5		79	
594	49241	32.1	196	39	19.9		36	
595	49242	40.9	1,032	289	28.0		280	
596	49245	40.9	393	58	14.8		57	
597	49246	23.7	151	40	26.5		39	
598	49247	49.3	405	85	21.0		72	
599	49248	76.0	58	8	13.8		7	
600	49249	18.5	236	41	17.4		40	
601	49250	37.4	475	107	22.5		104	
602	49251	33.5	428	108	25.2		105	
603	49252	42.4	208	50	24.0		50	
604	49253	36.1	162	25	15.4		24	
605	49254	49.6	171	45	26.3		44	
606	49255	53.1	227	24	10.6		23	
607	49256	54.8	318	55	17.3		48	
608	49259	26.7	170	36	21.2		35	
609	49261	---	---	4	---		4	
610	49262	54.2	71	13	18.3		13	
611	49263	53.3	6	0	0.0		0	
612	49264	28.9	135	20	14.8		20	
613	49265	28.1	307	39	12.7		36	
614	49266	37.8	226	64	28.3		63	
615	49267	39.6	247	22	8.9		22	
616	49268	62.6	82	7	8.5		5	
617	49269	28.4	418	73	17.5		71	
618	49270	28.9	347	54	15.6		52	
619	49271	54.7	137	39	28.5		39	
620	49272	33.9	141	22	15.6		22	

	I	J	K	L	M	N	O	P	Q	R	S	T	U
573	1	0		2	0	0	0		2	6.9		3	10.3
574	0	0		0	0	0	0		0	0.0		0	0.0
575	1	0		0	0	0	0		0	0.0		1	8.3
576	21	3		6	1	1	0		8	1.2		32	4.6
577	19	4		5	0	0	0		5	0.9		28	5.2
578	52	6		13	1	1	0		15	1.7		73	8.5
579	0	0		0	0	0	0		0	0.0		0	0.0
580	52	8		14	1	1	0		16	2.5		76	11.9
581	9	0		5	0	0	0		5	3.3		14	9.2
582	1	0		0	0	0	0		0	0.0		1	3.7
583	0	1		1	0	0	0		1	2.2		2	4.4
584	3	0		0	0	0	0		0	0.0		3	8.6
585	1	0		0	0	0	0		0	0.0		1	1.0
586	1	0		1	0	0	0		1	1.7		2	3.4
587	2	0		0	0	0	0		0	0.0		2	6.7
588	0	1		1	1	1	0		3	9.4		4	12.5
589	2	1		0	0	0	0		0	0.0		3	10.7
590	1	0		0	0	0	0		0	0.0		1	3.6
591	2	0		0	0	0	0		0	0.0		2	3.8
592	1	0		0	0	0	0		0	0.0		1	3.8
593	0	0		0	0	0	0		0	0.0		0	0.0
594	2	0		1	0	0	0		1	2.6		3	7.7
595	7	1		1	0	0	0		1	0.3		9	3.1
596	1	0		0	0	0	0		0	0.0		1	1.7
597	1	0		0	0	0	0		0	0.0		1	2.5
598	2	3		6	1	1	0		8	9.4		13	15.3
599	0	1		0	0	0	0		0	0.0		1	12.5
600	1	0		0	0	0	0		0	0.0		1	2.4
601	3	0		0	0	0	0		0	0.0		3	2.8
602	3	0		0	0	0	0		0	0.0		3	2.8
603	0	0		0	0	0	0		0	0.0		0	0.0
604	0	1		0	0	0	0		0	0.0		1	4.0
605	1	0		0	0	0	0		0	0.0		1	2.2
606	1	0		0	0	0	0		0	0.0		1	4.2
607	7	0		0	0	0	0		0	0.0		7	12.7
608	0	0		1	0	0	0		1	2.8		1	2.8
609	0	0		0	0	0	0		0	0.0		0	0.0
610	0	0		0	0	0	0		0	0.0		0	0.0
611	0	0		0	0	0	0		0	---		0	---
612	0	0		0	0	0	0		0	0.0		0	0.0
613	2	1		0	0	0	0		0	0.0		3	7.7
614	1	0		0	0	0	0		0	0.0		1	1.6
615	0	0		0	0	0	0		0	0.0		0	0.0
616	2	0		0	0	0	0		0	0.0		2	28.6
617	2	0		0	0	0	0		0	0.0		2	2.7
618	2	0		0	0	0	0		0	0.0		2	3.7
619	0	0		0	0	0	0		0	0.0		0	0.0
620	0	0		0	0	0	0		0	0.0		0	0.0

	A	B	C	D	E	F	G	H
621	49274	40.3	317	65	20.5		64	
622	49276	66.0	58	5	8.6		5	
623	49277	23.9	237	44	18.6		42	
624	49279	57.6	59	5	8.5		5	
625	49282	6.9	11	10	90.9		10	
626	49283	15.6	187	52	27.8		51	
627	49284	40.4	225	44	19.6		41	
628	49285	34.9	395	81	20.5		77	
629	49286	26.5	1,016	119	11.7		115	
630	49287	29.8	153	13	8.5		11	
631	49288	64.2	116	38	32.8		37	
632	49289	64.9	9	2	22.2		2	
633	49301	13.7	1,477	139	9.4		139	
634	49302	21.0	570	45	7.9		44	
635	49303	30.7	107	9	8.4		9	
636	49304	13.8	230	50	21.7		49	
637	49305	22.0	151	23	15.2		22	
638	49306	9.9	651	66	10.1		66	
639	49307	25.6	1,132	151	13.3		151	
640	49309	15.8	75	9	12.0		9	
641	49310	33.7	251	19	7.6		19	
642	49312	3.2	14	6	42.9		6	
643	49315	17.7	1,597	168	10.5		166	
644	49316	16.7	1,763	160	9.1		156	
645	49318	42.0	106	32	30.2		32	
646	49319	17.1	1,478	222	15.0		218	
647	49320	---	---	4	---		4	
648	49321	8.9	1,462	298	20.4		296	
649	49322	40.4	101	15	14.9		15	
650	49323	13.8	876	44	5.0		42	
651	49325	37.9	161	10	6.2		10	
652	49326	14.4	258	21	8.1		21	
653	49327	22.4	756	94	12.4		93	
654	49328	39.7	312	21	6.7		20	
655	49329	17.8	729	95	13.0		92	
656	49330	30.4	524	113	21.6		110	
657	49331	21.6	1,332	166	12.5		161	
658	49332	22.1	158	19	12.0		19	
659	49333	21.6	1,037	95	9.2		94	
660	49335	71.8	27	0	0.0		0	
661	49336	26.1	367	28	7.6		27	
662	49337	20.6	848	80	9.4		80	
663	49338	14.4	130	20	15.4		20	
664	49339	32.5	178	21	11.8		21	
665	49340	29.0	184	30	16.3		30	
666	49341	14.3	2,878	272	9.5		270	
667	49342	23.3	124	14	11.3		14	
668	49343	22.4	456	64	14.0		63	

	I	J	K	L	M	N	O	P	Q	R	S	T	U
621	0	0		1	0	0	0		1	1.5		1	1.5
622	0	0		0	0	0	0		0	0.0		0	0.0
623	2	0		0	0	0	0		0	0.0		2	4.5
624	0	0		0	0	0	0		0	0.0		0	0.0
625	0	0		0	0	0	0		0	0.0		0	0.0
626	1	0		0	0	0	0		0	0.0		1	1.9
627	2	0		1	0	0	0		1	2.3		3	6.8
628	2	1		1	0	0	0		1	1.2		4	4.9
629	3	0		0	1	1	0		2	1.7		5	4.2
630	2	0		0	0	0	0		0	0.0		2	15.4
631	0	1		0	0	0	0		0	0.0		1	2.6
632	0	0		0	0	0	0		0	0.0		0	0.0
633	0	0		0	0	0	0		0	0.0		0	0.0
634	1	0		0	0	0	0		0	0.0		1	2.2
635	0	0		0	0	0	0		0	0.0		0	0.0
636	1	0		0	0	0	0		0	0.0		1	2.0
637	0	0		0	0	0	0		0	0.0		0	0.0
638	0	0		0	0	0	0		0	0.0		0	0.0
639	0	0		0	0	0	0		0	0.0		0	0.0
640	0	0		0	0	0	0		0	0.0		0	0.0
641	0	0		0	0	0	0		0	0.0		0	0.0
642	0	0		0	0	0	0		0	0.0		0	0.0
643	2	0		0	0	0	0		0	0.0		2	1.2
644	2	0		1	0	0	0		1	0.6		3	1.9
645	0	0		0	0	0	0		0	0.0		0	0.0
646	3	0		1	0	0	0		1	0.5		4	1.8
647	0	0		0	0	0	0		0	0.0		0	0.0
648	2	0		0	0	0	0		0	0.0		2	0.7
649	0	0		0	0	0	0		0	0.0		0	0.0
650	1	0		1	0	0	0		1	2.3		2	4.5
651	0	0		0	0	0	0		0	0.0		0	0.0
652	0	0		0	0	0	0		0	0.0		0	0.0
653	1	0		0	0	0	0		0	0.0		1	1.1
654	1	0		0	0	0	0		0	0.0		1	4.8
655	2	0		0	0	0	0		0	0.0		2	2.1
656	3	0		0	0	0	0		0	0.0		3	2.7
657	5	0		0	0	0	0		0	0.0		5	3.0
658	0	0		0	0	0	0		0	0.0		0	0.0
659	1	0		0	0	0	0		0	0.0		1	1.1
660	0	0		0	0	0	0		0	---		0	---
661	0	0		0	0	0	0		0	0.0		0	0.0
662	0	0		0	0	0	0		0	0.0		0	0.0
663	0	0		0	0	0	0		0	0.0		0	0.0
664	0	0		0	0	0	0		0	0.0		0	0.0
665	0	0		0	0	0	0		0	0.0		0	0.0
666	2	0		0	0	0	0		0	0.0		2	0.7
667	0	0		0	0	0	0		0	0.0		0	0.0
668	1	0		0	0	0	0		0	0.0		1	1.6

	A	B	C	D	E	F	G	H
669	49344	23.0	240	37	15.4		37	
670	49345	27.3	1,084	199	18.4		198	
671	49346	7.4	342	26	7.6		26	
672	49347	29.8	69	8	11.6		8	
673	49348	21.9	1,036	77	7.4		77	
674	49349	20.2	604	65	10.8		64	
675	49401	10.7	1,205	82	6.8		82	
676	49402	11.6	64	14	21.9		14	
677	49403	41.1	154	82	53.2		79	
678	49404	28.6	688	72	10.5		72	
679	49405	34.4	97	16	16.5		15	
680	49406	38.5	35	4	11.4		4	
681	49408	24.4	702	131	18.7		131	
682	49410	16.0	137	22	16.1		20	
683	49411	26.5	71	19	26.8		18	
684	49412	31.3	833	117	14.0		116	
685	49415	19.3	399	74	18.5		74	
686	49417	23.4	2,175	441	20.3		429	
687	49418	13.8	2,255	239	10.6		237	
688	49419	21.6	704	70	9.9		69	
689	49420	36.9	571	188	32.9		184	
690	49421	23.3	427	61	14.3		60	
691	49423	30.3	3,733	729	19.5		693	
692	49424	8.1	4,073	705	17.3		684	
693	49425	23.7	277	47	17.0		45	
694	49426	12.3	3,187	210	6.6		208	
695	49428	3.9	2,046	134	6.5		133	
696	49431	36.8	1,208	256	21.2		239	
697	49435	27.6	243	27	11.1		26	
698	49436	15.3	102	21	20.6		20	
699	49437	24.4	480	75	15.6		72	
700	49440	65.3	74	29	39.2		27	
701	49441	33.8	2,587	486	18.8		453	
702	49442	29.0	3,726	814	21.8		740	
703	49444	42.2	2,571	546	21.2		513	
704	49445	22.1	1,429	206	14.4		202	
705	49446	29.4	210	41	19.5		40	
706	49448	24.7	250	50	20.0		49	
707	49449	29.5	121	36	29.8		36	
708	49450	23.0	378	83	22.0		82	
709	49451	20.9	474	57	12.0		55	
710	49452	18.8	180	26	14.4		26	
711	49453	38.3	154	13	8.4		13	
712	49454	33.2	325	79	24.3		73	
713	49455	31.0	441	122	27.7		120	
714	49456	18.9	1,223	250	20.4		246	
715	49457	17.9	934	125	13.4		121	
716	49458	15.3	5	2	40.0		2	

	I	J	K	L	M	N	O	P	Q	R	S	T	U
669	0	0		0	0	0	0		0	0.0		0	0.0
670	0	0		1	0	0	0		1	0.5		1	0.5
671	0	0		0	0	0	0		0	0.0		0	0.0
672	0	0		0	0	0	0		0	0.0		0	0.0
673	0	0		0	0	0	0		0	0.0		0	0.0
674	1	0		0	0	0	0		0	0.0		1	1.5
675	0	0		0	0	0	0		0	0.0		0	0.0
676	0	0		0	0	0	0		0	0.0		0	0.0
677	2	0		1	0	0	0		1	1.2		3	3.7
678	0	0		0	0	0	0		0	0.0		0	0.0
679	1	0		0	0	0	0		0	0.0		1	6.3
680	0	0		0	0	0	0		0	0.0		0	0.0
681	0	0		0	0	0	0		0	0.0		0	0.0
682	1	0		1	0	0	0		1	4.5		2	9.1
683	1	0		0	0	0	0		0	0.0		1	5.3
684	0	1		0	0	0	0		0	0.0		1	0.9
685	0	0		0	0	0	0		0	0.0		0	0.0
686	6	0		6	0	0	0		6	1.4		12	2.7
687	1	0		1	0	0	0		1	0.4		2	0.8
688	1	0		0	0	0	0		0	0.0		1	1.4
689	2	0		0	2	2	0		4	2.1		6	3.2
690	1	0		0	0	0	0		0	0.0		1	1.6
691	30	2		3	1	1	0		5	0.7		37	5.1
692	15	3		3	0	0	0		3	0.4		21	3.0
693	1	1		0	0	0	0		0	0.0		2	4.3
694	1	0		1	0	0	0		1	0.5		2	1.0
695	1	0		0	0	0	0		0	0.0		1	0.7
696	16	0		1	0	0	0		1	0.4		17	6.6
697	1	0		0	0	0	0		0	0.0		1	3.7
698	1	0		0	0	0	0		0	0.0		1	4.8
699	1	0		2	0	0	0		2	2.7		3	4.0
700	1	0		1	0	0	0		1	3.4		2	6.9
701	14	2		13	4	4	0		21	4.3		37	7.6
702	27	6		30	5	5	0		40	4.9		73	9.0
703	16	3		14	0	0	0		14	2.6		33	6.0
704	2	1		1	0	0	0		1	0.5		4	1.9
705	1	0		0	0	0	0		0	0.0		1	2.4
706	1	0		0	0	0	0		0	0.0		1	2.0
707	0	0		0	0	0	0		0	0.0		0	0.0
708	1	0		0	0	0	0		0	0.0		1	1.2
709	1	0		1	0	0	0		1	1.8		2	3.5
710	0	0		0	0	0	0		0	0.0		0	0.0
711	0	0		0	0	0	0		0	0.0		0	0.0
712	6	0		0	0	0	0		0	0.0		6	7.6
713	1	0		0	1	1	0		2	1.6		3	2.5
714	4	0		0	0	0	0		0	0.0		4	1.6
715	2	0		1	1	1	0		3	2.4		5	4.0
716	0	0		0	0	0	0		0	0.0		0	0.0

	A	B	C	D	E	F	G	H
717	49459	16.9	134	37	27.6		37	
718	49460	14.6	594	88	14.8		87	
719	49461	23.0	560	82	14.6		81	
720	49464	22.3	2,549	269	10.6		265	
721	49503	66.1	3,180	829	26.1		765	
722	49504	58.0	3,696	812	22.0		739	
723	49505	37.8	2,933	581	19.8		553	
724	49506	48.2	2,563	434	16.9		396	
725	49507	58.0	4,361	1309	30.0		1164	
726	49508	3.3	3,459	838	24.2		808	
727	49509	20.6	2,864	726	25.3		713	
728	49512	1.5	1,364	278	20.4		274	
729	49519	*	2,553	480	18.8		467	
730	49525	13.3	1,865	271	14.5		266	
731	49534	*	1,559	174	11.2		173	
732	49544	11.2	662	128	19.3		126	
733	49546	3.7	2,165	418	19.3		410	
734	49548	20.2	2,898	750	25.9		732	
735	49601	29.6	1,744	216	12.4		214	
736	49611	29.1	16	9	56.3		8	
737	49612	23.6	62	11	17.7		11	
738	49613	48.2	30	12	40.0		12	
739	49614	31.9	161	24	14.9		24	
740	49615	19.9	211	34	16.1		34	
741	49616	23.3	134	34	25.4		34	
742	49617	24.6	154	38	24.7		37	
743	49618	16.3	54	3	5.6		3	
744	49619	26.3	65	9	13.8		7	
745	49620	20.8	215	53	24.7		52	
746	49621	16.8	173	26	15.0		25	
747	49622	32.2	129	27	20.9		27	
748	49623	18.8	96	15	15.6		14	
749	49625	33.2	80	21	26.3		20	
750	49626	66.7	29	6	20.7		6	
751	49627	30.7	4	1	25.0		1	
752	49628	62.6	16	5	31.3		5	
753	49629	30.7	101	14	13.9		14	
754	49630	27.3	57	7	12.3		7	
755	49631	24.3	481	93	19.3		88	
756	49632	20.0	75	13	17.3		13	
757	49633	19.9	220	35	15.9		35	
758	49634	66.7	10	0	0.0		0	
759	49635	40.1	144	41	28.5		41	
760	49636	14.6	9	5	55.6		5	
761	49637	13.4	288	77	26.7		77	
762	49638	10.8	35	9	25.7		9	
763	49639	16.7	196	42	21.4		41	
764	49640	28.1	90	21	23.3		21	

	I	J	K	L	M	N	O	P	Q	R	S	T	U
717	0	0		0	0	0	0		0	0.0		0	0.0
718	1	0		0	0	0	0		0	0.0		1	1.1
719	0	0		1	0	0	0		1	1.2		1	1.2
720	3	0		1	0	0	0		1	0.4		4	1.5
721	41	1		14	3	3	0		20	2.4		62	7.5
722	43	1		18	7	7	0		32	3.9		76	9.4
723	18	0		7	2	2	0		11	1.9		29	5.0
724	28	2		7	0	0	0		7	1.6		37	8.5
725	100	3		25	8	8	0		41	3.1		144	11.0
726	26	0		2	0	0	0		2	0.2		28	3.3
727	10	0		2	1	1	0		4	0.6		14	1.9
728	4	0		0	0	0	0		0	0.0		4	1.4
729	9	1		3	0	0	0		3	0.6		13	2.7
730	5	0		0	0	0	0		0	0.0		5	1.8
731	1	0		0	0	0	0		0	0.0		1	0.6
732	2	0		0	0	0	0		0	0.0		2	1.6
733	4	0		4	0	0	0		4	1.0		8	1.9
734	11	0		3	1	1	0		5	0.7		16	2.1
735	0	0		0	0	0	0		0	0.0		0	0.0
736	0	0		1	0	0	0		1	11.1		1	11.1
737	0	0		0	0	0	0		0	0.0		0	0.0
738	0	0		0	0	0	0		0	0.0		0	0.0
739	0	0		0	0	0	0		0	0.0		0	0.0
740	0	0		0	0	0	0		0	0.0		0	0.0
741	0	0		0	0	0	0		0	0.0		0	0.0
742	1	0		0	0	0	0		0	0.0		1	2.6
743	0	0		0	0	0	0		0	0.0		0	0.0
744	2	0		0	0	0	0		0	0.0		2	22.2
745	1	0		0	0	0	0		0	0.0		1	1.9
746	1	0		0	0	0	0		0	0.0		1	3.8
747	0	0		0	0	0	0		0	0.0		0	0.0
748	1	0		0	0	0	0		0	0.0		1	6.7
749	1	0		0	0	0	0		0	0.0		1	4.8
750	0	0		0	0	0	0		0	0.0		0	0.0
751	0	0		0	0	0	0		0	0.0		0	0.0
752	0	0		0	0	0	0		0	0.0		0	0.0
753	0	0		0	0	0	0		0	0.0		0	0.0
754	0	0		0	0	0	0		0	0.0		0	0.0
755	1	0		2	0	0	0		2	2.2		3	3.2
756	0	0		0	0	0	0		0	0.0		0	0.0
757	0	0		0	0	0	0		0	0.0		0	0.0
758	0	0		0	0	0	0		0	---		0	---
759	0	0		0	0	0	0		0	0.0		0	0.0
760	0	0		0	0	0	0		0	0.0		0	0.0
761	0	0		0	0	0	0		0	0.0		0	0.0
762	0	0		0	0	0	0		0	0.0		0	0.0
763	1	0		0	0	0	0		0	0.0		1	2.4
764	0	0		0	0	0	0		0	0.0		0	0.0

	A	B	C	D	E	F	G	H
765	49642	23.3	64	8	12.5		8	
766	49643	9.4	505	120	23.8		120	
767	49644	8.3	61	11	18.0		11	
768	49645	28.4	97	27	27.8		26	
769	49646	13.7	653	101	15.5		101	
770	49648	13.5	96	19	19.8		19	
771	49649	16.7	536	115	21.5		115	
772	49650	10.5	292	65	22.3		64	
773	49651	16.8	524	73	13.9		72	
774	49653	29.6	113	25	22.1		24	
775	49654	36.7	12	1	8.3		1	
776	49655	19.2	241	28	11.6		28	
777	49656	26.0	79	16	20.3		16	
778	49657	33.9	301	32	10.6		32	
779	49659	16.5	555	122	22.0		121	
780	49660	43.1	740	165	22.3		156	
781	49663	23.9	511	57	11.2		57	
782	49664	23.8	90	19	21.1		17	
783	49665	26.7	374	44	11.8		44	
784	49666	30.0	9	2	22.2		2	
785	49667	23.5	28	1	3.6		1	
786	49668	16.7	281	48	17.1		47	
787	49670	30.3	64	17	26.6		17	
788	49675	37.7	32	8	25.0		8	
789	49676	21.1	204	49	24.0		48	
790	49677	27.3	473	115	24.3		111	
791	49679	14.7	79	12	15.2		12	
792	49680	20.7	160	34	21.3		34	
793	49682	20.6	274	64	23.4		64	
794	49683	17.5	120	28	23.3		28	
795	49684	19.1	2,634	599	22.7		590	
796	49685	*	*	30	---		30	
797	49686	17.6	2,091	423	20.2		421	
798	49688	26.3	169	29	17.2		28	
799	49689	16.8	62	16	25.8		16	
800	49690	12.2	301	77	25.6		76	
801	49696	---	---	18	---		18	
802	49701	25.7	54	14	25.9		13	
803	49705	18.2	68	11	16.2		11	
804	49706	17.5	322	79	24.5		79	
805	49707	30.2	1,376	204	14.8		196	
806	49709	20.1	155	23	14.8		23	
807	49710	25.2	15	3	20.0		3	
808	49712	23.9	574	92	16.0		91	
809	49713	23.0	156	26	16.7		26	
810	49715	18.6	239	44	18.4		43	
811	49716	13.0	37	2	5.4		2	
812	49718	33.7	29	5	17.2		5	

	I	J	K	L	M	N	O	P	Q	R	S	T	U
765	0	0		0	0	0	0		0	0.0		0	0.0
766	0	0		0	0	0	0		0	0.0		0	0.0
767	0	0		0	0	0	0		0	0.0		0	0.0
768	1	0		0	0	0	0		0	0.0		1	3.7
769	0	0		0	0	0	0		0	0.0		0	0.0
770	0	0		0	0	0	0		0	0.0		0	0.0
771	0	0		0	0	0	0		0	0.0		0	0.0
772	1	0		0	0	0	0		0	0.0		1	1.5
773	0	0		0	1	1	0		2	2.7		2	2.7
774	1	0		0	0	0	0		0	0.0		1	4.0
775	0	0		0	0	0	0		0	0.0		0	0.0
776	0	0		0	0	0	0		0	0.0		0	0.0
777	0	0		0	0	0	0		0	0.0		0	0.0
778	0	0		0	0	0	0		0	0.0		0	0.0
779	0	0		1	0	0	0		1	0.8		1	0.8
780	6	0		1	0	0	0		1	0.6		7	4.2
781	0	0		0	0	0	0		0	0.0		0	0.0
782	1	1		0	0	0	0		0	0.0		2	10.5
783	0	0		0	0	0	0		0	0.0		0	0.0
784	0	0		0	0	0	0		0	0.0		0	0.0
785	0	0		0	0	0	0		0	0.0		0	0.0
786	1	0		0	0	0	0		0	0.0		1	2.1
787	0	0		0	0	0	0		0	0.0		0	0.0
788	0	0		0	0	0	0		0	0.0		0	0.0
789	1	0		0	0	0	0		0	0.0		1	2.0
790	2	0		0	2	2	0		4	3.5		6	5.2
791	0	0		0	0	0	0		0	0.0		0	0.0
792	0	0		0	0	0	0		0	0.0		0	0.0
793	0	0		0	0	0	0		0	0.0		0	0.0
794	0	0		0	0	0	0		0	0.0		0	0.0
795	5	2		2	0	0	0		2	0.3		9	1.5
796	0	0		0	0	0	0		0	0.0		0	0.0
797	0	1		1	0	0	0		1	0.2		2	0.5
798	1	0		0	0	0	0		0	0.0		1	3.4
799	0	0		0	0	0	0		0	0.0		0	0.0
800	1	0		0	0	0	0		0	0.0		1	1.3
801	0	0		0	0	0	0		0	0.0		0	0.0
802	1	0		0	0	0	0		0	0.0		1	7.1
803	0	0		0	0	0	0		0	0.0		0	0.0
804	0	0		0	0	0	0		0	0.0		0	0.0
805	6	1		1	0	0	0		1	0.5		8	3.9
806	0	0		0	0	0	0		0	0.0		0	0.0
807	0	0		0	0	0	0		0	0.0		0	0.0
808	1	0		0	0	0	0		0	0.0		1	1.1
809	0	0		0	0	0	0		0	0.0		0	0.0
810	0	0		1	0	0	0		1	2.3		1	2.3
811	0	0		0	0	0	0		0	0.0		0	0.0
812	0	0		0	0	0	0		0	0.0		0	0.0

	A	B	C	D	E	F	G	H
813	49719	22.8	65	9	13.8		9	
814	49720	27.2	506	93	18.4		93	
815	49721	26.8	831	165	19.9		161	
816	49722	47.2	12	3	25.0		3	
817	49724	23.8	75	10	13.3		10	
818	49725	19.9	14	1	7.1		1	
819	49726	14.0	36	3	8.3		3	
820	49727	25.0	474	90	19.0		90	
821	49728	18.5	15	2	13.3		2	
822	49729	33.2	78	6	7.7		6	
823	49730	14.6	148	23	15.5		23	
824	49733	15.6	116	19	16.4		19	
825	49735	11.2	1,421	252	17.7		252	
826	49736	20.5	22	2	9.1		2	
827	49738	21.8	567	62	10.9		61	
828	49740	24.2	295	53	18.0		53	
829	49743	34.9	34	5	14.7		5	
830	49744	30.9	51	4	7.8		4	
831	49745	50.7	46	16	34.8		16	
832	49746	18.9	202	35	17.3		35	
833	49747	21.0	84	12	14.3		12	
834	49748	24.9	4	2	50.0		2	
835	49749	14.8	241	36	14.9		35	
836	49751	17.7	110	18	16.4		18	
837	49752	9.0	34	4	11.8		4	
838	49753	20.7	120	18	15.0		18	
839	49755	26.2	124	14	11.3		14	
840	49756	10.8	153	32	20.9		30	
841	49757	53.8	31	3	9.7		3	
842	49759	14.0	90	14	15.6		14	
843	49760	25.4	32	8	25.0		8	
844	49762	22.1	21	1	4.8		1	
845	49764	29.3	10	8	80.0		8	
846	49765	26.8	271	49	18.1		48	
847	49766	24.7	161	12	7.5		12	
848	49768	10.9	19	1	5.3		1	
849	49769	30.3	127	25	19.7		25	
850	49770	31.6	1,118	176	15.7		176	
851	49774	26.6	115	15	13.0		15	
852	49775	29.3	3	0	0.0		0	
853	49776	31.0	122	18	14.8		17	
854	49777	17.7	45	5	11.1		5	
855	49779	38.1	198	44	22.2		44	
856	49780	23.6	137	20	14.6		19	
857	49781	28.1	260	69	26.5		68	
858	49782	18.2	16	5	31.3		5	
859	49783	39.7	1,374	262	19.1		260	
860	49788	15.6	293	73	24.9		73	

	I	J	K	L	M	N	O	P	Q	R	S	T	U
813	0	0		0	0	0	0		0	0.0		0	0.0
814	0	0		0	0	0	0		0	0.0		0	0.0
815	3	0		1	0	0	0		1	0.6		4	2.4
816	0	0		0	0	0	0		0	0.0		0	0.0
817	0	0		0	0	0	0		0	0.0		0	0.0
818	0	0		0	0	0	0		0	0.0		0	0.0
819	0	0		0	0	0	0		0	0.0		0	0.0
820	0	0		0	0	0	0		0	0.0		0	0.0
821	0	0		0	0	0	0		0	0.0		0	0.0
822	0	0		0	0	0	0		0	0.0		0	0.0
823	0	0		0	0	0	0		0	0.0		0	0.0
824	0	0		0	0	0	0		0	0.0		0	0.0
825	0	0		0	0	0	0		0	0.0		0	0.0
826	0	0		0	0	0	0		0	0.0		0	0.0
827	1	0		0	0	0	0		0	0.0		1	1.6
828	0	0		0	0	0	0		0	0.0		0	0.0
829	0	0		0	0	0	0		0	0.0		0	0.0
830	0	0		0	0	0	0		0	0.0		0	0.0
831	0	0		0	0	0	0		0	0.0		0	0.0
832	0	0		0	0	0	0		0	0.0		0	0.0
833	0	0		0	0	0	0		0	0.0		0	0.0
834	0	0		0	0	0	0		0	0.0		0	0.0
835	1	0		0	0	0	0		0	0.0		1	2.8
836	0	0		0	0	0	0		0	0.0		0	0.0
837	0	0		0	0	0	0		0	0.0		0	0.0
838	0	0		0	0	0	0		0	0.0		0	0.0
839	0	0		0	0	0	0		0	0.0		0	0.0
840	2	0		0	0	0	0		0	0.0		2	6.3
841	0	0		0	0	0	0		0	0.0		0	0.0
842	0	0		0	0	0	0		0	0.0		0	0.0
843	0	0		0	0	0	0		0	0.0		0	0.0
844	0	0		0	0	0	0		0	0.0		0	0.0
845	0	0		0	0	0	0		0	0.0		0	0.0
846	1	0		0	0	0	0		0	0.0		1	2.0
847	0	0		0	0	0	0		0	0.0		0	0.0
848	0	0		0	0	0	0		0	0.0		0	0.0
849	0	0		0	0	0	0		0	0.0		0	0.0
850	0	0		0	0	0	0		0	0.0		0	0.0
851	0	0		0	0	0	0		0	0.0		0	0.0
852	0	0		0	0	0	0		0	---		0	---
853	1	0		0	0	0	0		0	0.0		1	5.6
854	0	0		0	0	0	0		0	0.0		0	0.0
855	0	0		0	0	0	0		0	0.0		0	0.0
856	0	0		1	0	0	0		1	5.0		1	5.0
857	1	0		0	0	0	0		0	0.0		1	1.4
858	0	0		0	0	0	0		0	0.0		0	0.0
859	1	0		1	0	0	0		1	0.4		2	0.8
860	0	0		0	0	0	0		0	0.0		0	0.0

	A	B	C	D	E	F	G	H
861	49791	70.0	17	5	29.4		5	
862	49792	22.2	*	1	---		1	
863	49793	33.8	8	0	0.0		0	
864	49795	16.3	125	33	26.4		32	
865	49796	47.6	10	2	20.0		2	
866	49799	14.5	140	27	19.3		26	
867	49801	42.2	675	139	20.6		139	
868	49802	43.1	391	74	18.9		74	
869	49805	75.0	24	4	16.7		4	
870	49806	34.3	21	2	9.5		2	
871	49807	27.6	230	21	9.1		21	
872	49808	26.4	9	3	33.3		3	
873	49812	37.5	51	9	17.6		9	
874	49814	30.5	87	9	10.3		8	
875	49815	37.5	29	7	24.1		7	
876	49816	37.6	30	5	16.7		5	
877	49817	29.8	33	5	15.2		5	
878	49818	24.7	57	6	10.5		6	
879	49820	23.7	16	4	25.0		4	
880	49821	36.6	101	11	10.9		10	
881	49822	15.4	14	0	0.0		0	
882	49825	35.5	20	0	0.0		0	
883	49826	22.2	5	0	0.0		0	
884	49827	31.1	66	9	13.6		9	
885	49829	46.0	1,228	236	19.2		225	
886	49831	57.1	49	15	30.6		15	
887	49833	17.6	17	3	17.6		3	
888	49834	32.4	24	4	16.7		4	
889	49835	32.0	47	5	10.6		5	
890	49836	31.1	38	9	23.7		9	
891	49837	34.7	650	103	15.8		100	
892	49838	21.2	21	6	28.6		6	
893	49839	33.3	6	4	66.7		4	
894	49840	19.1	41	9	22.0		9	
895	49841	12.4	583	95	16.3		93	
896	49847	45.3	52	16	30.8		14	
897	49848	43.8	6	1	16.7		0	
898	49849	48.5	921	118	12.8		112	
899	49852	71.8	9	3	33.3		3	
900	49853	23.4	66	10	15.2		10	
901	49854	37.7	378	78	20.6		77	
902	49855	30.7	1,591	179	11.3		177	
903	49858	43.4	703	140	19.9		129	
904	49861	34.0	18	4	22.2		4	
905	49862	35.8	246	54	22.0		54	
906	49863	57.8	9	3	33.3		3	
907	49866	40.2	654	49	7.5		47	
908	49868	32.9	301	78	25.9		78	

	I	J	K	L	M	N	O	P	Q	R	S	T	U
861	0	0		0	0	0	0		0	0.0		0	0.0
862	0	0		0	0	0	0		0	0.0		0	0.0
863	0	0		0	0	0	0		0	---		0	---
864	1	0		0	0	0	0		0	0.0		1	3.0
865	0	0		0	0	0	0		0	0.0		0	0.0
866	1	0		0	0	0	0		0	0.0		1	3.7
867	0	0		0	0	0	0		0	0.0		0	0.0
868	0	0		0	0	0	0		0	0.0		0	0.0
869	0	0		0	0	0	0		0	0.0		0	0.0
870	0	0		0	0	0	0		0	0.0		0	0.0
871	0	0		0	0	0	0		0	0.0		0	0.0
872	0	0		0	0	0	0		0	0.0		0	0.0
873	0	0		0	0	0	0		0	0.0		0	0.0
874	1	0		0	0	0	0		0	0.0		1	11.1
875	0	0		0	0	0	0		0	0.0		0	0.0
876	0	0		0	0	0	0		0	0.0		0	0.0
877	0	0		0	0	0	0		0	0.0		0	0.0
878	0	0		0	0	0	0		0	0.0		0	0.0
879	0	0		0	0	0	0		0	0.0		0	0.0
880	0	0		1	0	0	0		1	9.1		1	9.1
881	0	0		0	0	0	0		0	---		0	---
882	0	0		0	0	0	0		0	---		0	---
883	0	0		0	0	0	0		0	---		0	---
884	0	0		0	0	0	0		0	0.0		0	0.0
885	10	0		0	0	0	0		0	0.0		10	4.2
886	0	0		0	0	0	0		0	0.0		0	0.0
887	0	0		0	0	0	0		0	0.0		0	0.0
888	0	0		0	0	0	0		0	0.0		0	0.0
889	0	0		0	0	0	0		0	0.0		0	0.0
890	0	0		0	0	0	0		0	0.0		0	0.0
891	2	0		1	0	0	0		1	1.0		3	2.9
892	0	0		0	0	0	0		0	0.0		0	0.0
893	0	0		0	0	0	0		0	0.0		0	0.0
894	0	0		0	0	0	0		0	0.0		0	0.0
895	1	0		1	0	0	0		1	1.1		2	2.1
896	1	0		0	0	0	0		0	0.0		1	6.3
897	1	0		0	0	0	0		0	0.0		1	100.0
898	0	1		5	0	0	0		5	4.2		6	5.1
899	0	0		0	0	0	0		0	0.0		0	0.0
900	0	0		0	0	0	0		0	0.0		0	0.0
901	0	0		1	0	0	0		1	1.3		1	1.3
902	0	1		1	0	0	0		1	0.6		2	1.1
903	8	1		2	0	0	0		2	1.4		11	7.9
904	0	0		0	0	0	0		0	0.0		0	0.0
905	0	0		0	0	0	0		0	0.0		0	0.0
906	0	0		0	0	0	0		0	0.0		0	0.0
907	1	0		1	0	0	0		1	2.0		2	4.1
908	0	0		0	0	0	0		0	0.0		0	0.0

	A	B	C	D	E	F	G	H
909	49870	51.6	229	49	21.4		49	
910	49871	60.8	37	2	5.4		2	
911	49872	58.8	12	3	25.0		3	
912	49873	27.1	11	2	18.2		2	
913	49874	29.4	49	10	20.4		10	
914	49876	22.0	84	12	14.3		11	
915	49877	52.8	4	0	0.0		0	
916	49878	27.4	157	29	18.5		28	
917	49879	36.0	69	0	0.0		0	
918	49880	36.8	49	4	8.2		4	
919	49881	24.1	13	3	23.1		3	
920	49883	28.3	6	1	16.7		1	
921	49884	15.9	33	9	27.3		9	
922	49885	22.5	124	8	6.5		7	
923	49886	40.8	24	4	16.7		4	
924	49887	36.4	116	18	15.5		18	
925	49891	37.6	53	8	15.1		8	
926	49892	34.1	86	13	15.1		13	
927	49893	26.1	85	17	20.0		17	
928	49894	39.5	34	7	20.6		6	
929	49895	18.4	37	9	24.3		8	
930	49896	27.8	159	28	17.6		27	
931	49901	85.8	19	6	31.6		5	
932	49902	69.2	3	3	100.0		3	
933	49903	67.0	6	3	50.0		3	
934	49905	56.0	254	50	19.7		50	
935	49908	30.5	181	57	31.5		56	
936	49910	33.4	13	0	0.0		0	
937	49911	58.8	171	28	16.4		28	
938	49912	50.6	44	11	25.0		11	
939	49913	75.6	603	142	23.5		133	
940	49915	69.3	58	12	20.7		12	
941	49916	37.0	196	40	20.4		40	
942	49917	84.8	15	2	13.3		2	
943	49918	69.3	2	1	50.0		1	
944	49919	36.9	15	1	6.7		1	
945	49920	41.6	185	50	27.0		50	
946	49921	57.9	18	7	38.9		7	
947	49922	35.5	92	12	13.0		11	
948	49925	43.0	12	2	16.7		2	
949	49927	53.4	34	2	5.9		2	
950	49929	70.2	16	0	0.0		0	
951	49930	56.5	571	127	22.2		126	
952	49931	38.0	410	109	26.6		109	
953	49934	88.8	43	14	32.6		14	
954	49935	42.8	330	66	20.0		63	
955	49938	63.6	486	86	17.7		84	
956	49942	89.0	17	1	5.9		1	

	I	J	K	L	M	N	O	P	Q	R	S	T	U
909	0	0		0	0	0	0		0	0.0		0	0.0
910	0	0		0	0	0	0		0	0.0		0	0.0
911	0	0		0	0	0	0		0	0.0		0	0.0
912	0	0		0	0	0	0		0	0.0		0	0.0
913	0	0		0	0	0	0		0	0.0		0	0.0
914	0	0		1	0	0	0		1	8.3		1	8.3
915	0	0		0	0	0	0		0	---		0	---
916	1	0		0	0	0	0		0	0.0		1	3.4
917	0	0		0	0	0	0		0	---		0	---
918	0	0		0	0	0	0		0	0.0		0	0.0
919	0	0		0	0	0	0		0	0.0		0	0.0
920	0	0		0	0	0	0		0	0.0		0	0.0
921	0	0		0	0	0	0		0	0.0		0	0.0
922	1	0		0	0	0	0		0	0.0		1	12.5
923	0	0		0	0	0	0		0	0.0		0	0.0
924	0	0		0	0	0	0		0	0.0		0	0.0
925	0	0		0	0	0	0		0	0.0		0	0.0
926	0	0		0	0	0	0		0	0.0		0	0.0
927	0	0		0	0	0	0		0	0.0		0	0.0
928	1	0		0	0	0	0		0	0.0		1	14.3
929	0	0		0	1	1	0		2	22.2		2	22.2
930	1	0		0	0	0	0		0	0.0		1	3.6
931	1	0		0	0	0	0		0	0.0		1	16.7
932	0	0		0	0	0	0		0	0.0		0	0.0
933	0	0		0	0	0	0		0	0.0		0	0.0
934	0	0		0	0	0	0		0	0.0		0	0.0
935	1	0		0	0	0	0		0	0.0		1	1.8
936	0	0		0	0	0	0		0	---		0	---
937	0	0		0	0	0	0		0	0.0		0	0.0
938	0	0		0	0	0	0		0	0.0		0	0.0
939	4	0		3	1	1	0		5	3.5		9	6.3
940	0	0		0	0	0	0		0	0.0		0	0.0
941	0	0		0	0	0	0		0	0.0		0	0.0
942	0	0		0	0	0	0		0	0.0		0	0.0
943	0	0		0	0	0	0		0	0.0		0	0.0
944	0	0		0	0	0	0		0	0.0		0	0.0
945	0	0		0	0	0	0		0	0.0		0	0.0
946	0	0		0	0	0	0		0	0.0		0	0.0
947	0	0		1	0	0	0		1	8.3		1	8.3
948	0	0		0	0	0	0		0	0.0		0	0.0
949	0	0		0	0	0	0		0	0.0		0	0.0
950	0	0		0	0	0	0		0	---		0	---
951	1	0		0	0	0	0		0	0.0		1	0.8
952	0	0		0	0	0	0		0	0.0		0	0.0
953	0	0		0	0	0	0		0	0.0		0	0.0
954	3	0		0	0	0	0		0	0.0		3	4.5
955	2	0		0	0	0	0		0	0.0		2	2.3
956	0	0		0	0	0	0		0	0.0		0	0.0

	A	B	C	D	E	F	G	H
957	49945	49.1	168	46	27.4		44	
958	49946	33.9	286	72	25.2		72	
959	49947	33.3	30	3	10.0		3	
960	49948	58.7	27	5	18.5		4	
961	49950	52.7	60	14	23.3		13	
962	49952	29.5	9	3	33.3		3	
963	49953	43.8	121	19	15.7		19	
964	49955	85.9	23	9	39.1		9	
965	49958	43.3	78	14	17.9		14	
966	49959	74.0	12	4	33.3		4	
967	49960	66.2	11	3	27.3		3	
968	49961	44.1	2	1	50.0		1	
969	49962	42.0	4	0	0.0		0	
970	49963	61.5	91	19	20.9		18	
971	49965	39.1	11	4	36.4		4	
972	49967	48.9	24	1	4.2		1	
973	49968	53.6	122	10	8.2		10	
974	49969	20.8	78	23	29.5		23	
975	49970	59.4	7	3	42.9		3	
976	49971	8.4	25	7	28.0		6	
977	Po Box or Unknown	---	---	68	---		67	
978	Total	27.0	710,976	143,123	20.1		136,152	0
979								
980	*No census data available							
981	Sources: US Census Bureau, Census 2010 (ZIP Populations) and Census 2000 (Pre-1950 Housing)							
982	MDCH Data Warehouse (children tested and elevated levels).							

	I	J	K	L	M	N	O	P	Q	R	S	T	U
957	0	0		0	1	1	0		2	4.3		2	4.3
958	0	0		0	0	0	0		0	0.0		0	0.0
959	0	0		0	0	0	0		0	0.0		0	0.0
960	1	0		0	0	0	0		0	0.0		1	20.0
961	1	0		0	0	0	0		0	0.0		1	7.1
962	0	0		0	0	0	0		0	0.0		0	0.0
963	0	0		0	0	0	0		0	0.0		0	0.0
964	0	0		0	0	0	0		0	0.0		0	0.0
965	0	0		0	0	0	0		0	0.0		0	0.0
966	0	0		0	0	0	0		0	0.0		0	0.0
967	0	0		0	0	0	0		0	0.0		0	0.0
968	0	0		0	0	0	0		0	0.0		0	0.0
969	0	0		0	0	0	0		0	---		0	---
970	1	0		0	0	0	0		0	0.0		1	5.3
971	0	0		0	0	0	0		0	0.0		0	0.0
972	0	0		0	0	0	0		0	0.0		0	0.0
973	0	0		0	0	0	0		0	0.0		0	0.0
974	0	0		0	0	0	0		0	0.0		0	0.0
975	0	0		0	0	0	0		0	0.0		0	0.0
976	1	0		0	0	0	0		0	0.0		1	14.3
977	0	0		1	0	0	0	1	2	2.9		1	1.5
978	2,119	212	0	2,050	387	277	8	1	2,723	1.9		5,053	3.5
979													
980													
981													
982													July 21, 2015

From: Larder, Cristin (DCH)
Sent: Tuesday, July 28, 2015 9:25 AM
To: Peeler, Nancy (DHHS);McKane, Patricia (DHHS)
Cc: Scott, Robert L. (DHHS)
Subject: RE: Flint Testing and EBLLs.xlsx
Attachments: Flint Testing and EBLLs_CL.xlsx

Hi Nancy,

I made a p-chart, which Shewhart's version of a control chart for proportions, for the data you sent. Basically, I used the monthly data from 2013-14 to create upper and lower control limits, then plotted the 2014-15 data in a run chart. It shows that the three months in question are the only ones that lie outside the control limit: in fact, they are the only points that lie well above the mean at all. This doesn't say anything about causality, but it does warrant further investigation.

There are several next steps we can employ if the folks upstairs ask us to look deeper into the data. Also, I'm not sure if you talked at all with the Environmental Health folks, but their toxicologists could probably help give us some context to the issue.

Cristin

From: Peeler, Nancy (DCH)
Sent: Monday, July 27, 2015 3:37 PM
To: McKane, Patricia (DCH)
Cc: Larder, Cristin (DCH); Scott, Robert L. (DCH)
Subject: Re: Flint Testing and EBLLs.xlsx

Thanks, Patti. I'm looking forward to hearing about your CoIIN meeting, I'm sure you will be bringing great information back.

Sent from my iPhone

On Jul 27, 2015, at 3:11 PM, "McKane, Patricia (DCH)" <McKaneP@michigan.gov> wrote:

> Thanks Nancy.
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>
> Sent from my iPhone
>
> On Jul 27, 2015, at 1:14 PM, Peeler, Nancy (DCH) <PeelerN@michigan.gov> wrote:
>
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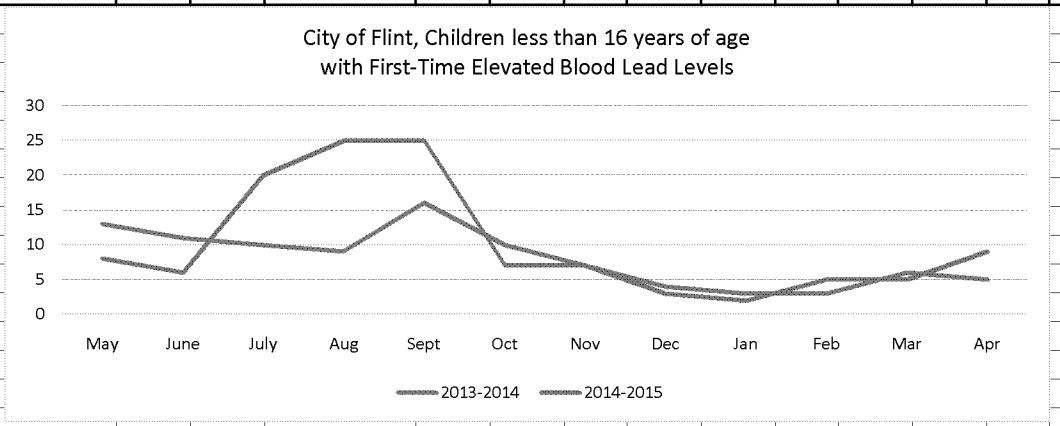
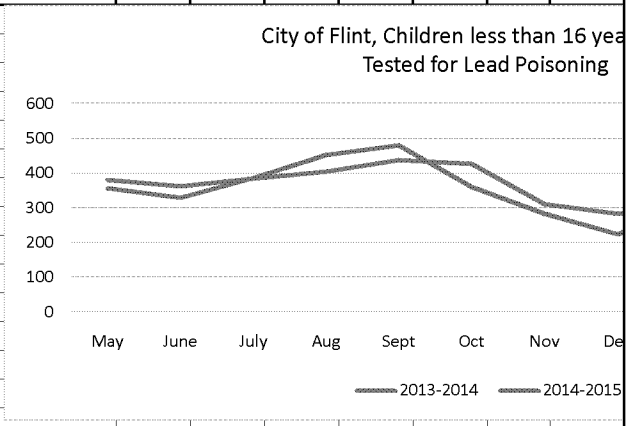
> >
> > This is the CLPPP data for Flint that I had mentioned to you last week. Cristin, can you quickly run any tests to see if the difference in the first graph is statistically significant? Bob is at his desk today, best to connect with him if you have questions about the data. We are hoping to send this up today, so we appreciate anything you can do to get us a response this afternoon, if at all

possible. Many thanks!

Nancy

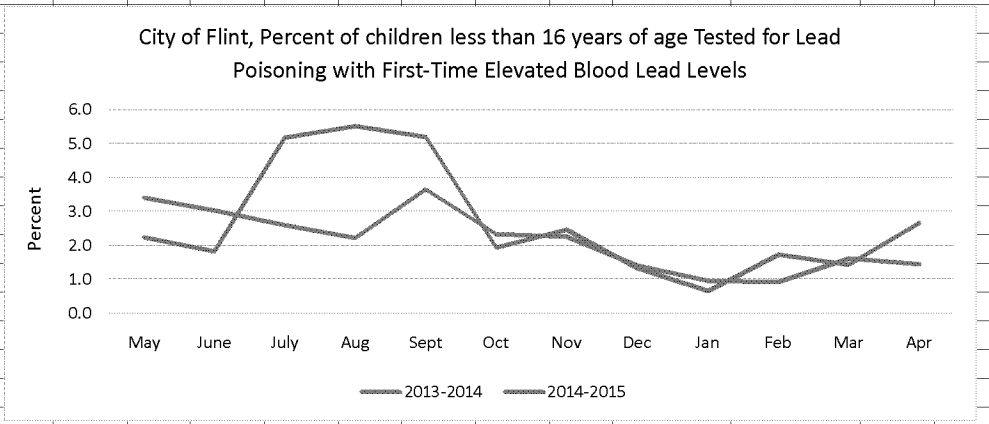


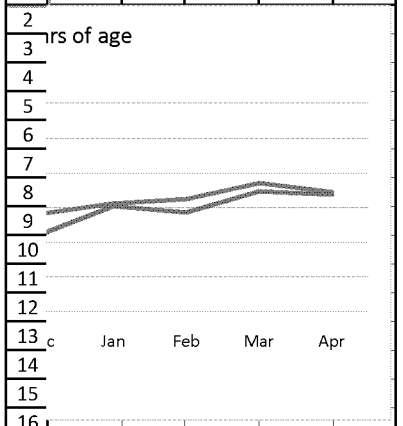


		May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr
2013-2014		13	11	10	9	16	10	7	4	3	3	6	5
2014-2015		8	6	20	25	25	7	7	3	2	5	5	9

	May	June	July	Aug	Sept	Oct	Nov
2013-2014	380	363	385	404	438	427	310
2014-2015	356	329	386	452	480	361	283

May	13	380	3.421052632
June	11	363	3.03030303
July	10	385	2.597402597
Aug	9	404	2.227722772
Sept	16	438	3.652968037
Oct	10	427	2.341920375
Nov	7	310	2.258064516
Dec	4	283	1.413427562
Jan	3	313	0.958466454
Feb	3	325	0.923076923
Mar	6	371	1.617250674
Apr	5	346	1.445086705
May	8	356	2.247191011
June	6	329	1.823708207
July	20	386	5.18134715
Aug	25	452	5.530973451
Sept	25	480	5.208333333
Oct	7	361	1.939058172
Nov	7	283	2.473498233
Dec	3	224	1.339285714
Jan	2	305	0.655737705





	W	X	Y	Z	AA
18	Dec	Jan	Feb	Mar	Apr
19	283	313	325	371	346
20	224	305	287	348	339

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V
43	Feb	5	287	1.742160279																		
44	Mar	5	348	1.436781609																		
45	Apr	9	339	2.654867257																		

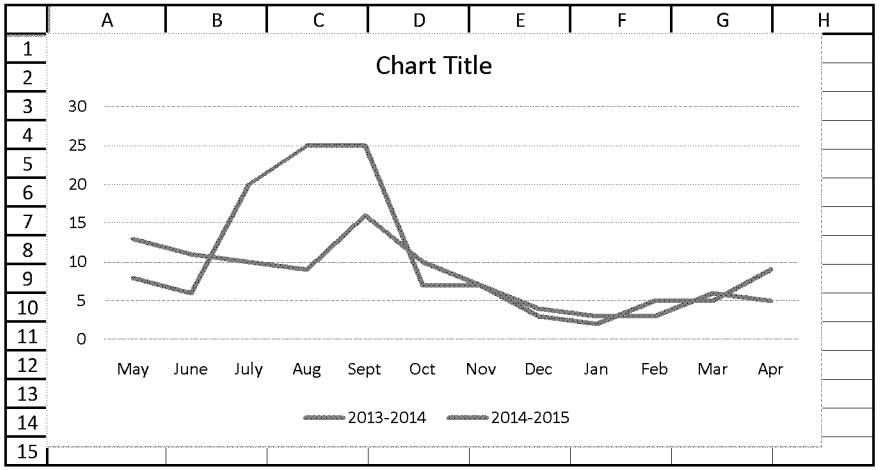


Chart Title
30
25
20
15
10
5
0
May
June
July
Aug
Sept
Oct
Nov
Dec
Jan
Feb
Mar
Apr
2013-2014
2014-2015

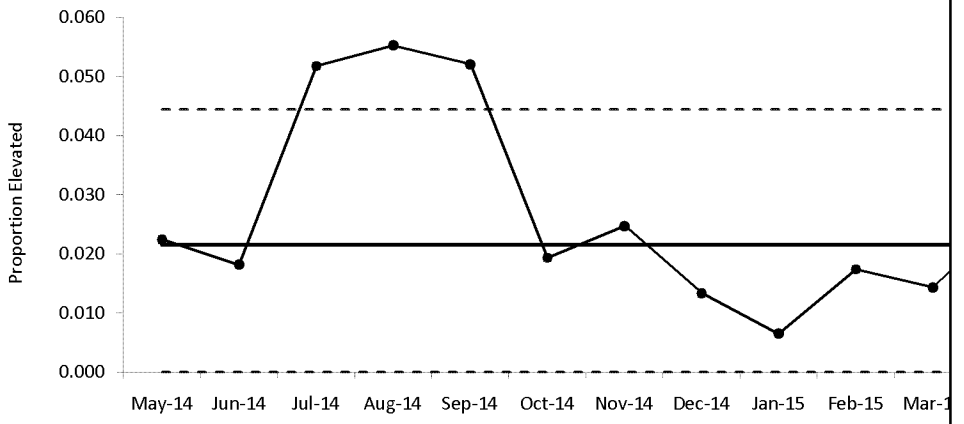
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	**Date**	**Elevated**	**Tested**	**Proportion**	**Mean P**	**P LCL**	**P UCL**			**2013/14**						
2	May-13	13	380	0.034	0.022	0	0.04		Mean P	0.022						
3	Jun-13	11	363	0.030	0.022	0.00	0.04		Mean n	362.08						
4	Jul-13	10	385	0.026	0.022	0.00	0.04									
5	Aug-13	9	404	0.022	0.022	0.00	0.04									
6	Sep-13	16	438	0.037	0.022	0.00	0.04									
7	Oct-13	10	427	0.023	0.022	0.00	0.04									
8	Nov-13	7	310	0.023	0.022	0.00	0.04									
9	Dec-13	4	283	0.014	0.022	0.00	0.04									
10	Jan-14	3	313	0.010	0.022	0.00	0.04									
11	Feb-14	3	325	0.009	0.022	0.00	0.04									
12	Mar-14	6	371	0.016	0.022	0.00	0.04									
13	Apr-14	5	346	0.014	0.022	0.00	0.04									
14	May-14	8	356	0.022	0.022	0.00	0.04									
15	Jun-14	6	329	0.018	0.022	0.00	0.04									
16	Jul-14	20	386	0.052	0.022	0.00	0.04									
17	Aug-14	25	452	0.055	0.022	0.00	0.04									
18	Sep-14	25	480	0.052	0.022	0.00	0.04									
19	Oct-14	7	361	0.019	0.022	0.00	0.04									
20	Nov-14	7	283	0.025	0.022	0.00	0.04									
21	Dec-14	3	224	0.013	0.022	0.00	0.04									
22	Jan-15	2	305	0.007	0.022	0.00	0.04									
23	Feb-15	5	287	0.017	0.022	0.00	0.04									
24	Mar-15	5	348	0.014	0.022	0.00	0.04									
25	Apr-15	9	339	0.027	0.022	0.00	0.04									
26																
27																

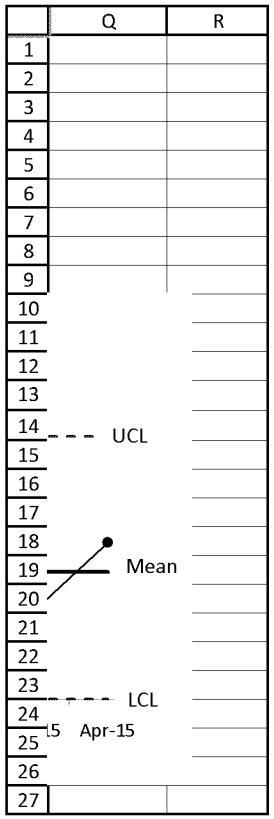
$\widehat{p}$–chart

$$\text{UCL} = \overline{p} + 3\sqrt{\frac{\overline{p}(1-\overline{p})}{n}}$$

$$\text{Center Line: } \overline{p}$$

$$\text{LCL} = \overline{p} - 3\sqrt{\frac{\overline{p}(1-\overline{p})}{n}}$$




Q
R
UCL
Mean
LCL
Apr-15

From: Larder, Cristin (DCH)
Sent: Tuesday, July 28, 2015 4:54 PM
To: Scott, Robert L. (DHHS);Peeler, Nancy (DHHS)
Cc: LyonCallo, Sarah (DHHS);McKane, Patricia (DHHS)
Subject: RE: Flint Testing and EBLLs.xlsx
Attachments: City of Flint EBLL May 2011-Apr 2015_Final.pdf

Hello Nancy and Bob,

It turns out that adding in the additional two years of data did not change the results of the analysis: there does appear to be a higher proportion of EBLL last summer than usual. I wrote up my methods and results in the attached brief, just in case anyone asks for specifics.

Have a good night!
Cristin

From: Scott, Robert L. (DCH)
Sent: Tuesday, July 28, 2015 10:15 AM
To: Larder, Cristin (DCH); Peeler, Nancy (DCH); McKane, Patricia (DCH)
Subject: RE: Flint Testing and EBLLs.xlsx

Cristin,

I can safely say I don't understand it without some explanation.

However, late yesterday Nancy and I decided to take a look two years farther back to see how they fit with the recent years. Please see attached, which I just finished this morning. Sorry I didn't have this for you yesterday before you did the analysis. Would this new information change the analysis?

Thanks,
Bob

From: Larder, Cristin (DCH)
Sent: Tuesday, July 28, 2015 10:07 AM
To: Peeler, Nancy (DCH); McKane, Patricia (DCH)
Cc: Scott, Robert L. (DCH)
Subject: RE: Flint Testing and EBLLs.xlsx

Nancy and Bob,

Is the control chart clear enough, do you think? I could whip up a fact sheet with a description of what it shows, if you think it would help make it more digestible for our audience.

Cristin

From: Larder, Cristin (DCH)
Sent: Tuesday, July 28, 2015 9:25 AM
To: Peeler, Nancy (DCH); McKane, Patricia (DCH)

Cc: Scott, Robert L. (DCH)
Subject: RE: Flint Testing and EBLLs.xlsx

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Sent: Monday, July 27, 2015 3:37 PM
To: McKane, Patricia (DCH)
Cc: Larder, Cristin (DCH); Scott, Robert L. (DCH)
Subject: Re: Flint Testing and EBLLs.xlsx

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Sent from my iPhone

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> >
> > Nancy

Elevated Blood Lead Levels Among Children <16 Years of Age

City of Flint, May 2011— April 2015

QUESTION:

Were positive tests for elevated blood lead levels (EBLL) higher than usual for children under age 16 living in the City of Flint during the months of July, August, and September, 2014?

METHODS:

- The number of children tested for lead poisoning varies from month to month, so the proportion of children with a first-time blood lead level ≥5 µg/dL was calculated for each month (Figure 1).
- To determine whether or not the difference between the summer of 2014 and the previous three years warrants further investigation, a control chart for proportions (Figure 3) was constructed.
- Monthly data from May 2011 to April 2014 were used to construct upper and lower control limits (UCL and LCL) representing the amount of expected variation in EBLL (Figure 3).
- Finally, proportions of EBLL from May 2014 to April 2015 were plotted in Figure 3.

Figure 1. Formula for Calculating Monthly Proportion of Children with Elevated Blood Lead Levels

$$\frac{\text{Number of Children with Blood Lead Level} \geq 5\ \mu g/dL}{\text{Total Number of Children Tested}} = \text{Proportion with EBLL}$$

Figure 2. Proportion of Children Tested for Lead Poisoning with Elevated Blood Lead Levels, May 2011—April 2015

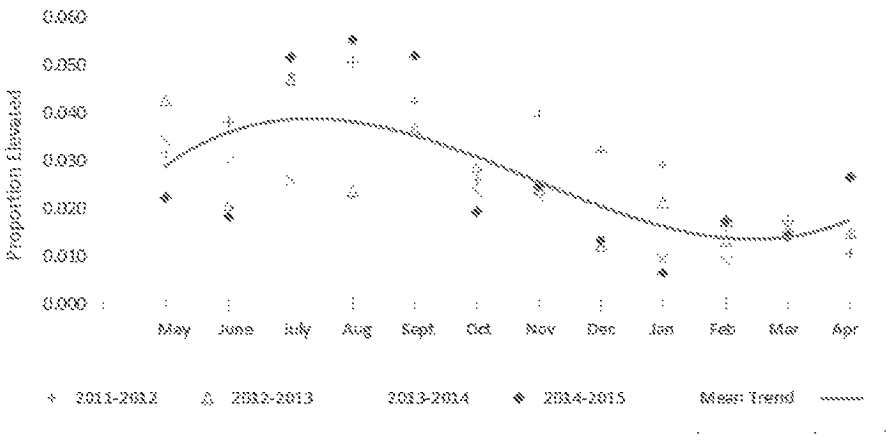
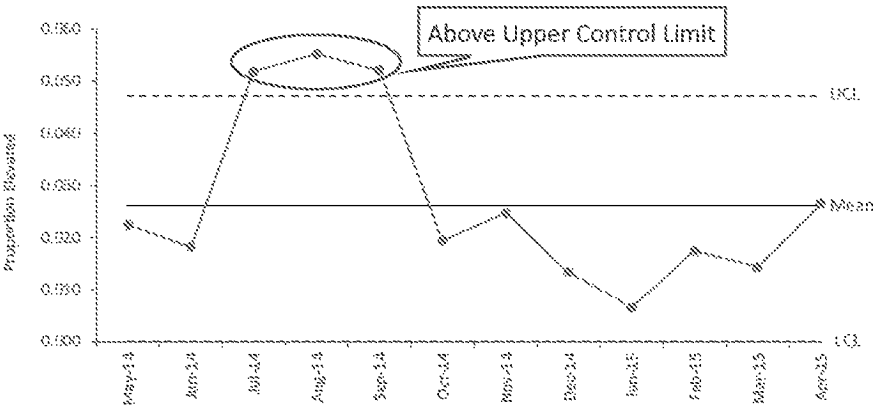


Figure 3. Control Chart of Proportion of Children Tested for Lead Poisoning with Elevated Blood Lead Levels, May 2014—April 2015



RESULTS:

- Figure 2 shows that—on average—there appears to be a higher proportion of first-time EBLL during the summer months of July, August, and September.
- However, even compared to the previous three years, the proportion of first-time EBLL is highest during summer 2014 (Figure 2).
- Based on the control chart for proportions (Figure 3), only the summer months of July, August, and September had proportions of EBLL higher than that expected from random variation over time.
- Further, the summer months of 2014 were the only data points between May 2014 and April 2015 with EBLL proportions above the average (mean) of the previous three years (Figure 3).

CONCLUSION:

- Based on the results depicted in Figure 3, positive tests for EBLL were higher than usual for children under age 16 living in the City of Flint during the months of July, August, and September, 2014.
- However, it's important to note that the purpose of control charts is to monitor data for the quick detection of abnormal variation—not to construct a case for causality.

SOURCES:

- Data for the City of Flint was provided by the Childhood Lead Poisoning Prevention Program at the Michigan Department of Health and Human Services (MDHHS). Information is current as of July 27, 2015.
- Control chart methods are based on The Six Sigma Way Team Fieldbook: An Implementation Guide for Process Improvement Teams, by Peter Pande, Robert Neuman, and Roland Cavanagh.

From: Minicuci, Angela (DCH)
Sent: Thursday, September 24, 2015 2:07 PM
To: Peeler, Nancy (DHHS);Scott, Robert L. (DHHS);Lasher, Geralyn (DHHS);Eisner, Jennifer (DHHS);Robinson, Mikelle (DHHS);Moran, Susan (DHHS);Hertel, Elizabeth (DHHS)
Subject: FW: Flint lead data
Attachments: Pediatric Lead Exposure Flint Water 092415 FINAL.pdf

The Next Steps slide no longer recommends that the city declare a health advisory. It now says 'support city's health advisory'. If Flint will be issuing a health advisory, will Genesee County support this?

Angela

From: Murray, David (GOV)
Sent: Thursday, September 24, 2015 1:56 PM
To: Hollins, Harvey (GOV) ; Lasher, Geralyn (DCH) ; Minicuci, Angela (DCH) ; Eisner, Jennifer (DCH) ; Clement, Elizabeth (GOV) ; Muchmore, Dennis (GOV) ; Agen, Jarrod (GOV) ; Wurfel, Sara (GOV) ; Wurfel, Brad (DEQ) ; Tommasulo, Karen (DEQ)
Cc: Biehl, Laura (GOV) ; Brown, Jessica (GOV) ; Heaton, Anna (GOV)
Subject: Flint lead data

Team,

Here's the data that will be presented at the Hurley Hospital press conference at 3 p.m. As you'll see, they are pointing to individual children, a very emotional approach. Our challenge will be to show how our state data is different from what the hospital and the coalition members are presenting today.

Dave

---------- Forwarded message ----------
From: **Andy Leavitt** <aleavitt@senatedems.org>
Date: Thu, Sep 24, 2015 at 1:41 PM
Subject: Data
To: Angela Wittrock <awittrock@senatedems.org>

Hey Angela,

Sorry for the delay. Dr. Mona Hanna-Attisha wanted to make a few changes to one of her slides.

Andy

PEDIATRIC LEAD EXPOSURE IN FLINT, MI: CONCERNS FROM THE MEDICAL COMMUNITY

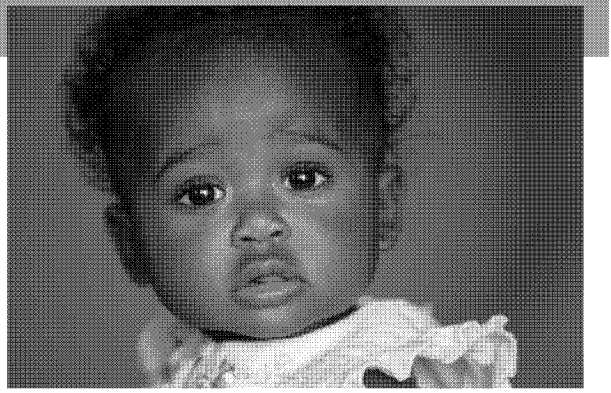
(this will not be written. I will introduce myself, Dr Reynolds can introduce himself and then I will say that we are here as a medical communtiy representing: GFHC, GCMS, Hurley Med Center, Hamilton Health Network)

THANK YOU'S

(this will not be written.

Thank you to Hurley for hosting this press conference, TY to grassroots organizers, prof Edwards and virginia tech, state and federal agencies involved in keeping our water safe, the city for being concerned and taking action, and health department for ensuring the safety of the entire population??

Introducing Makayla*



- 12 month old girl (DOB 8/15/2014) presented last week for her 1 year old check up. No concerns.
- Lives with single mom and 2 older siblings in west side (48504). Formula from WIC; powder mixed with warm tap water.
- Physical exam and development are normal. Makayla receives her 1 year old vaccines and routine lead and hemoglobin screening.
- *A couple days later, lead level comes back as 6 ug/dL.*

*Hypothetical scenario

Blood lead level of 6 ug/dL….

- Blood lead levels (BLL) above 5 ug/dL are considered elevated blood lead levels (EBL)
- Just a few years ago (2012), 10 ug/dL was cutoff
- Increasing evidence shows NO safe blood lead level
- Disproportionately impacts low income children
- Primary prevention is most important
  - Prevents exposure before it occurs!

Primary Prevention

- "Because no measurable level of blood lead is known to be without deleterious effects, and because once engendered, the effects appear to be irreversible in the absence of any other interventions, public health, environmental and housing policies should encourage PREVENTION of all exposure to lead."

"Low Level Lead Exposure Harms Children: A Renewed Call for Primary Prevention." 2012 CDC Advisory Committee on Childhood Lead Poisoning Prevention.

What will happen to Makayla?

- Vast evidence supports increased likelihood of:
  - Decrease in IQ
    - An increase in BLL from 1 to 4 ug/dL, drops mean IQ -3.7 points
  - Small change in mean IQ, shifts entire population IQ distribution
    - Reduces high achievers IQs (>130) and increases kids with low IQs (<70)
    - Implications for early intervention, special education services, employment, incarceration, life achievement, etc

Lanphear BP et al., Low-level environmental lead exposure and children's intellectual function: an international pooled analysis. Environ Health Perspect, 2005. 113:894-9.
Fewtrell LJ, Pruss-Ustun A, Landrigan P, and Ayuso-Mateos JL, Estimating the global burden of disease of mild mental retardation and cardiovascular diseases from environmental lead exposure. Environmental Research, 2004. 94:120-33.

Behavioral Burden

- Increased likelihood of :
  - ADHD behaviors
  - Delinquent behaviors and arrests
  - Total arrests and increased rates of arrests involving violent offenses
  - Other health effects: hematologic, cardiovascular, immunologic, endocrine, etc

Wright, JP, KN Dietrich, MD Ris, et al. 2008. Association of prenatal and childhood blood lead concentrations with criminal arrests in early adulthood. *PLoS Med* 5(5): e101

Chen, A, B Cai, KN Dietrich, et al. 2007. Lead exposure, IQ, and behavior in urban 5-7 year-olds: Does lead affect behavior only by lowering IQ? *Pediatrics* 119(3): e650-e658.

Needleman, HL, C McFarland, RB Ness, et al. 2002. Bone lead levels in adjudicated delinquents: A case control study. *Neurotoxicology and Teratology* 24(6):711-717.

The Cost

- "For childhood lead poisoning, $5.9 million in medical care costs, as well as an additional **$50.9 billion** (sensitivity analysis: $44.8–$60.6 billion) per year in lost economic productivity resulting from reduced cognitive potential from preventable childhood lead exposure."

- "The present value of Michigan's economic losses attributable to lead exposure in the 2009 cohort of 5 year-olds ranges from $3.19 (using U.S. blood lead levels) to **$4.85 billion** (using Michigan blood lead levels) per year in loss of future lifetime earnings."

Leonardo Trasande and Yinghua Liu. Reducing The Staggering Costs Of Environmental Disease In Children, Estimated At $76.6 Billion In 2008. *Health Affairs*, 30, no.5 (2011):863-870

The Price of Pollution: Cost Estimates of Environment-Related Childhood Diseases in Michigan. 2010 Report by Michigan Network of Children's Environmental Health

Lead in Water

- Increasing as source of lead because of success in controlling other sources.
- Increasing due to aging water infrastructures, change in water sources, disinfectant uses, etc
- Lots of variability in water lead levels depending on internal and external pipes, use of water, temperature, etc

- Disproportionally impacts developmentally-vulnerable formula-fed infants and pregnant mothers
  - Formula preparation

Triantafyllidou, S., Gallagher. D. and Edwards, M. Assessing risk with increasingly stringent public health goals: the case of water lead and blood lead in children. Journal of Water and Health. doi: 10.2166/wh.2013.067 58-68 (2014).
Edwards, M. Fetal Death and Reduced Birth Rates Associated with Exposure to Lead-Contaminated Drinking Water. Env. Sci. and Tech. 2013 DOI: 10.1021/es4034952

Role of the Pediatrician

- Prevention of everything to optimize children's health
- Lead screening as recommended by CDC and AAP at 1 and 2 years of age
- Inquiry and advocacy

RESEARCH FINDINGS

Results of Pediatric Blood Lead Levels

- **Methods**
  - Data from all blood lead levels processed at Hurley Medical Center
  - HMC Institutional Review Board (IRB) approved
  - All children under 5 years of age
  - Zip codes 48501-48507
  - Two periods of comparison:
    - PRE-SWITCH: January 1, 2013 – September 15, 2013
      - **WATER SWITCH APRIL 2014**
    - POST-SWITCH: January 1, 2015 – September 15, 2015

Results of Pediatric Blood Lead Levels

- **Methods**
  - Analyzed % Elevated Blood Lead (EBL)
    - EBL = Blood lead Levels > 5 g/dL
  - EBL analysis conducted based on scientific literature (most notably DC lead in water exposure)

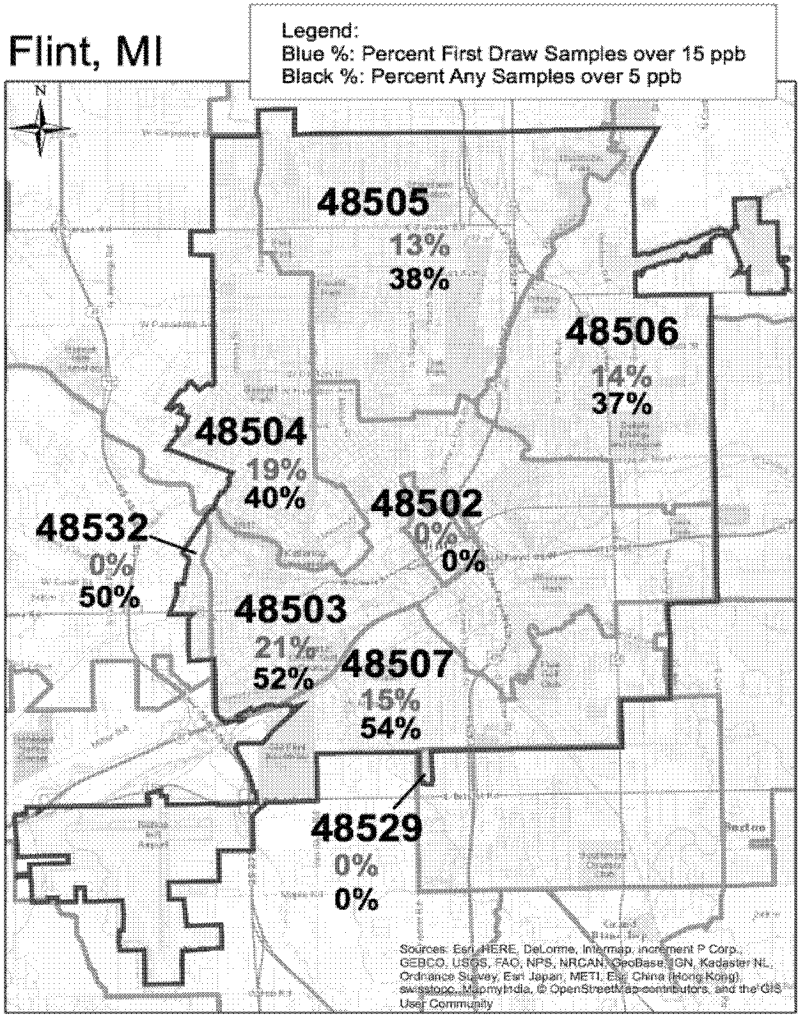
Blood Lead Level Analysis

- Large sample size
  - N= 1746 for Flint children (pre n=906, post n=840)
  - N= 1670 for non-Flint children (pre n=943, post n=727)

Flint results for children 5 years and under:

- PRE-SWITCH % EBL: **2.1%** **(consistent with MDHHS data 2.2)**
- POST-SWITCH % EBL: **4.0%**
- **$p < 0.05$; STATISTICALLY SIGNIFICANT CHANGE**

Zip Codes With High Water Lead



- Focus on zip codes (48503 and 48504) with high water lead levels
- Total n=742, pre n=394, post n=348

Results:

- PRE-SWITCH % EBL: **2.5%**
- POST-SWITCH % EBL: **6.3%**
- **$p < 0.05$; STATISTICALLY SIGNIFICANT CHANGE**

What was rest of county doing?

- Analysis of same time periods for Genesee County children who live outside of City of Flint zips codes (non 48501-48507)
  - N=1670 for non-Flint children (pre n=943, post n=727)

Non-Flint results for children 5 years and under:

- PRE-SWITCH % EBL: **0.6%**
- POST-SWITCH % EBL: **1.0%**
- **p = 0.637; NO STATISTICAL CHANGE**

Blood Lead Level Analysis

- % EBL all children less than 5 years of age

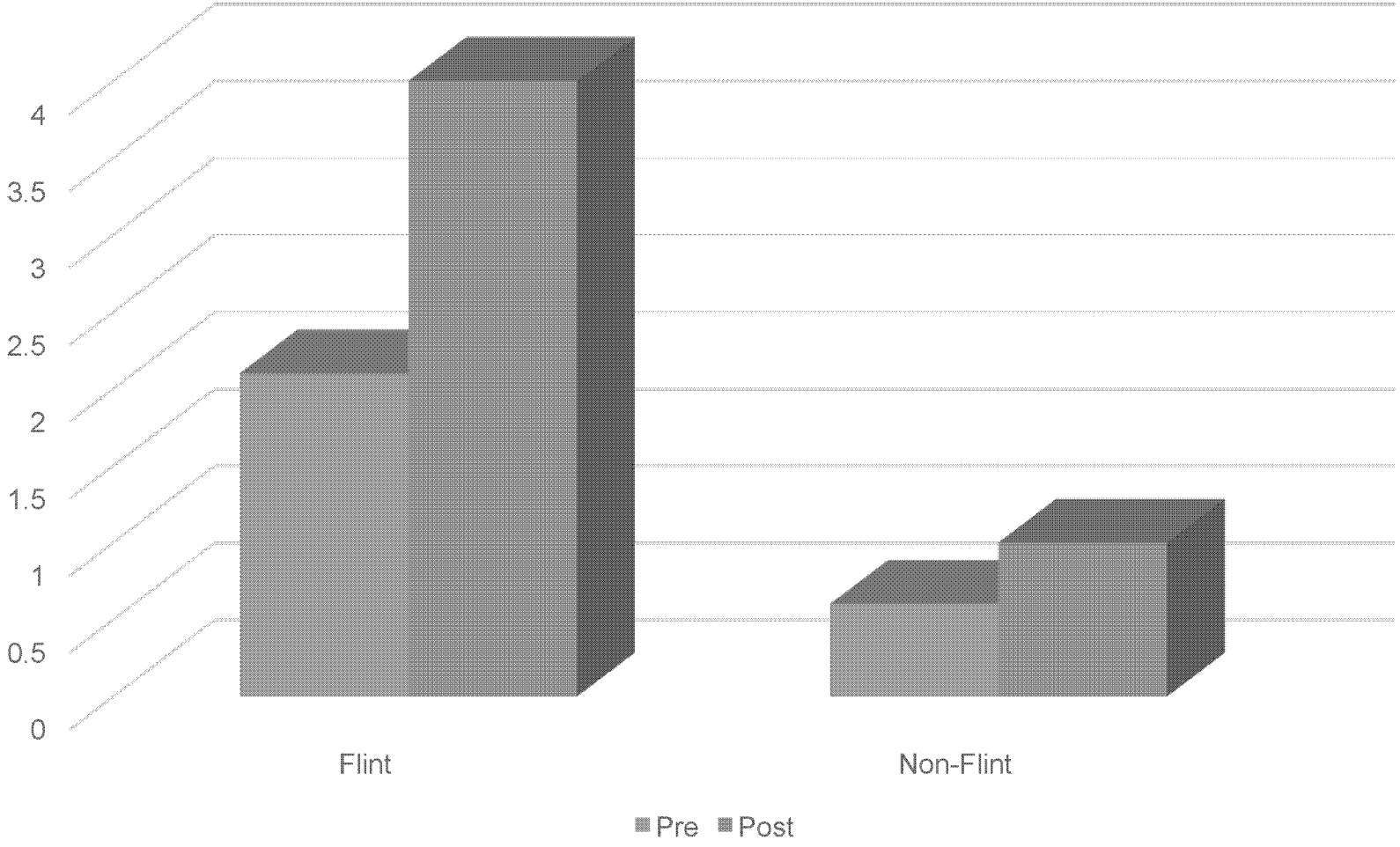
	ALL FLINT (n=1746)	HIGH-water lead FLINT (n=742)	REST OF FLINT (n=1004)	NON-FLINT (n=1670)
PRE-SWITCH	2.1%	2.5%	1.8%	0.6%
POST-SWITCH	4.0%	6.3%	2.4%	1.0%

Blood Lead Level Analysis – 15 month

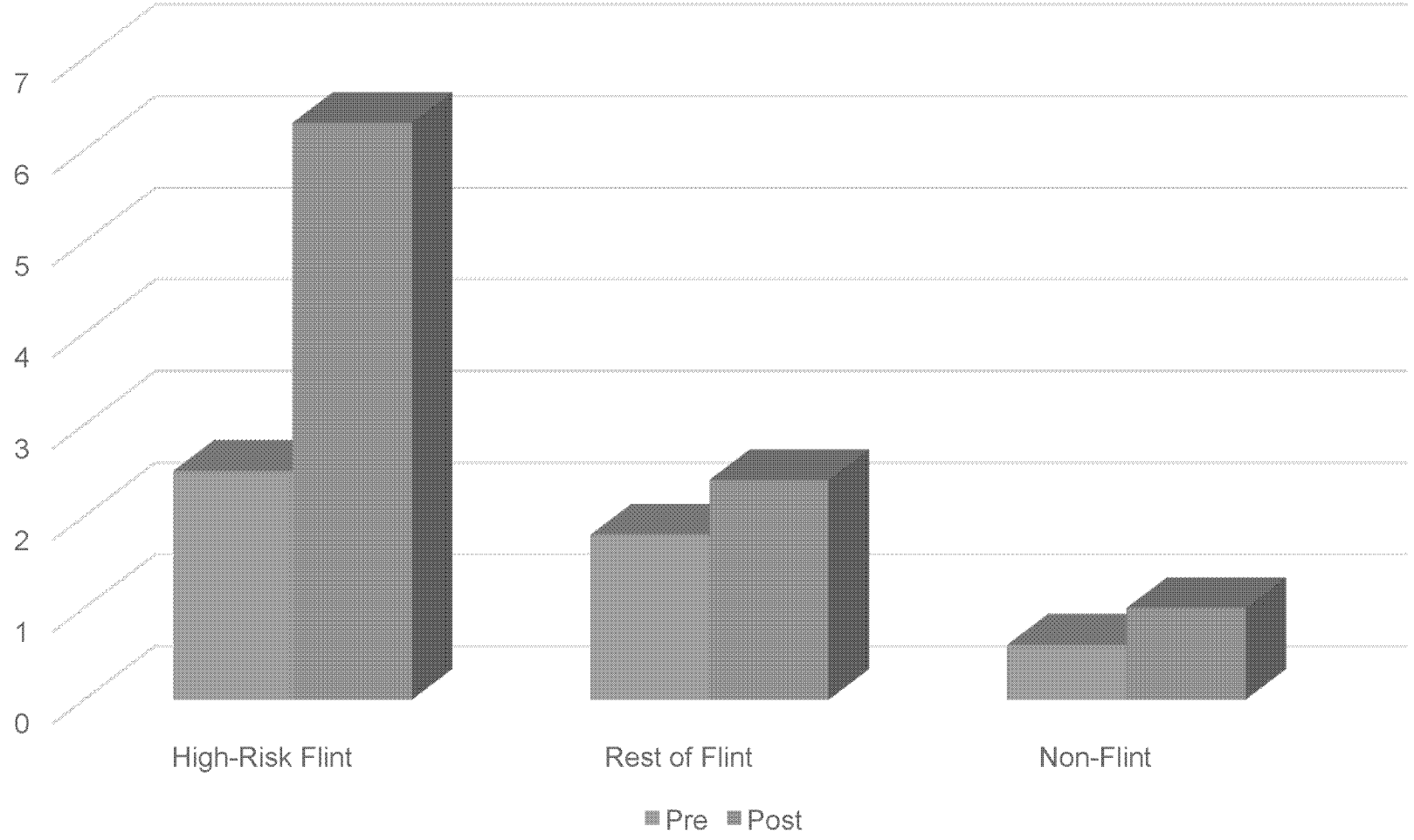
- % EBL children 15 months or less
  - Total Flint n=619, pre n=295, post n=324 (smaller sample size)
  - Total Non-Flint n=816, pre n=443, post n=376

	ALL FLINT (n=619)	HIGH-water lead (n=269)	REST OF FLINT (n=350)	NON-FLINT (n=816)
PRE-SWITCH	1.0%	1.5%	0.6%	0.5%
POST-SWITCH	2.5%	4.4%	1.1%	0.5%

Graphical Summary
Change in % EBL Flint vs Non-Flint



Graphical Summary
Change in % EBL by area



Conclusions from BLL analysis

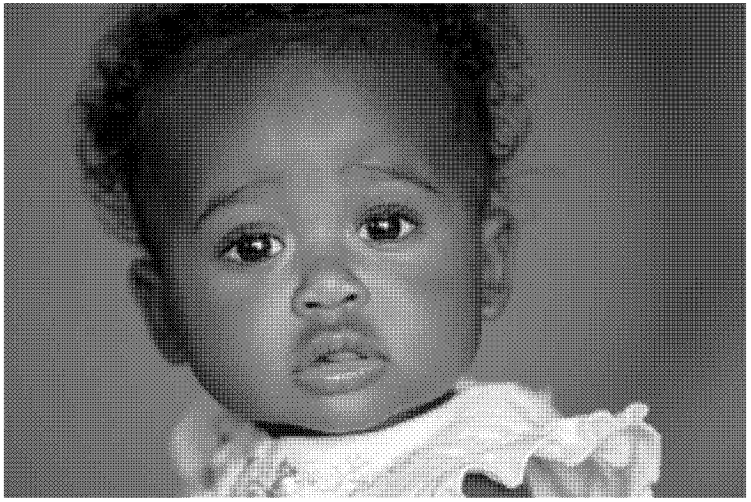
- Based on our research, % of children with EBL in Flint has increased
  - Most striking increase in zip codes with highest water lead levels
  - Also saw an increase in kids less than 15 months, sample small
- Results underestimate risk:
  - Infants not screened for lead
  - BLL may have peaked before being measured
  - Water usage has dropped

Recommendations

- AAP and CDC recommendation of primary prevention
- Limit further exposure
  - Encourage breast feeding
  - No tap water for high risk groups: infants on formula & pregnant mothers
  - Distribution of lead clearing NSF-approved filters
  - Public education regarding precautions (flushing, cold water, etc)
  - Connect to Lake Huron water source
- Support city's health advisory and health department's public education efforts

And Makayla…

- Asymptomatic now
- But what will her future hold and an entire generation of Flint children if we don't err on the side of safety?



From: Lasher, Geralyn (DCH)
Sent: Thursday, September 24, 2015 2:10 PM
To: Peeler, Nancy (DHHS);Minicuci, Angela (DHHS)
Cc: Scott, Robert L. (DHHS);Bien, Stan (DHHS);Eisner, Jennifer (DHHS)
Subject: RE: Flint Talking Points

I would leave it out for now

From: Peeler, Nancy (DCH)
Sent: Thursday, September 24, 2015 1:59 PM
To: Minicuci, Angela (DCH)
Cc: Scott, Robert L. (DCH) ; Bien, Stan (DCH) ; Eisner, Jennifer (DCH) ; Lasher, Geralyn (DCH)
Subject: Re: Flint Talking Points

Either way is fine with me.

Sent from my iPad

On Sep 24, 2015, at 1:57 PM, Minicuci, Angela (DCH) <MinicuciA@michigan.gov> wrote:

> I personally think that's more inside baseball but if G or Jen thinks it would help to say, I'm fine adding it in.
>
> Angela
>
> ---
>
> **From:** Peeler, Nancy (DCH)
> **Sent:** Thursday, September 24, 2015 1:54 PM
> **To:** Minicuci, Angela (DCH) <MinicuciA@michigan.gov>
> **Cc:** Scott, Robert L. (DCH) <ScottR9@michigan.gov>; Bien, Stan (DCH) <biens@michigan.gov>; Eisner, Jennifer (DCH) <EisnerJ@michigan.gov>; Lasher, Geralyn (DCH) <lasherg@michigan.gov>
> **Subject:** Re: Flint Talking Points
>
> Do we want to add, in the first section, that MDHHS is working with Hurley to obtain approval for sharing a broader data set with Hurley for their review.
>
> Sent from my iPad
>
> On Sep 24, 2015, at 1:46 PM, Minicuci, Angela (DCH) <MinicuciA@michigan.gov> wrote:
>
> > Excellent. Thank you, Bob. I also spoke with Stan. The updated talking points are attached.
> >
> > Angela
> >
> > ---
> >
> > **From:** Scott, Robert L. (DCH)
> > **Sent:** Thursday, September 24, 2015 1:35 PM
> > **To:** Minicuci, Angela (DCH) <MinicuciA@michigan.gov>; Peeler, Nancy (DCH)

<PeelerN@michigan.gov>; Bien, Stan (DCH) <biens@michigan.gov>
Cc: Eisner, Jennifer (DCH) <EisnerJ@michigan.gov>; Lasher, Geralyn (DCH) <lasherg@michigan.gov>
Subject: RE: Flint Talking Points

Angela,

One suggested change to the second bullet:
"The analysis that Hurley conducted is different from the way MDHHS has analyzed data regarding blood lead levels in Flint."

Another suggestion for the 5th bullet under Differences in Analysis:
"The MDHHS analysis looks specifically at the first elevated blood lead level for each child, which provides an accurate picture of when first exposure occurred."

Thanks,
Bob

From: Minicuci, Angela (DCH)
Sent: Thursday, September 24, 2015 1:16 PM
To: Peeler, Nancy (DCH) <PeelerN@michigan.gov>; Bien, Stan (DCH) <biens@michigan.gov>; Scott, Robert L. (DCH) <ScottR9@michigan.gov>
Cc: Eisner, Jennifer (DCH) <EisnerJ@michigan.gov>; Lasher, Geralyn (DCH) <lasherg@michigan.gov>
Subject: Flint Talking Points

Hi everyone,

With the Hurley press event at 3pm, can you please take a look at the following/attached talking points to make sure these are accurate and send me your edits?

Thank you.

- The results of the Hurley Children's Hospital are under review by the Michigan Department of Health and Human Services.
- The analysis that Hurley conducted is different than the way MDHHS collects data regarding blood lead levels.
- MDHHS is looking to see if we can replicate the results of the Hurley study to see how they achieved their results.

Differences in Analysis

- MDHHS data provides a much more robust picture of the entire blood lead levels for the Flint area, and specifically, accounts for data over the full course of the past five years.
- Looking at the past five years as a whole provides a much more accurate look at the seasonal trends of lead in the area.

- Seasonal exposure is higher in the summer for a variety of reasons including children playing outside in the soil, and when windows are open and lead paint is more likely to be in the air. This seasonal increase would be unrelated to the water system.
- Our data includes children from the entire city, including all medical facilities, rather than just Hurley, has a larger age group of children, and includes a much larger sample size.
- MDHHS data also looks specifically at the first test with elevated blood lead levels which provides a much more accurate picture of when and how first exposure occurred.
- The Hurley data includes a smaller sample size, much more limited time period (January-September of 2013 and 2015 only), and a smaller age group of children.

WIC Children

- For children with elevated blood lead levels that receive WIC benefits, they may be eligible to receive ready made formula with a test result that indicates that the child has an elevated blood lead level.
- WIC cannot cover bottled water.

From: Peeler, Nancy (DCH)
Sent: Thursday, September 24, 2015 3:14 PM
To: Scott, Robert L. (DHHS)
Subject: Re: flint lead powerpoint

Only thought - should we way that if results were being driven by the water supply, we would expect the rate to remain at a higher rate?

Also, I forgot this earlier, probably too in the weeds - Larry Reynolds kept mentioning MCIR data - I don't think they know what our data source is that we use. Should we add any kind of a talking point that says all data included in this analysis is reported directly from labs to MDHHS, in accordance with state law?

If you think it worth adding those, go ahead, and send on to Jennifer. Thanks!

Sent from my iPad

On Sep 24, 2015, at 2:49 PM, Scott, Robert L. (DCH) <ScottR9@michigan.gov> wrote:

> Nancy,
> Please see attached. If for some reason you can't read/open it, let me know and I'll try it as a PDF.
> Bob
> Robert L. Scott
> Childhood Lead Poisoning Prevention Program
> Michigan Department of Health & Human Services
> (517) 335-8178
> fax (517) 335-8509

Message

From: Peeler, Nancy (DCH) [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=ec5ddcb9dcec411293aaafd42aef28bd-Peeler Nancy]
Sent: 9/25/2015 5:43:41 PM
To: Scott, Robert L. (DHHS) [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=1aefbcaada9a48ad8d643aa95e441df1-Scott Robert L.]
Subject: Re: Flint follow-up

\f0Thanks for doing this!

\f0
\f0Based on reading the email from the Free Press person, maybe emphasize that looking at the big picture is probably more accurate than a strict year to year analysis. For example, the results for the months after the water source change look a whole lot like results a few years earlier when Flint WAS on the Detroit water.

\f0
\f0And, that paint is still the primary source of lead poisoning in our whole state AND in Flint, and that the biggest problem is still in Detroit.

\f0
\f0I'm running on, Blah blah blah - you'll do great!

Sent from my iPad

\f0On Sep 25, 2015, at 1:36 PM, Scott, Robert L. (DCH) <ScottR9@michigan.gov> wrote:

Yes
From: Minicuci, Angela (DCH)
Sent: Friday, September 25, 2015 1:36 PM
To: Peeler, Nancy (DCH) <PeelerN@michigan.gov>
Cc: Scott, Robert L. (DCH) <ScottR9@michigan.gov>
Subject: RE: Flint follow-up
Bob, I like what you had to say. That' s basically what I told her, but she wants to hear it from someone other than a spokesperson J Are you available for a call with her?
Angela
From: Peeler, Nancy (DCH)
Sent: Friday, September 25, 2015 1:20 PM
To: Minicuci, Angela (DCH) <MinicuciA@michigan.gov>
Cc: Scott, Robert L. (DCH) <ScottR9@michigan.gov>
Subject: Re: Flint follow-up
I think Bob is the best person to speak to them about the lead data, if you are comfortable with that, Bob. My secret hope is that we can work in the fact that this pattern is similar to recent past. :)

Sent from my iPad

On Sep 25, 2015, at 1:12 PM, Minicuci, Angela (DCH) <MinicuciA@michigan.gov> wrote:
\sb240Hi Nancy and Bob,
The Detroit Free Press wants to do a bigger story about the issue of lead in Flint. I made it clear to her yesterday that we could not say the lead poisonings are related to the water, but she instead wants to do a story about the increase of overall lead poisonings in Flint between 12/13 and 14/15. Are either of you available to speak with her today?
Thank you,
Angela
From: Tanner, Kristi [mailto:ktanner@freepress.com]
Sent: Friday, September 25, 2015 12:16 PM
To: Minicuci, Angela (DCH) <MinicuciA@michigan.gov>
Subject: Flint follow-up
Hi Angela,
Thanks for the feedback yesterday. I took a look at the numbers last night that you sent over and the year over year increase between 13/14 and 14/15 is statistically significant p<.05
Can you ask you epidemiologist to confirm? Also, is this the first significant increase that Flint has seen for this cohort?
Thanks!
Kristi
(313) 222-8877 office
PPI cell

\intblChildren in Flint, less than 16 years of age, tested for lead

\intblChildren with Elevated BLL*\intblChildren Tested**
\intbl\qcMay 2010 - April 2011\intbl\qr168\intbl\qr0.043796\intbl\qcMay 2010 - April 2011\intbl\qr3,836
\intbl\qc2011-2012\intbl\qr153\intbl\qr0.036085\intbl\qc2011-2012\intbl\qr4,240
\intbl\qc2012-2013\intbl\qr118\intbl\qr0.028379\intbl\qc2012-2013\intbl\qr4,158
\intbl\qc2013-2014\intbl\qr95\intbl\qr0.023691\intbl\qc2013-2014\intbl\qr4,010
\intbl\qc2014-2015\intbl\qr123\intbl\qr0.032106\intbl\qc2014-2015\intbl\qr3,831
\intbl\qcMay - August 2015\intbl\qr34\intbl\qr0.029746\intbl\qcMay - August 2015\intbl\qr1,143

\intbl*Each child counted only once.\intbl**Some children counted in more than one year.

\intblSeptember 24, 2015
\intblSource: MDHHS Data Warehouse

From: Larder, Cristin (DCH)
Sent: Monday, September 28, 2015 11:26 AM
To: Scott, Robert L. (DHHS)
Cc: LyonCallo, Sarah (DHHS);McKane, Patricia (DHHS)
Subject: RE: State data confirms higher blood-lead levels in Flint kids

Hi Bob,

Just a quick note: I'll restrict the analytic file to each child's first positive test every calendar year.

Cristin

> **From:** Scott, Robert L. (DCH)
> **Sent:** Monday, September 28, 2015 10:40 AM
> **To:** Peeler, Nancy (DCH); LyonCallo, Sarah (DCH)
> **Cc:** McKane, Patricia (DCH); Fink, Brenda (DCH); Larder, Cristin (DCH)
> **Subject:** RE: State data confirms higher blood-lead levels in Flint kids
>
> I spoke with Cristin. I have extracted a file from the Warehouse with all tests for Genesee County, age
>
> We talked about which test to use---I had been using the first elevated test (>= 5, whether venous, capillary or unknown) and Cristin will probably do the same). Once Cristin has geocoded all records to identify which are in City of Flint and which are out-county, she can then slice and dice them as appropriate.
>
> I'll be happy to help in any way I can.
>
> **From:** Peeler, Nancy (DCH)
> **Sent:** Monday, September 28, 2015 10:35 AM
> **To:** LyonCallo, Sarah (DCH) <lyoncallos@michigan.gov>
> **Cc:** McKane, Patricia (DCH) <McKaneP@michigan.gov>; Fink, Brenda (DCH) <FinkB@michigan.gov>; Scott, Robert L. (DCH) <ScottR9@michigan.gov>
> **Subject:** Re: State data confirms higher blood-lead levels in Flint kids
>
> Bob is assembling a list of questions, info he needs to share with/obtain from Epi to do a data pull. Can we get in the same room, perhaps around 11:30 or 12?
>
> Sent from my iPhone
>
> On Sep 28, 2015, at 10:04 AM, LyonCallo, Sarah (DCH) <lyoncallos@michigan.gov> wrote:
>
> nancy - i will be in touch with you and bob via email shortly. please work with me until patti gets back, ccing patti.
>
> Sent from my iPad
>
> On Sep 28, 2015, at 9:59 AM, Peeler, Nancy (DCH) <PeelerN@michigan.gov> wrote:

Can you give us your cell number? Bob and I have a number of questions about the data you need pulled.

Sent from my iPhone

On Sep 28, 2015, at 9:45 AM, McKane, Patricia (DCH) <McKaneP@michigan.gov> wrote:

I believe Sarah's point was that we should have been brought in before count data was provided to Angela and others and released to the press, not after.
Cristin is well aware of the need to analyze data, now.
Also if you are having difficulty reaching Cristin, I would recommend contacting me, Sarah or Virginia. Email or cell phone works best for me as I'm rarely at my desk.

Sent from my iPhone

On Sep 28, 2015, at 7:35 AM, Peeler, Nancy (DCH) <PeelerN@michigan.gov> wrote:

We've also been trying to reach Cristin – it wasn't clear to us whether she knew about this assignment, which this email indicates she does. We appreciate that confirmation. I will pass this info on to Bob Scott. We appreciate if you can please keep Bob, as the CLPPP Surveillance Manager who has extended knowledge about this data, in the loop. He can then update me as needed.

Nancy

From: LyonCallo, Sarah (DCH)
Sent: Monday, September 28, 2015 9:19 AM
To: Fink, Brenda (DCH)
Cc: Peeler, Nancy (DCH); McKane, Patricia (DCH)
Subject: Re: State data confirms higher blood-lead levels in Flint kids

Dear Brenda,

After seeing Gongwer on Friday AM, I contacted Corinne to understand what was going on, Linda Dykema and Angela later pulled in Epidemiology. I come out of environmental health (cut my teeth on superfund site in a politically complex area) and can appreciate sensitivity on multiple fronts, as well as appreciating the analyses of data at the local level (well done).

It would benefit all of us for epidemiology staff to be pulled in as quickly as possible in the future, so that Patti and I can assist Cristin, that we can weigh in on design issues, and we can make sure that we are not at cross purposes when Angela requests a response. Cristin's response will take some time.

Cristin and I discussed an approach on Friday before we received the report from Angela with the updated counts. We will take a look this AM and revise our approach.

Sarah

Sent from my iPad

On Sep 28, 2015, at 8:45 AM, Fink, Brenda (DCH) <FinkB@michigan.gov> wrote:

Obviously this is uber high profile---so we just need to be sure we're about the data, which as you and Sarah likely know, is under a lot of scrutiny because some of the local folks have different data (done differently, lots of issues----just this involves people who care deeply about the community, Larry Reynolds who is now on our iM Exec Team, etc) I'm just saying sensitivity to the local people who are so concerned about the babies there based on what they have for data is a context that is important, beyond the high profile and other issues . My comment has nothing to do with the data itself. Just the context of very concerned people. Doesn't impact our data . . . obviously. It's just there's a people side to this issue that sometimes gets lost when something becomes so politicized. Just for us, I guess.

Brenda Fink, A.C.S.W.
Director, Division of Family and Community Health
Michigan Department of Health and Human Services
109 W. Michigan Ave.
Lansing, MI 48933
517-335-8863
Fax: 517-335-8697
finkb@michigan.gov

From: Peeler, Nancy (DCH)
Sent: Monday, September 28, 2015 7:54 AM
To: McKane, Patricia (DCH)
Cc: Fink, Brenda (DCH); LyonCallo, Sarah (DCH)
Subject: Fwd: State data confirms higher blood-lead levels in Flint kids

Good morning Patti, looping you in FYI. Wanted you to be aware of this as Cristins supervisor.

Sent from my iPhone

Begin forwarded message:

From: "Minicuci, Angela (DCH)" <MinicuciA@michigan.gov>
Date: September 27, 2015 at 9:29:49 PM EDT
To: "Wells, Eden (DCH)" <WellsE3@michigan.gov>
Cc: "Lasher, Geralyn (DCH)" <lasherg@michigan.gov>, "Moran, Susan (DCH)" <MoranS@michigan.gov>, "Peeler, Nancy (DCH)" <PeelerN@michigan.gov>, "Robinson, Mikelle (DCH)" <RobinsonM18@michigan.gov>, "Hertel, Elizabeth (DCH)" <HertelE@michigan.gov>, "Eisner, Jennifer (DCH)" <EisnerJ@michigan.gov>
Subject: Re: State data confirms higher blood-lead levels in Flint kids

I've asked our lead epidemiologist to look at the data closer than what was in the charts to get a handle on this. The epi is Cristin Larder.

Sent from my iPhone

On Sep 27, 2015, at 5:39 PM, Wells, Eden (DCH) <WellsE3@michigan.gov> wrote:

Given not sure what % children tested, etc.

Sent from my iPhone

On Sep 27, 2015, at 5:34 PM, Wells, Eden (DCH) <WellsE3@michigan.gov> wrote:

Thanks--DFP is looking at tests positive/number of tests done-- not sure that this is a reliable measure used by our program. Await input from Nancy or Linda.

Sent from my iPhone

On Sep 27, 2015, at 5:26 PM, Lasher, Geralyn (DCH) <lasherg@michigan.gov> wrote:

Yes. We provided the graphs with the narrative bullet points.

Sent from my iPad

On Sep 27, 2015, at 5:20 PM, Wells, Eden (DCH) <WellsE3@michigan.gov> wrote:

Geralyn- were the graphs shown outside of MDHHS?

Sent from my iPhone

On Sep 27, 2015, at 5:06 PM, Moran, Susan (DCH) <MoranS@michigan.gov> wrote:

Sorry - hit send too soon.
Copying Lynda and Corrine- not sure who in Epi or CLPPP has been point person on state's data.

Sent from my iPhone

On Sep 27, 2015, at 2:11 PM, Lasher, Geralyn (DCH) <lasherg@michigan.gov> wrote:

We will need help responding to what the Free Press is claiming in this article.

Sue--let us know who can get us this as early Monday as possible.

State data confirms higher blood-lead levels in Flint kids

http://www.freep.com/story/opinion/columnists/nancy-kaffer/2015/09/26/state-data-flint-lead/72820798/

Sent from my iPad

From: Peeler, Nancy (DCH)
Sent: Monday, September 28, 2015 10:26 PM
To: Scott, Robert L. (DHHS)
Subject: Fwd: State data confirms higher blood-lead levels in Flint kids

Does this sound like the process you use, or any tips on how you approach this most effectively?

Sent from my iPhone

Begin forwarded message:

From: "LyonCallo, Sarah (DCH)" <lyoncallos@michigan.gov>
Date: September 28, 2015 at 7:16:48 PM EDT
To: "Peeler, Nancy (DCH)" <PeelerN@michigan.gov>
Cc: "McKane, Patricia (DCH)" <McKaneP@michigan.gov>, "Fink, Brenda (DCH)" <FinkB@michigan.gov>, "Scott, Robert L. (DCH)" <ScottR9@michigan.gov>
Subject: RE: State data confirms higher blood-lead levels in Flint kids

Nancy
Cristin has been working all day on this. We are working together right now and expect to be doing so for a while this evening. We are committed to getting monthly proportion of tested positive graphic for each region (high risk, other flint, other Genesee) for 0-6 year olds for tomorrow am review by Corinne – we will forward when comfortable it is correct.
To do this, we are having to identify tests on a monthly basis for the denominator, up until (and including) the first incidence of high EBLL in the year. Then remove subsequent tests for that child in the rest of the calendar year. The whole thing starts over the next calendar year. We are in a maze of do-loops right now.
Sarah
From: Peeler, Nancy (DCH)
Sent: Monday, September 28, 2015 5:24 PM
To: LyonCallo, Sarah (DCH)
Cc: McKane, Patricia (DCH); Fink, Brenda (DCH); Scott, Robert L. (DCH)
Subject: RE: State data confirms higher blood-lead levels in Flint kids
Thanks, everyone, I understand that Bob and Cristin connected and the work is moving forward.
From: LyonCallo, Sarah (DCH)
Sent: Monday, September 28, 2015 10:55 AM
To: Peeler, Nancy (DCH)
Cc: McKane, Patricia (DCH); Fink, Brenda (DCH); Scott, Robert L. (DCH)
Subject: Re: State data confirms higher blood-lead levels in Flint kids
I am interviewing job candidate during this time. Cristin and Bob have talked and he is working on the file we need. Bob, Cristin is following up with one question.
Sent from my iPad

On Sep 28, 2015, at 10:34 AM, Peeler, Nancy (DCH) <PeelerN@michigan.gov> wrote:

Bob is assembling a list of questions, info he needs to share with/obtain from Epi to do a data pull. Can we get in the same room, perhaps around 11:30 or 12?

Sent from my iPhone

On Sep 28, 2015, at 10:04 AM, LyonCallo, Sarah (DCH) <lyoncallos@michigan.gov> wrote:

nancy - i will be in touch with you and bob via email shortly. please work with me until patti gets back, ccing patti.

Sent from my iPad

On Sep 28, 2015, at 9:59 AM, Peeler, Nancy (DCH) <PeelerN@michigan.gov> wrote:

Can you give us your cell number? Bob and I have a number of questions about the data you need pulled.

Sent from my iPhone

On Sep 28, 2015, at 9:45 AM, McKane, Patricia (DCH) <McKaneP@michigan.gov> wrote:

I believe Sarah's point was that we should have been brought in before count data was provided to Angela and others and released to the press, not after.
Cristin is well aware of the need to analyze data, now.
Also if you are having difficulty reaching Cristin, I would recommend contacting me, Sarah or Virginia. Email or cell phone works best for me as I'm rarely at my desk.

Sent from my iPhone

On Sep 28, 2015, at 7:35 AM, Peeler, Nancy (DCH) <PeelerN@michigan.gov> wrote:

We've also been trying to reach Cristin – it wasn't clear to us whether she knew about this assignment, which this email indicates she does. We appreciate that confirmation. I will pass this info on to Bob Scott. We appreciate if you can please keep Bob, as the CLPPP Surveillance Manager who has extended knowledge about this data, in the loop. He can then update me as needed.
Nancy
From: LyonCallo, Sarah (DCH)
Sent: Monday, September 28, 2015 9:19 AM
To: Fink, Brenda (DCH)
Cc: Peeler, Nancy (DCH); McKane, Patricia (DCH)
Subject: Re: State data confirms higher blood-lead levels in Flint kids
Dear Brenda,
After seeing Gongwer on Friday AM, I contacted Corinne to understand what was going on, Linda Dykema and Angela later pulled in Epidemiology. I come out of environmental health (cut my teeth on superfund site in a politically complex area) and can appreciate sensitivity on multiple fronts, as well as appreciating the analyses of data at the local level (well done).
It would benefit all of us for epidemiology staff to be pulled in as quickly as possible in the future, so that Patti and I can assist Cristin, that we can weigh in on design issues, and we can make sure that we are not at cross purposes when Angela requests a response. Cristin's response will take some time.
Cristin and I discussed an approach on Friday before we received the report from Angela with the updated counts. We will take a look this AM and revise our approach.
Sarah

Sent from my iPad

On Sep 28, 2015, at 8:45 AM, Fink, Brenda (DCH) <FinkB@michigan.gov> wrote:

Obviously this is uber high profile---so we just need to be sure we're about the data, which as you and Sarah likely know, is under a lot of scrutiny because some of the local folks have different data (done differently, lots of issues----just this involves people who care deeply about the community, Larry Reynolds who is now on our iM Exec Team, etc) I'm just saying sensitivity to the local people who are so concerned about the babies there based on what they have for data is a context that is important, beyond the high profile and other issues . My comment has nothing to do with the data itself. Just the context of very concerned people. Doesn't impact our data . . . obviously. It's just there's a people side to this issue that sometimes gets lost when something becomes so politicized. Just for us, I guess.

Brenda Fink, A.C.S.W.
Director, Division of Family and Community Health
Michigan Department of Health and Human Services
109 W. Michigan Ave.
Lansing, MI 48933
517-335-8863
Fax: 517-335-8697
finkb@michigan.gov

From: Peeler, Nancy (DCH)
Sent: Monday, September 28, 2015 7:54 AM
To: McKane, Patricia (DCH)
Cc: Fink, Brenda (DCH); LyonCallo, Sarah (DCH)
Subject: Fwd: State data confirms higher blood-lead levels in Flint kids

Good morning Patti, looping you in FYI. Wanted you to be aware of this as Cristins supervisor.

Sent from my iPhone

Begin forwarded message:

From: "Minicuci, Angela (DCH)" <MinicuciA@michigan.gov>
Date: September 27, 2015 at 9:29:49 PM EDT
To: "Wells, Eden (DCH)" <WellsE3@michigan.gov>
Cc: "Lasher, Geralyn (DCH)" <lasherg@michigan.gov>, "Moran, Susan (DCH)" <MoranS@michigan.gov>, "Peeler, Nancy (DCH)" <PeelerN@michigan.gov>, "Robinson, Mikelle (DCH)" <RobinsonM18@michigan.gov>, "Hertel, Elizabeth (DCH)" <HertelE@michigan.gov>, "Eisner, Jennifer (DCH)" <EisnerJ@michigan.gov>
Subject: Re: State data confirms higher blood-lead levels in Flint kids

I've asked our lead epidemiologist to look at the data closer than what was in the charts to get a handle on this. The epi is Cristin Larder.

Sent from my iPhone

On Sep 27, 2015, at 5:39 PM, Wells, Eden (DCH) <WellsE3@michigan.gov> wrote:
Given not sure what % children tested, etc.
Sent from my iPhone
On Sep 27, 2015, at 5:34 PM, Wells, Eden (DCH) <WellsE3@michigan.gov> wrote:
Thanks--DFP is looking at tests positive/number of tests done-- not sure that this is a reliable measure used by our program. Await input from Nancy or Linda.
Sent from my iPhone
On Sep 27, 2015, at 5:26 PM, Lasher, Geralyn (DCH) <lasherg@michigan.gov> wrote:
Yes. We provided the graphs with the narrative bullet points.
Sent from my iPad
On Sep 27, 2015, at 5:20 PM, Wells, Eden (DCH) <WellsE3@michigan.gov> wrote:
Geralyn- were the graphs shown outside of MDHHS?
Sent from my iPhone
On Sep 27, 2015, at 5:06 PM, Moran, Susan (DCH) <MoranS@michigan.gov> wrote:
Sorry - hit send too soon.
Copying Lynda and Corrine- not sure who in Epi or CLPPP has been point person on state's data.
Sent from my iPhone
On Sep 27, 2015, at 2:11 PM, Lasher, Geralyn (DCH) <lasherg@michigan.gov> wrote:
We will need help responding to what the Free Press is claiming in this article.
Sue--let us know who can get us this as early Monday as possible.
State data confirms higher blood-lead levels in Flint kids
http://www.freep.com/story/opinion/columnists/nancy-kaffer/2015/09/26/state-data-flint-lead/72820798/
Sent from my iPad

From: Peeler, Nancy (DCH)
Sent: Tuesday, September 29, 2015 4:04 PM
To: Scott, Robert L. (DHHS)
Cc: Fink, Brenda (DHHS)
Subject: FW: Public Health Advisory
Attachments: water.pdf

Importance: High

Forwarding, FYI. The analysis is now in the hands of Epi, so out of our realm.

Just curious -- Bob, what were the zip codes Hurley used, and do they cross over into the townships, or are they completely within city boundaries?

From: Lasher, Geralyn (DCH)
Sent: Tuesday, September 29, 2015 12:06 PM
To: Wells, Eden (DCH); Miller, Corinne (DCH); Moran, Susan (DCH); Robinson, Mikelle (DCH); Dykema, Linda D. (DCH); LyonCallo, Sarah (DCH); Hertel, Elizabeth (DCH); Peeler, Nancy (DCH); Travis, Rashmi (DCH); Miller, Mark (DCH)
Cc: Minicuci, Angela (DCH); Eisner, Jennifer (DCH); Grijalva, Nancy (DCH)
Subject: FW: Public Health Advisory
Importance: High

And Genesee County and the Genesee County Health Department, have just issued the attached public health advisory and on the final paragraph it says:

> Recent data provided by Hurley Hospital researchers has indicated that a significant increase in blood lead levels has occurred in children since the switch to Flint River water. The county Health Officer has requested that the Michigan Department of Health and Human Services (MDHHS) provide to the County specific data to support its claim that state data is more comprehensive and does not show a significant increase. To date, the MDHHS has failed to confirm the geographic area included in their findings. We want to assure the state data is specific to the boundaries of the City of Flint, and not Flint addresses which would include addresses in areas outside of the City of Flint. These areas, such as Flint Township, that obtain their water from the Detroit Water Authority and would, therefore, not be representative of Flint River water as the water source. The County is prepared to take further action if the State fails to provide the requested data by September 30, 2015. Further action could include a request for outside independent evaluation of the data and to declare a Public Health Emergency in Flint.

I understand that we are still reviewing the data---but the county has basically issued a ransom date that they want this information by tomorrow.

Eden---please coordinate an answer so Nick can walk into the 1:00 p.m. meeting prepared on this.

From: Minicuci, Angela (DCH)
Sent: Tuesday, September 29, 2015 11:59 AM
To: Lasher, Geralyn (DCH) <lasherg@michigan.gov>
Subject: FW: Public Health Advisory
Importance: High

Last paragraph, last page.

Angela

From: Sandlin, Mary [mailto:MSANDLIN@gchd.us]
Sent: Tuesday, September 29, 2015 11:55 AM
Subject: Public Health Advisory
Importance: High

Mary E. Sandlin
Clerical Coordinator
Genesee County Health Department
630 S. Saginaw Street, Suite 4
Flint, MI 48502-1540
(810) 257-3812 FAX: (810) 257-3147
msandlin@gchd.us

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For a copy of the Health Department's Notice of Information Practices, contact the Health Department or visit the Health Department's website at http://www.gchd.us

From: Wells, Eden (DCH)
Sent: Wednesday, September 30, 2015 7:53 PM
To: Peeler, Nancy (DHHS)
Cc: Miller, Corinne (DHHS);Miller, Mark (DHHS);LyonCallo, Sarah (DHHS);Dykema, Linda D. (DHHS);Priem, Wesley F. (DHHS);Travis, Rashmi (DHHS);Fink, Brenda (DHHS);Scott, Robert L. (DHHS)
Subject: Re: Hurley -- follow up about the question on Hurley lab results

Very cool-- what a way to learn about a program! Thx!

Sent from my iPhone

On Sep 30, 2015, at 6:50 PM, Peeler, Nancy (DCH) <PeelerN@michigan.gov> wrote:

> I can partially answer your question now, will get additional info from Bob and send more later.
> The data flows in daily, year-round. We process several thousand test results every week. We monitor the results daily, and have an algorithm for our follow-up response, based on the blood lead level. Because we are processing results every day, we do see some patterns if they begin to emerge, especially with the higher lead levels. We normally track and report data at health department level, county level/Detroit. We are still building our capacity and putting new procedures in place via our CDC Surveillance grant to crank out more reports/report cards, and more frequent data reports, especially with the switch in focus to levels of 5 and above (which means we are focusing on a larger number of results than just 10 and above). We develop and share out many maps, charts, graphs, and yes, do publish an annual legislative report.
> We have .2 FTE Epi support (Cristin Larder), mostly for special projects and/or reports, for example, Cristin is working with us and Dr. Stan Kaplowitz from MSU to use his research to help pinpoint smaller geographic areas with higher risk, so we can better direct resources toward those areas.
> Bob, can you please add more information about frequency of your analysis, and how we detect issues?
>
> **From:** Wells, Eden (DCH)
> **Sent:** Wednesday, September 30, 2015 6:24 PM
> **To:** Peeler, Nancy (DCH); Miller, Corinne (DCH); Miller, Mark (DCH); LyonCallo, Sarah (DCH); Dykema, Linda D. (DCH); Priem, Wesley F. (DCH); Travis, Rashmi (DCH)
> **Subject:** RE: Hurley -- follow up about the question on Hurley lab results
> That sounds about right.
> May I ask,, is it CLPP's usual process to collect the lead data on an ongoing basis...if so, at what level is the data usually analyzed (by Epi?) IS it daily,nmonthly? Quarterly? Annually? How would we normally detect/know if there is an issue in a particular locality---do you look at it at county level or smaller when you peruse your data? This question may arise...
> E
>
> **From:** Peeler, Nancy (DCH)
> **Sent:** Wednesday, September 30, 2015 5:22 PM
> **To:** Miller, Corinne (DCH); Miller, Mark (DCH); LyonCallo, Sarah (DCH); Dykema, Linda D. (DCH); Priem, Wesley F. (DCH); Travis, Rashmi (DCH); Wells, Eden (DCH)
> **Subject:** FW: Hurley -- follow up about the question on Hurley lab results
> Hi all -- I talked to Bob to confirm the information I had shared about the Hurley lab results. It is a little more nuanced than I had explained, forwarding Bob's explanation, FYI.
>
> **From:** Scott, Robert L. (DCH)
> **Sent:** Wednesday, September 30, 2015 5:05 PM

To: Peeler, Nancy (DCH)
Subject: Hurley
Hurley Medical Center is listed as the "Provider" on approximately half of the blood lead results we received for Flint children in 2014—I assume that pattern holds in 2015 and in recent years. Warde Medical Lab is listed as the "Laboratory" on those results. Warde reported the results to CLPPP in accordance with State law.
I can't say whether the blood specimens were a) drawn at Hurley's lab, or b) simply passed through Hurley's lab—from physician office to Hurley to Warde for analysis. As I understand it, both scenarios are common at various hospital labs.
Robert L. Scott
Childhood Lead Poisoning Prevention Program
Michigan Department of Health & Human Services
(517) 335-8178
fax (517) 335-8509

From: Wells, Eden (DHHS)
Sent: Monday, October 05, 2015 9:37 AM
To: Miller, Corinne (DHHS);Miller, Mark (DHHS);LyonCallo, Sarah (DHHS);Peeler, Nancy (DHHS);Travis, Rashmi (DHHS);Moran, Susan (DHHS);Scott, Robert L. (DHHS);Robinson, Mikelle (DHHS)
Subject: Fwd: Flint water talking points
Attachments: Flint Water Talking Points 100215.docx; ATT00001.htm

Sent from my iPhone

Begin forwarded message:

> **From:** "Eisner, Jennifer (DHHS)" <EisnerJ@michigan.gov>
> **Date:** October 5, 2015 at 9:33:40 AM EDT
> **To:** "Wells, Eden (DHHS)" <WellsE3@michigan.gov>
> **Subject: Flint water talking points**
>
> Here you go!!
> Jennifer (Smith) Eisner
> Public Information Officer
> Michigan Department of Health and Human Services
> 517-241-2112

Blood Lead Levels in Flint Talking Points
October 1, 2015

- Initial analysis of MDHHS data found that blood lead levels (BLLs) of children in Flint have followed an expected seasonal trend; due to small numbers further analysis was initiated.
- While this analysis of blood lead levels in Flint as a whole remains true, after a comprehensive and detailed review down to the zip code level, we have found that the state analysis is consistent with that presented by Hurley.
- Director Lyon is working closely with DEQ and the administration to take active steps to reduce all potential lead exposures in Flint, and across the state.
- Our Chief Medical Executive has been in communication with the lead investigator at Hurley Children's Hospital, and we continue to work with Hurley, the city of Flint, local and state leaders to verify and analyze data trends.
- Zip code-level data does show that there has been an increase in elevated childhood blood lead levels in specific communities.
    - This does not conclusively mean that the water source change is the sole cause of the increase, but data does show an association.
    - There is an increased proportion of children with elevated Blood Levels (ELBs) in several zip codes, particularly 03 and 04. These appear to have increased over the last 1.5 years.
    - Lead exposure can occur from a number of different sources (such as paint, gasoline, solder, and consumer products) and through different pathways (such as air, food, water, dust, and soil).
    - Although there are several exposure sources, lead-based paint is still the most widespread and dangerous high-dose source of lead exposure for young children in the US and Michigan.
- We reviewed MDHHS statewide data using the same methodology used by Hurley, looking at our numbers by zip code and age ranges, and filtering out non-Flint children.
- Routine surveillance of blood lead levels does not analyze data down to the zip code level. Detailed analysis like this occurs when there is reason to focus in on precise locations or populations.
- MDHHS will be working closely with the Michigan Department of Environmental Quality, Hurley Children's Hospital, the Genesee County Health Department, and community organizations to initiate further action steps.
- We understand that cost may be a barrier to following the recommendations of the local health department. We are actively working with public and private partners to make resources available to those who may need assistance.

- MDHHS is recommending that residents follow the Public Health Advisory issued by the Genesee County Health Department, as well as take further steps to reduce exposures to all forms of lead in and around their homes.

MDHHS Stats and Facts

- 'High Risk' Zip codes (48503 and 48504)
    - Blood lead level rates among children under six years of age in the high risk zip codes (48503, 48504) were 2.7 times higher than the rest of Genesee County before the switch to Flint River Water.
    - After the switch to Flint River Water, rates in the high risk Zip codes were 3.2 times that of the rest of Genesee County.
- Other Zip codes in Flint
    - Rates of elevated blood lead levels among children under six years of age in other parts of the city of Flint were 2 times that of the rest of Genesee County before the switch to Flint River Water.
    - The magnitude of the elevated rate remained roughly the same during the period after the water source switch.
- Lead abatement through MDHHS was federally funded up until FY14 when Michigan began providing additional funds to abate homes.
- In FY14, $1.25M General Fund was added. In FY15, General Fund was bumped up to $1.75M and FY16, General Fund remains at $1.75M.

Water Filters

- Our first action item is to work closely with our public and private partners to provide water filters to Flint residents and MDHHS clients.
- To meet this priority, the governor has identified one million dollars in state funding to purchase water filters for Flint residents.
- Given the questions and concerns regarding the change in water source in Flint, MDHHS has authorized the use of emergency services funding to provide water filters for MDHHS clients receiving assistance in the city of Flint.
- We are pursuing a plan for clients who are active Family Independence Program (FIP), Food Assistance Program (FAP), Child Development and Care (CDC), State Disability Assistance (SDA), State Disability Assistance (SDA), or Social Security Insurance (SSI) to that they can obtain filters that are National Sanitation Foundation (NSF) certified to remove lead and ANSI Standard 53.
- We are in discussions with local retailers and will share additional information about where residents can go to purchase filters as soon as those details have been finalized.

- MDHHS currently serves approximately 25,000 households in Flint.

Reducing and Removing Lead Exposure

- In housing built before 1978, it can be assumed that the paint has lead unless tests show otherwise.
- Make sure your child does not have access to peeling paint or chewable surfaces painted with lead-based paint.
- Children and pregnant women should not be present in housing built before 1978 that is undergoing renovation. They should not participate in activities that disturb old paint or in cleaning up paint debris after work is completed.
- Create barriers between living/play areas and lead sources. Until environmental clean-up is completed, you should clean and isolate all sources of lead.
    - Close and lock doors to keep children away from chipping or peeling paint on walls. You can also apply temporary barriers such as contact paper or duct tape, to cover holes in walls or to block children's access to other sources of lead.
- Regularly wash children's hands and toys. Hands and toys can become contaminated from household dust or exterior soil. Both are known lead sources.
- Regularly wet-mop floors and wet-wipe window components. Because household dust is a major source of lead, you should wet-mop floors and wet-wipe horizontal surfaces every 2-3 weeks.
    - Windowsills and wells can contain high levels of leaded dust. They should be kept clean. If feasible, windows should be shut to prevent abrasion of painted surfaces or opened from the top sash.
- Take off shoes when entering the house to prevent bringing lead-contaminated soil in from outside.
- Prevent children from playing in bare soil; if possible, provide them with sandboxes. Plant grass on areas of bare soil or cover the soil with grass seed, mulch, or wood chips, if possible.
    - Until the bare soil is covered, move play areas away from bare soil and away from the sides of the house. If you have a sandbox, cover the box when not in use to prevent cats from using it as a litter box. That will help protect children from exposure to animal waste.
- Avoid using makeup, containers, cookware, or tableware to store or cook foods or liquids that are not shown to be lead free.
- Remove recalled toys and toy jewelry immediately from children.
- Use only cold water from the tap for drinking, cooking, and making baby formula. Hot water is more likely to contain higher levels of lead. Most of the lead in household water usually comes from the plumbing in your house, not from the local water supply.

- Shower and change clothes after finishing a task that involves working with lead-based products such as stained glass, making bullets, or using a firing range.

WIC Children

- There are 855 infants participating in WIC in Flint.
- We are working with partners at the United Way to ensure that WIC families have access to water filters and bottled water.
- In homes with infants on WIC, if the household has documentation from an official source of unsanitary water supply issues, that family may be eligible to receive ready-to-feed formula. Families should contact WIC to see if they are eligible.
- Each household would have to be looked at on an individual basis.
- WIC cannot cover bottled water.

Background

- The results of the Hurley Children's Hospital were reviewed by MDHHS after the study was released last week.
- The analysis that Hurley conducted was different from the initial MDHHS data regarding blood lead levels in Flint.
- MDHHS initial data looked at the entire blood lead levels for the Flint area for the past five years and showed the annual seasonal trends in the area.
- Seasonal exposure is higher in the summer for a variety of reasons including children playing outside in the soil, and when windows are open and lead paint is more likely to be in the air. Further, seasonal variations in water can occur due to changes in temperature, pH , and other factors

From: Travis, Rashmi (DHHS)
Sent: Monday, October 05, 2015 6:23 PM
To: Peeler, Nancy (DHHS);Scott, Robert L. (DHHS)
Subject: FW: Flint EBL's
Attachments: Response to N.Lyon 10.5.15 v2.docx; Flint_EBLLs_Retesting_v2.pdf; AAP Medical Management of Childhood Lead Exposure-June-2013.pdf; Blood Lead Level (BLL) Quick Reference for Primary Care Providers.pdf; Lead Program Process Map 1.27.15.pptx

Importance: High

GREAT JOB, Nancy and Bob! Once again, thanks for being available for questions and calls today!
Rashmi

From: Peeler, Nancy (DHHS)
Sent: Monday, October 05, 2015 5:59 PM
To: Wells, Eden (DHHS)
Cc: Travis, Rashmi (DHHS); Moran, Susan (DHHS); Scott, Robert L. (DHHS); Fink, Brenda (DHHS)
Subject: RE: Flint EBL's
Importance: High

Sending updated Response, with original attachments, PLUS requested data is attached. Please let us know if you have questions or need additional information.

Nancy

From: Wells, Eden (DHHS)
Sent: Monday, October 05, 2015 2:46 PM
To: Peeler, Nancy (DHHS)
Cc: Travis, Rashmi (DHHS); Moran, Susan (DHHS); Scott, Robert L. (DHHS); Fink, Brenda (DHHS)
Subject: Re: Flint EBL's

These are beautiful-!!!- thanks- I will let Nick know regarding data

Sent from my iPhone

On Oct 5, 2015, at 1:33 PM, Peeler, Nancy (DHHS) <PeelerN@michigan.gov> wrote:

> Attached is our initial response, plus attachments that we referenced in the response. Let us know if you think the attachments are helpful or too much.
>
> Bob is still analyzing data to give specific responses where they were requested. We estimate it will take most of today to assemble that data for you.
>
> Nancy

From: Wells, Eden (DHHS)
Sent: Monday, October 05, 2015 9:01 AM
To: Peeler, Nancy (DHHS)
Cc: Travis, Rashmi (DHHS); Moran, Susan (DHHS)
Subject: FW: Flint EBL's

Good morning, Nancy!

Please respond to me on this with a CC to Rashmi and Sue Moran. I have the heat map from last week, but he wants the numbers as well---
---------- Forwarded message ----------
From: **Eden Wells** <ewells@umich.edu>
Date: Mon, Oct 5, 2015 at 8:57 AM
Subject: Re: Flint EBL's
To: "Lyon, Nick (DHHS)" <LyonN2@michigan.gov>
Cc: "Moran, Susan (DHHS)" <MoranS@michigan.gov>, "Grijalva, Nancy (DHHS)" <GrijalvaN@michigan.gov>

Good morning,

I will get information right away to CLPP on this- but there are established protocols, and they do involve the primary care provider as well. I have a heat map showing the numbers of children above 5 and 15 by zip, so I know we have those numbers as well. To you shortly,

E

Eden V. Wells, MD, MPH, FACPM
Clinical Associate Professor, Epidemiology
Director, Preventive Medicine Residency
University of Michigan School of Public Health
1415 Washington Heights,
Ann Arbor, MI 48109
Tel: 734-647-5306
Fax: 734-936-2084
ewells@umich.edu

On Mon, Oct 5, 2015 at 8:52 AM, Lyon, Nick (DHHS) <LyonN2@michigan.gov> wrote:

So, I have a process question: If a child tests above 5 micg/dl, the suggested protocol is to provide information on how to mitigate lead exposure in the home and do a follow up blood test in the future. Can someone describe the protocols/requirements that are supposed to be followed and who is doing it?

I am also curious to know how we've done with children who have a confirmed elevated blood level. If I look at the zip code data we were using last week, there have been more than 100

children who have tested at 5 or above from 2014 Q3 – 2015 Q2. How many of those children have been retested and what is their result?

I would also like to know summary level data for these zip codes for how many children have tested above .14, and what the follow up rates have been for them as well.

I think this would and should be the next question that we are receiving…You identified the issue, you are suggesting a test, filter, flush approach…what about the kids who tested above the threshold?

Nick

Follow-up for Children in Flint (ZIPs 48501-48507) with Elevated Blood Lead Levels April 2014 through March 2015

Children with Initial Confirmed (Venous) Elevated BLL 5-14

Children w/BLL 5-14:	43	
With retest:	14	
Most recent retest was <5:		4
5 to 14:		9
>= 15:		1

Children with Initial Confirmed (Venous) Elevated BLL >= 15

Children w/BLL >= 15:	3	
With retest:	1	
Most recent retest was <5:		0
5 to 14:		0
>= 15:		1

Children with Initial Capillary Elevated BLL 5-14 (needing confirmation)

Children w/BLL 5-14:	70	
With confirmatory venous:	15	
Confirmatory test was <5:		7
5 to 14:		7
>= 15:		1

Children with Initial Capillary Elevated BLL >= 15 (needing confirmation)

Children w/BLL >= 15:	1
With confirmatory venous:	0

October 5, 2015

Source: MDHHS Data Warehouse

From: Hallwood, Dawn <dhallwood@gchd.us>
Sent: Friday, October 24, 2014 11:58 AM
To: Scott, Robert L. (DCH)
Subject: RE: Lead Prevention quarterly reports due soon
Attachments: Code enforcement tool.pdf; CLPPP PREVENTION Quarterly Report 4th qtr.docx

Bob,

Here are the items that Rod said needed to be sent in order to complete our requirements. Please let me know if there is anything else that needs to be done. Thank you.

Dawn Hallwood, R.S.
Genesee County Health Department
Environmental Health Supervisor
630 S. Saginaw Street, Suite 4
Flint, Michigan 48502
(810) 257-3159
Fax # (810) 257-3125

From: Scott, Robert L. (DCH) [mailto:ScottR9@michigan.gov]
Sent: Thursday, October 16, 2014 8:15 AM
To: whitingd@detroitmi.gov; benjaminv@detroitmi.gov; McNeill, Rod; Taylor, Sherry; Hawkins, Joy; Valacak, Mark; jyorko@ingham.org; dedokpolo@ingham.org; nhayward@ingham.org; mbulling@co.jackson.mi.us; rrudolph@co.jackson.mi.us; rthoune@co.jackson.mi.us; bhampton@co.jackson.mi.us; joan.dyer@kentcountymi.gov; joann.hoganson@kentcountymi.gov; montgomerykeastji@co.muskegon.mi.us; jheringhausen@saginawcounty.com; Hallwood, Dawn; bwilke@saginawcounty.com; kmcelroy@waynecounty.com; causterb@waynecounty.com
Cc: Lishinski, Karen (DCH); Peeler, Nancy (DCH)
Subject: Lead Prevention quarterly reports due soon

Hello all,

Your quarterly report for the 4th quarter (July-September) of FY14 is due on October 30. For your convenience, I've attached a copy of the QR form for Prevention.

PLEASE NOTE: You are released from any obligation for FY14 regarding the "Community Prescription," so there is no need to report on that activity this quarter. Development of this document has been a long and arduous process, with a variety of views—all of them with merit—on the best language and format. In the new fiscal year, we'll work together to get it into the hands of providers and the families they serve.

Let me know if you have questions.

Thanks,
Bob

Robert L. Scott

Childhood Lead Poisoning Prevention Program
Michigan Department of Community Health
(517) 335-8178
fax (517) 335-8509

Code Enforcement Childhood Lead Poisoning Assessment Tool

Final Version: December 19, 2013

This scorecard is a baseline tool for sparking conversations about improvement opportunities to broaden the number and variety of strategies currently being used to combat childhood lead poisoning in a local community. This scorecard focuses upon code enforcement and related activities that are typically under the control of local municipal government in the state of Michigan.

The scorecard draws upon model programs and approaches from across the nation. With that in mind, it is anticipated that not one Michigan community will be following in every best practice. On the contrary, it is anticipated that many communities will currently be following just a select few of these best practices.

The intent of the scorecard is to measure what is currently being done, pose opportunities for enhancement, and measure positive change over time. By applying the scorecard in 2014 and then using it again in future years, a community's progress towards broadening the strategies deployed to combat childhood lead poisoning can be objectively measured. The goal is not to focus on deficiencies, but to surface opportunity for enhancement.

Measure[1]	Best Practice	Who to ask	Scoring: Evidence of Practice
Education of Property Owners	**Section Score** (13 possible points):		
E	**Does the municipality educate landlords / property management on their requirements under the U.S. Environmental Protection Agency's (EPA) Renovation, Repair and Painting (RRP) rule when citing code violations for pre-1978 housing?** Evidence • Narrative in code citation notices advising property owners / management where to get more information about the RRP rule, or • Special insert detailing the requirements of the RRP rule, or • Lead-safe work practices are required elsewhere in the code.	Code Enforcement Supervisor	☑ Yes (3 points) ☐ No (0 points)
E	**Does the municipality educate homeowners on the importance of lead-safe work practices and use of RRP-certified labor when issuing citations to pre-1978 housing?** Evidence • Narrative in code citation notices advising property owners where to get more information about the RRP rule, or • Special insert detailing the requirements of the RRP rule. • LSWP required elsewhere in the code. • Hold proactive workshops for property owners (elsewhere in matrix).	Code Enforcement Supervisor	☑ Yes (3 points) ☐ No (0 points)

[1] E = expected, + = enhanced activity, ++ = gold standard

Measure	Best Practice	Who to ask	Scoring: Evidence of Practice
E	**Does the local Housing Commission fully understand and operationalize its obligations under HUD's Regulation on Controlling Lead-Based Paint Hazards in Housing Receiving Federal Assistance** (24 CFR Part 35), specifically as set forth in the September 2000 Interpretive Guidance, Subpart M (Tenant-Based Rental Assistance). Evidence • Housing Quality Standard (HQS) inspections are being conducted at all rented property, AND • Property owners with deficiencies are required to make corrections, AND • Property owners are required to incorporate ongoing lead-based paint maintenance, AND • The Housing Commission works with local public health to match addresses of children with environmental intervention blood lead levels[2] with addresses receiving assistance, AND • Lead hazards are required to be remediated and cleared in all units where a child with an environmental intervention blood lead level resides.	Housing Commission, Director of Leased Housing	☐ Yes (3 points) ☐ No (0 points)
+	**Does the municipality holds proactive workshops for property owners to educate them on lead-safe work practices?** Evidence • Promotional materials from a workshop	Code Enforcement Supervisor	☐ Yes (2 points) ☑ No (0 points)
++	**Does the local municipality have and enforce a local disclosure law?** Evidence • Citation in the municipal ordinance, AND • Staff assigned to enforcement activities.	City Attorney	☑ Yes (1 points) ☐ No (0 points)
Upholding RRP Requirements		Section Score (11 possible points):	
E	**Does the municipality educate contractors on their requirements under RRP at the time of pulling a building permit for pre-1978 housing?** Evidence • Handouts provided to those applying for a building permit, AND • Educational posters visible to the public when visiting the permitting office.	Building Official	☐ Yes (3 points) ☑ No (0 points)

[2]Defined by HUD as a blood lead level of 20 µg/dL (micrograms per deciliter) of whole blood or above for a single test, or blood lead levels of 15-19 µg/dL in two tests taken at least three months apart for a child under six years of age.

Measure	Best Practice		Who to ask	Scoring: Evidence of Practice
E	**Does the municipality require the use of lead-safe work practices in its property maintenance code?** (Note, the International Property Maintenance Code (IPMC) does not require lead-safe work practices. This would need to be a in a supplemental code). Evidence • Citation in the municipal ordinance.		Code Enforcement Supervisor	☐ Yes (3 points) ☒ No (0 points)
+	**Does the municipality require contractors to be RRP-certified when pulling a building permit for pre-1978 housing?** Evidence • Citation in the municipal ordinance, AND • Requirement to provide evidence of certification included on the building permit application.		Building Official	☐ Yes (3 points) ☒ No (0 points)
+	**Does the municipality require that code enforcement and building inspection professionals participate in RRP training?** Evidence • RRP training a requirement included in the job description, or • RRP training requirement included in the employee handbook. • Evidence of training being provided		Code Enforcement Supervisor, Building Official	☒ Yes (2 points) ☐ No (0 points)
Registration and Routine Maintenance		Section Score (23 possible points):		
E	**Does the municipality require the registration[3] of rental property for all types of rental property** (single-families, duplexes, and multi-unit properties)? Evidence • Citation in the municipal ordinance, AND • List of all registered rental properties.	☑ Multi-family ☑ Duplexes ☑ Single-family ☐ None	Code Enforcement Supervisor	☑ Yes (3 points) ☐ No (0 points)

[3] Registration involves informing the municipality in writing that the property will be used for residential rental purposes and usually requires completion of a form calling for contact information and other pertinent information. A fee may or may not be charged for registration. The period for which the registration is valid may range from as little as one year to in perpetuity. Inspections are not required for registration.

Measure	Best Practice		Who to ask	Scoring: Evidence of Practice
E	**Does the municipality require the certification[4] of rental property to be incompliance with the property maintenance code at least every four years for all types of rental property** (single-families, duplexes, and multi-unit properties)? Evidence • Citation in the municipal ordinance, AND • List of open enforcement case.	☐ Multi-family ☐ Duplexes ☐ Single-family ☐ None	Code Enforcement Supervisor	☒ Yes (3 points) ☐ No (0 points)
E	**Does the municipality have dedicated funding to support code enforcement and rental certification programs?** This may include fees to support enforcement. Evidence • Program budget showing sources of revenue.		Code Enforcement Supervisor	☒ Yes (3 points) No (0 points)
E	**Are owners required to address all lead hazards in order to obtain/maintain certification? Or are properties ordered vacated when hazards are not addressed in a timely manner?** Evidence • Citation in the municipal ordinance, AND • List of properties ordered vacated.		Code Enforcement Supervisor, City Attorney	☐ Yes (3 points) ☑ No (0 points)
E	**Does the municipality use the International Property Maintenance Code (IPMC) or similar code?** Evidence • Citation in the municipal ordinance.		Code Enforcement Supervisor	☒ Yes (3 points) ☐ No (0 points)
E	**Does the municipality have a supplemental code to address lead hazards not found in the IPMC**, such as the lead paint guidance set forth in the National Healthy Housing Standard[5] or a similar ordinance? Evidence • Citation in the municipal ordinance.		Code Enforcement Supervisor	☐ Yes (3 points) ☑ No (0 points)
+	**When potential lead hazards are found in a building (visual assessment), does notification go beyond the owner or property management and include the notification of all occupants?** Evidence • Documentation of tenant notification in case files.		Code Enforcement Supervisor	☐ Yes (2 points) ☑ No (0 points)

[4]Certification involves and inspection of the property to determine if it is in compliance with local codes.A fee is typically charged for certification. The period for which the certification is valid may be no more than six years under current state law (subject to change), and may be less.

[5] The National Healthy Housing Standard is a guidance document jointly prepared by the American Public Health Association and the National Center for Healthy Housing. It will be released in early 2014.

Measure	Best Practice	Who to ask	Scoring: Evidence of Practice
+	**If lead hazards are found in a building (visual assessment), are all units required to be inspected?** Evidence • Documentation of inspection of all units in case files.	Code Enforcement Supervisor	☐ Yes (2 points) ☑ No (0 points)
++	**Does the municipality require rental property to pass independent lead clearance before issuing rental certification?** Evidence • Citation in the municipal ordinance, AND • Documentation in case files for certified rental property.	Code Enforcement Supervisor	☐ Yes (1 points) ☑ No (0 points)
Linking Code Enforcement and Lead Hazard Control Programs		Section Score (8 possible points):	
E	**Does code enforcement promote and/or coordinate participation in a municipal, county or state lead hazard control program** (or a general housing rehabilitation program when dedicated lead hazard control funds are not available)? Evidence • Promotional materials sent along with code orders, or • Language included on code orders promoting programs, or • Any other method of informing those receiving citations of the availability of program funds.	Code Enforcement Supervisor, Housing Rehab Office	☐ Yes (3 points) ☑ No (0 points)
E	**Does the local municipality have a lead-safe housing registry or participate in the State's registry?** Evidence • Copy of the registry.	Housing Rehab Office	☐ Yes (3 points) ☑ No (0 points)
+	**Does the municipality have a lead-hazard control program with dedicated (restricted) funding that serves both owners and rental property owners?** Evidence • Program application.	Housing Rehab Office	☑ Yes (2 points) ☐ No (0 points)

Total Score (55 possible points):	

Many of the best practices recommended in this document were initially detailed in the publication "Building Blocks for Primary Prevention - Protecting Children from Lead-Based Paint Hazards" published October 2005 by the Centers for Disease Control and Prevention National Center for Environmental Health - Lead Poisoning Prevention Branch and produced by the Alliance for Healthy Homes.
http://www.cdc.gov/nceh/lead/publications/Building_Blocks_for_Primary_Prevention.pdf

CLPPP PREVENTION Contractor Quarterly Report FY2014

Notes: a) The white spaces for reporting will expand as necessary as you type. b) Please save the file with a new name that includes your health department's initials and the FY quarter for this report—e.g. Prevention_XCHD_2ndQtr.docx c) Report should be submitted to Robert Scott: scottr9@michigan.gov

Health department: Genesee County
Quarter: 4th

Requirement 1: Develop a "Community Prescription" that can be used by home visitors, health care providers, and other partners to promote action by parents and point them to community resources, using format supplied by MDCH CLPPP.
The single point of entry concept created through the HUD Lead Hazard Reduction Grant Proposal though not implemented due to not being awarded HUD funds, remains the goal should future funding allow for its implementation.
Requirement 2: Provide presentations at meetings of rental property owner associations, educating them on the dangers of lead poisoning, legal requirements for RPOs, and methods for keeping properties lead safe.
The powerpoint presentation was conducted for the Genesee County Landlords Association in September, with approximately 30 attendees.
Requirement 3: Complete a report card to publicly report the extent to which code enforcement agencies follow best practices with regard to lead inspection activities, using format supplied by MDCH CLPPP (Code Enforcement CLP Assessment Tool.docx).
The City of Flint has completed the Code Enforcement Assessment tool, see attached.
Requirement 4: To the extent that funding will allow, conduct other lead poisoning prevention activities for families with children with elevated blood lead levels (above > 5ug/dL), which may include: a. Providing information on lead safe cleaning methods b. Providing lead safe cleaning supplies/equipment c. Providing direct training and coaching on lead safe cleaning methods d. Conducting lead safe cleaning in the home e. Providing supplies to make temporary fixes to prevent lead poisoning f. Arranging for minor repairs that will prevent lead poisoning, using lead safe
The City of Flint in partnership with the Genesee County Health Department was awarded a $100,000 Lead Safe for Kids Sake grant and the hope was to pair this with a HUD grant, however due to the lack of HUD funds, the program will be administered as a stand-alone program. The period of performance has not been determined as of the date f this report.
Requirement 5: Participate in quarterly conference calls/webinars. (No report required.)

From: Schacher, Andrew <aschacher@gchd.us>
Sent: Tuesday, April 28, 2015 3:02 PM
To: Scott, Robert L. (DCH)
Cc: Hallwood, Dawn;Valacak, Mark
Subject: CLPPP Prevention Contractor Quarterly Report FY2015
Attachments: Prevention_GCHD_2ndQtr.docx

Hi Robert,

I am Andrew Schacher with the Genesee County Health Department. Along with my supervisor, Dawn Hallwood, I will be following through with the responsibilities of this CLPPP grant. If you have any questions or concerns please feel free to contact me.

Thank you

Andrew Schacher, B.S.
Genesee County Health Department
Environmental Health Division
630 S. Saginaw Street, Suite 4
Flint, MI 48502
Phone: 810-257-3015, Fax: 810-257-3125

CLPPP PREVENTION Contractor Quarterly Report FY2015

Notes: a) The white spaces for reporting will expand as necessary as you type. b) Please save the file with a new name that includes your health department's initials and the FY quarter for this report—e.g. Prevention_XCHD_2nd Qtr.docx c) Report should be submitted to Robert Scott: scottr9@michigan.gov

Health department: Genesee
Quarter: 2nd Quarter

Requirement 1: Update the "Community Prescription" (CRx) as appropriate. Distribute bounds pads of CRx (50 sheets per pad) to health care providers throughout the focus community, along with guidance regarding its use. To the extent possible, collaborate with Medicaid Health Plans on distribution.
Report: We are sending out a letter in request for assistance to the local pediatrician's offices in the Flint area, to distribute the prescription. Pads are in progress and should be ready for distribution soon. The department has filled the vacant position that enables the administration of the CLPP grant.
Requirement 2: Outreach to Rental Property Owners – Provide presentations at meetings of rental property owner associations, educating them on the dangers of lead poisoning, legal requirements for RPOs, and methods for keeping properties lead safe; AND/OR provide printed educational material or other education to unassociated RPOs/property managers throughout the focus community. To the extent possible, collaborate with local housing authorities, tenants' rights organizations and other community-based organizations to identify and reach RPOs/property managers.
Report: We are in the process with local organizations to try and capture rental property owners who are not part of the landlords association. We would like to provide a letter and an educational pamphlet to them. We have done a presentation the previous year for the landlords association.
Requirement 3: Code Enforcement CLP Assessment Tool – Using the Assessment Tool as guidance, work with code enforcement agencies to bring about best practices with regard to education of property owners, upholding RRP requirements, registration and routine maintenance of rental properties, and linking code enforcement with lead hazard control programs. Update the Assessment Tool as appropriate throughout the contract year.
Report: Provide more education to rental property owners with the aide of local organizations.
Requirement 4: To the extent that funding will allow, conduct other lead poisoning prevention activities for families with children with elevated blood lead levels (above > 5ug/dL), which may include: a. Providing information on lead safe cleaning methods b. Providing lead safe cleaning supplies/equipment c. Providing direct training and coaching on lead safe cleaning methods d. Conducting lead safe cleaning in the home e. Providing supplies to make temporary fixes to prevent lead poisoning f. Arranging for minor repairs that will prevent lead poisoning, using lead safe
Report: There were not any elevated blood lead cases for this quarter yet. We will distribute information to the families on cleaning and provide cleaning supplies that have been purchased if we should get any in the future.
Requirement 5: Participate in quarterly conference calls/webinars. (No report required.)

From: Peeler, Nancy (DCH)
Sent: Monday, September 28, 2015 7:57 AM
To: Scott, Robert L. (DCH)
Subject: Fwd: State data confirms higher blood-lead levels in Flint kids

Hi Bob, sharing this string of emails FYI. I have also shared with CristIn's supervisor since it looks like there is an expectation that CristIn will be doing some analysis of our clip data, which I'm sure she will need your assistance with.

Sent from my iPhone

Begin forwarded message:

From: "Minicuci, Angela (DCH)" <MinicuciA@michigan.gov>
Date: September 27, 2015 at 9:29:49 PM EDT
To: "Wells, Eden (DCH)" <WellsE3@michigan.gov>
Cc: "Lasher, Geralyn (DCH)" <lasherg@michigan.gov>, "Moran, Susan (DCH)" <MoranS@michigan.gov>, "Peeler, Nancy (DCH)" <PeelerN@michigan.gov>, "Robinson, Mikelle (DCH)" <RobinsonM18@michigan.gov>, "Hertel, Elizabeth (DCH)" <HertelE@michigan.gov>, "Eisner, Jennifer (DCH)" <EisnerJ@michigan.gov>
Subject: Re: State data confirms higher blood-lead levels in Flint kids

I've asked our lead epidemiologist to look at the data closer than what was in the charts to get a handle on this. The epi is Cristin Larder.

Sent from my iPhone

On Sep 27, 2015, at 5:39 PM, Wells, Eden (DCH) <WellsE3@michigan.gov> wrote:

Given not sure what % children tested, etc.

Sent from my iPhone

On Sep 27, 2015, at 5:34 PM, Wells, Eden (DCH) <WellsE3@michigan.gov> wrote:

Thanks--DFP is looking at tests positive/number of tests done-- not sure that this is a reliable measure used by our program. Await input from Nancy or Linda.

Sent from my iPhone

On Sep 27, 2015, at 5:26 PM, Lasher, Geralyn (DCH) <lasherg@michigan.gov> wrote:

Yes. We provided the graphs with the narrative bullet points.

Sent from my iPad

On Sep 27, 2015, at 5:20 PM, Wells, Eden (DCH) <WellsE3@michigan.gov> wrote:

Geralyn- were the graphs shown outside of MDHHS?

Sent from my iPhone

On Sep 27, 2015, at 5:06 PM, Moran, Susan (DCH) <MoranS@michigan.gov> wrote:

Sorry - hit send too soon.
Copying Lynda and Corrine- not sure who in Epi or CLPPP has been point person on state's data.

Sent from my iPhone

On Sep 27, 2015, at 2:11 PM, Lasher, Geralyn (DCH) <lasherg@michigan.gov> wrote:

We will need help responding to what the Free Press is claiming in this article.

Sue--let us know who can get us this as early Monday as possible.

State data confirms higher blood-lead levels in Flint kids

http://www.freep.com/story/opinion/columnists/nancy-kaffer/2015/09/26/state-data-flint-lead/72820798/

Sent from my iPad

From: Peeler, Nancy (DCH)
Sent: Tuesday, September 29, 2015 3:13 PM
To: Scott, Robert L. (DCH)
Subject: Fwd: TIME SENSITIVE: Fw: Discrepencies
Attachments: Flint Testing and EBLLs_updated 092315_with notes (2).pdf; ATT00001.htm; Flint Testing and EBLLs (4).pdf; ATT00002.htm; STATELEADDATA with original and updated numbers.xlsx; ATT00003.htm

Here's the question -- see you shortly!

Sent from my iPad

Begin forwarded message:

> **From:** "Wells, Eden (DCH)" <WellsE3@michigan.gov>
> **Date:** September 29, 2015 at 2:41:54 PM EDT
> **To:** "Peeler, Nancy (DCH)" <PeelerN@michigan.gov>
> **Cc:** "Miller, Corinne (DCH)" <MillerC39@michigan.gov>, "Lasher, Geralyn (DCH)" <lasherg@michigan.gov>, "Hertel, Elizabeth (DCH)" <HertelE@michigan.gov>
> **Subject: TIME SENSITIVE: Fw: Discrepencies**
>
> HI Nancy,
>
> I do not have Bob's email, so if you cam talk to him; however, I got a request from Dr. Hanna-Attisha at Hurley today as to why the 2014-2015 may differ in the 2 pdf's she attached (received 9/15 and 9/25). FYI, she stated that Bob is great to work with.
>
> However, due to different numbers and analyses and such flying around in the last 24 hours, please respond back to me ASAP regarding the discrepancies, and I can relay to her.
>
> Thank you!
>
> Eden
>
> Eden V. Wells, MD, MPH, FACPM
> Chief Medical Executive
> Michigan Department of Health and Human Services
> 201 Townsend Street, 5th Floor CVB
> Lansing, MI 48913
> Phone: 517-335-8011
> wellse3@michigan.gov
>
> ---
>
> **From:** Mona Hanna-Attisha <MHanna1@hurleymc.com>
> **Sent:** Tuesday, September 29, 2015 1:07 PM
> **To:** Wells, Eden (DCH)
> **Subject:** FW: Discrepencies

Dr Wells, in regards to the discrepancy noted in state data. Attached are two PDF files that were sent regarding the state lead numbers.

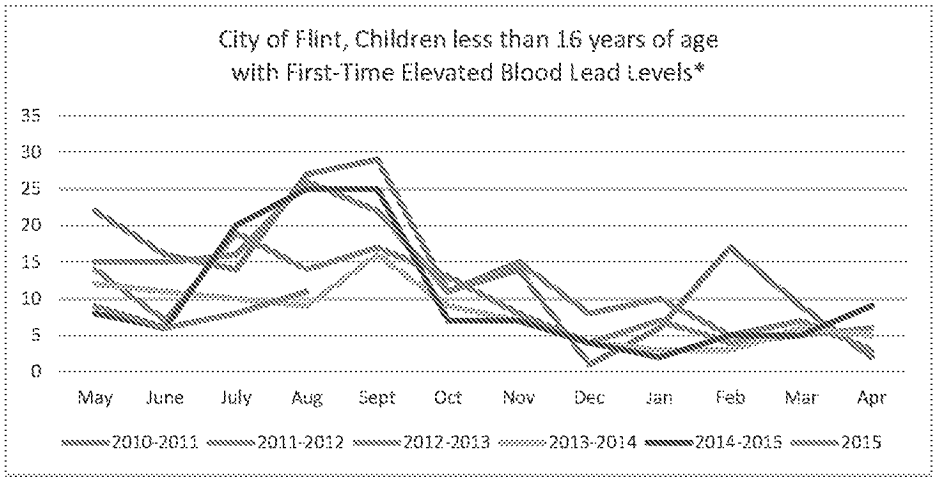
The original PDF was sent on 9/15/15 to Dr Reynolds from Bob Scott from MDHHS's Childhood Lead Poisoning Prevention Program and the updated PDF was sent to me from Bob Scott last Friday.

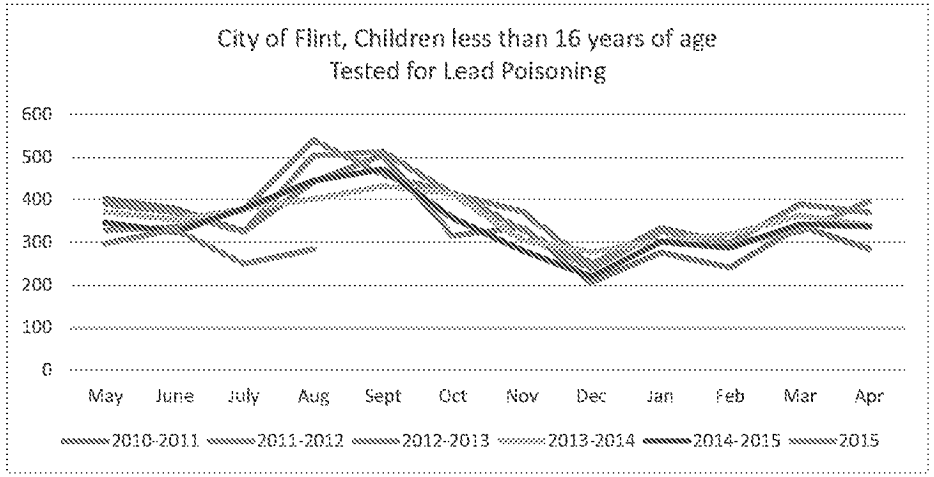
The attached excel database (that I created) has two tabs that include the original and updated numbers. Yellow highlights are all the numbers that changed. It is very strange how many of the numbers have changed. I'm not sure if the updated numbers tried to refine the location to Flint proper???

The analyses of the data does not change very much (when you look at total annual EBL%) - there has been a statistically significant increase in EBL% since water change (2014-2015) where every year prior there has been a decrease (as has happened nationally). And this does not even include the fact that the data is not scientific – wrong age range and missing lots of EBLS by using first time lead analysis rather than highest lead.

Just thought the discrepancy was odd.

Mona Hanna-Attisha MD MPH FAAP
Program Director Pediatric Residency
Hurley Children's Hospital at Hurley Medical Center
Michigan State University College of Human Medicine
Department of Pediatrics and Human Development
Mhanna1@hurleymc.com



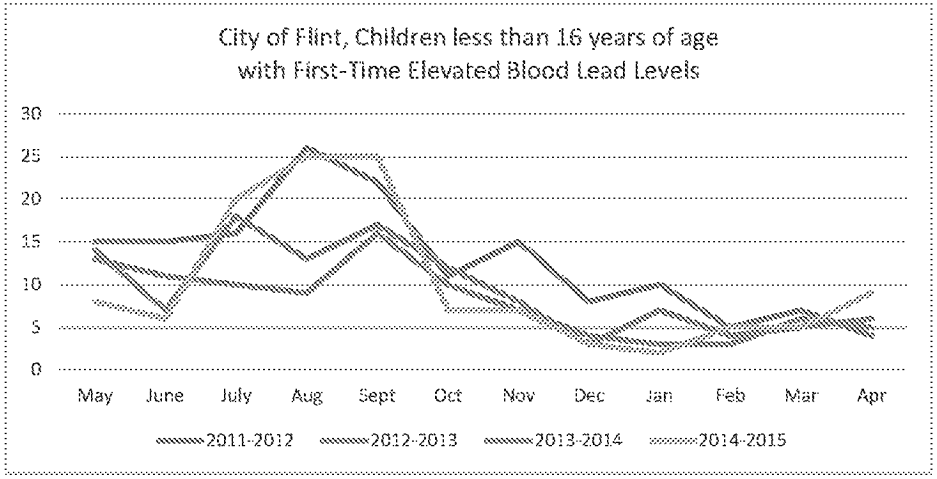


	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr
2010-2011	22	16	14	27	29	11	14	1	6	17	9	2
2011-2012	15	15	16	26	22	11	15	8	10	5	7	3
2012-2013	14	7	19	14	17	13	8	4	7	4	5	6
2013-2014	12	11	10	9	16	9	7	4	3	3	6	5
2014-2015	8	6	20	25	25	7	7	4	2	5	5	9
2015	9	6	8	11								

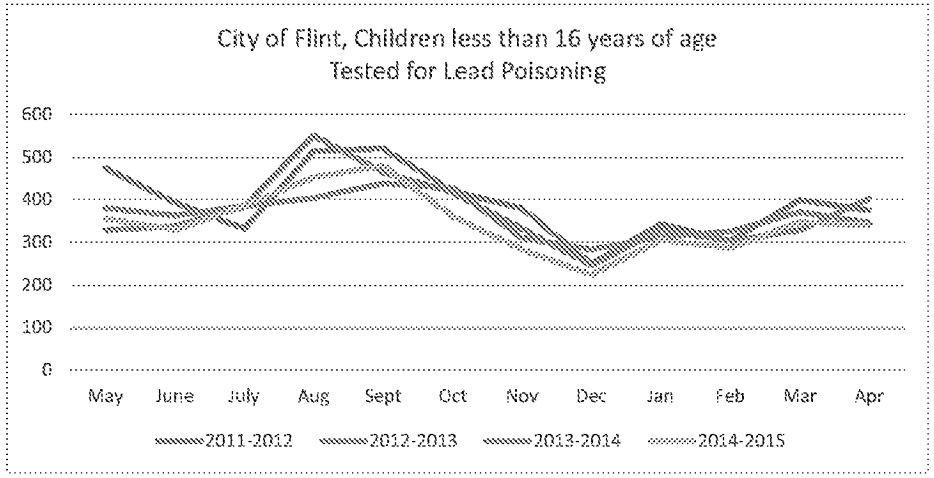
	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr
2010-2011	402	379	325	442	504	315	335	206	276	240	338	285
2011-2012	390	370	324	503	512	413	372	248	333	298	389	370
2012-2013	328	335	376	540	458	416	331	237	325	298	325	397
2013-2014	371	353	378	401	432	414	305	277	304	319	363	339
2014-2015	346	324	379	445	471	357	281	219	301	287	342	337
2015	297	330	249	284								

*Children whose address is listed as "Flint"--may not conform exactly to Flint city limits
Less than 16 years of age at time of test
Includes only first-time blood lead levels >= 5 ug/dL
Includes sample type of venous, capillary or unknown

September 23, 2015
Source: MDHHS Data Warehouse, Lead Specimen table



	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr
2011-2012	15	15	16	26	22	11	15	8	10	5	7	4
2012-2013	14	7	18	13	17	12	8	3	7	4	5	6
2013-2014	13	11	10	9	16	10	7	4	3	3	6	5
2014-2015	8	6	20	25	25	7	7	3	2	5	5	9



	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr
2011-2012	474	393	332	513	520	420	379	249	343	303	399	375
2012-2013	328	338	383	550	464	417	332	246	328	303	328	402
2013-2014	380	363	385	404	438	427	310	283	313	325	371	346
2014-2015	356	329	386	452	480	361	283	224	305	287	348	339

	A	B	C	D	E	F	G	H	I	J	K	L	M
2	**NUMBER OF EBL**												
3		**May**	**June**	**July**	**August**	**September**	**October**	**November**	**December**	**January**	**February**	**March**	**April**
4	**2010-2011**	**NO DATA**											
5	**2011-2012**	15	15	16	26	22	11	15	8	10	5	7	4
6	**2012-2013**	14	7	18	13	17	12	8	3	7	4	5	6
7	**2013-2014**	13	11	10	9	16	10	7	4	3	3	6	5
8	**2014-2015**	8	6	20	25	25	7	7	3	2	5	5	9
9													
10	**TOTAL KIDS TESTED**												
11		**May**	**June**	**July**	**August**	**September**	**October**	**November**	**December**	**January**	**February**	**March**	**April**
12	**2010-2011**	**NO DATA**											
13	**2011-2012**	474	393	332	513	520	420	379	249	343	303	399	375
14	**2012-2013**	328	338	383	550	464	417	332	246	328	303	328	402
15	**2013-2014**	380	363	385	404	438	427	310	283	313	325	371	346
16	**2014-2015**	356	329	386	452	480	361	283	224	305	287	348	339
17													
18													
19	**EBL % BY MONTH**												
20		**May**	**June**	**July**	**August**	**September**	**October**	**November**	**December**	**January**	**February**	**March**	**April**
21	**2010-2011**	**NO DATA**											
22	**2011-2012**	3.16%	3.82%	4.82%	5.07%	4.23%	2.62%	3.96%	3.21%	2.92%	1.65%	1.75%	1.07%
23	**2012-2013**	4.27%	2.07%	4.70%	2.36%	3.66%	2.88%	2.41%	1.22%	2.13%	1.32%	1.52%	1.49%
24	**2013-2014**	3.42%	3.03%	2.60%	2.23%	3.65%	2.34%	2.26%	1.41%	0.96%	0.92%	1.62%	1.45%
25	**2014-2015**	2.25%	1.82%	5.18%	5.53%	5.21%	1.94%	2.47%	1.34%	0.66%	1.74%	1.44%	2.65%

	N
2	
3	**Total**
4	
5	**154**
6	**114**
7	**97**
8	**122**
9	
10	
11	
12	
13	**4700**
14	**4419**
15	**4345**
16	**4150**
17	
18	
19	
20	**TOTAL EBL%**
21	
22	**3.28%**
23	**2.58%**
24	**2.23%**
25	**2.94%**

	A	B	C	D	E	F	G	H	I	J	K	L	M
2	**NUMBER OF EBL**												
3		**May**	**June**	**July**	**August**	**September**	**October**	**November**	**December**	**January**	**February**	**March**	**April**
4	**2010-2011**	22	16	14	27	29	11	14	1	6	17	9	2
5	**2011-2012**	15	15	16	26	22	11	15	8	10	5	7	3
6	**2012-2013**	14	7	19	14	17	13	8	4	7	4	5	6
7	**2013-2014**	12	11	10	9	16	9	7	4	3	3	6	5
8	**2014-2015**	8	6	20	25	25	7	7	4	2	5	5	9
9	**2015**	9	6	8	11								
10	**TOTAL KIDS TESTED**												
11		**May**	**June**	**July**	**August**	**September**	**October**	**November**	**December**	**January**	**February**	**March**	**April**
12	**2010-2011**	402	379	325	442	504	315	335	206	276	240	338	285
13	**2011-2012**	390	370	324	503	512	413	372	248	333	298	389	370
14	**2012-2013**	328	335	376	540	458	416	331	237	325	298	325	397
15	**2013-2014**	371	353	378	401	432	414	305	277	304	319	363	339
16	**2014-2015**	346	324	379	445	471	357	281	219	301	287	342	337
17	**2015**	297	330	249	284								
18													
19	**EBL % BY MONTH**												
20		**May**	**June**	**July**	**August**	**September**	**October**	**November**	**December**	**January**	**February**	**March**	**April**
21	**2010-2011**	5.47%	4.22%	4.31%	6.11%	5.75%	3.49%	4.18%	0.49%	2.17%	7.08%	2.66%	0.70%
22	**2011-2012**	3.85%	4.05%	4.94%	5.17%	4.30%	2.66%	4.03%	3.23%	3.00%	1.68%	1.80%	0.81%
23	**2012-2013**	4.27%	2.09%	5.05%	2.59%	3.71%	3.13%	2.42%	1.69%	2.15%	1.34%	1.54%	1.51%
24	**2013-2014**	3.23%	3.12%	2.65%	2.24%	3.70%	2.17%	2.30%	1.44%	0.99%	0.94%	1.65%	1.47%
25	**2014-2015**	2.31%	1.85%	5.28%	5.62%	5.31%	1.96%	2.49%	1.83%	0.66%	1.74%	1.46%	2.67%
26	**2015**	3.03%	1.82%	3.21%	3.87%								

	N
2	
3	**Total**
4	**168**
5	**153**
6	**118**
7	**95**
8	**123**
9	
10	
11	
12	**4047**
13	**4522**
14	**4366**
15	**4256**
16	**4089**
17	
18	
19	
20	**TOTAL EBL%**
21	**4.15%**
22	**3.38%**
23	**2.70%**
24	**2.23%**
25	**3.01%**
26	

From: Credle, Kimball (CDC/ONDIEH/NCEH) <kfc2@cdc.gov>
Sent: Tuesday, January 05, 2016 3:13 PM
To: Scott, Robert L. (DHHS)
Subject: FW: Flint Water
Attachments: Hanna-Attisha - AJPH - Elevated Blood Lead Levels in Children Associated With the Flint Drinking Water Crisis A Spatial Analysis of Risk and Public.pdf

Hello Bob,

Any thoughts on this matter?

kc

Elevated Blood Lead Levels in Children Associated With the Flint Drinking Water Crisis: A Spatial Analysis of Risk and Public Health Response

Mona Hanna-Attisha, MD, MPH, Jenny LaChance, MS, Richard Casey Sadler, PhD, and Allison Champney Schnepp, MD

Objectives. We analyzed differences in pediatric elevated blood lead level incidence before and after Flint, Michigan, introduced a more corrosive water source into an aging water system without adequate corrosion control.

Methods. We reviewed blood lead levels for children younger than 5 years before (2013) and after (2015) water source change in Greater Flint, Michigan. We assessed the percentage of elevated blood lead levels in both time periods, and identified geographical locations through spatial analysis.

Results. Incidence of elevated blood lead levels increased from 2.4% to 4.9% ($P < .05$) after water source change, and neighborhoods with the highest water lead levels experienced a 6.6% increase. No significant change was seen outside the city. Geospatial analysis identified disadvantaged neighborhoods as having the greatest elevated blood lead level increases and informed response prioritization during the now-declared public health emergency.

Conclusions. The percentage of children with elevated blood lead levels increased after water source change, particularly in socioeconomically disadvantaged neighborhoods. Water is a growing source of childhood lead exposure because of aging infrastructure. (*Am J Public Health.* Published online ahead of print December 21, 2015: e1–e8. doi:10.2105/AJPH.2015.303003)

In April 2014, the postindustrial city of Flint, Michigan, under state-appointed emergency management, changed its water supply from Detroit-supplied Lake Huron water to the Flint River as a temporary measure, awaiting a new pipeline to Lake Huron in 2016. Intended to save money, the change in source water severed a half-century relationship with the Detroit Water and Sewage Department. Shortly after the switch to Flint River water, residents voiced concerns regarding water color, taste, and odor, and various health complaints including skin rashes.[1] Bacteria, including *Escherichia coli*, were detected in the distribution system, resulting in Safe Drinking Water Act violations.[2] Additional disinfection to control bacteria spurred formation of disinfection byproducts including total trihalomethanes, resulting in Safe Drinking Water Act violations for trihalomethane levels.[2]

Water from the Detroit Water and Sewage Department had very low corrosivity for lead as indicated by low chloride, low chloride-to-sulfate mass ratio, and presence of an orthophosphate corrosion inhibitor.[3,4] By contrast, Flint River water had high chloride, high chloride-to-sulfate mass ratio, and no corrosion inhibitor.[5] Switching from Detroit's Lake Huron to Flint River water created a perfect storm for lead leaching into drinking water.[6] The aging Flint water distribution system contains a high percentage of lead pipes and lead plumbing, with estimates of lead service lines ranging from 10% to 80%.[7] Researchers from Virginia Tech University reported increases in water lead levels (WLLs),[5] but changes in blood lead levels (BLLs) were unknown.

Lead is a potent neurotoxin, and childhood lead poisoning has an impact on many developmental and biological processes, most notably intelligence, behavior, and overall life achievement.[8] With estimated societal costs in the billions,[9–11] lead poisoning has a disproportionate impact on low-income and minority children.[12] When one considers the irreversible, life-altering, costly, and disparate impact of lead exposure, primary prevention is necessary to eliminate exposure.[13]

Historically, the industrial revolution's introduction of lead into a host of products has contributed to a long-running and largely silent pediatric epidemic.[14] With lead now removed from gasoline and paint, the incidence of childhood lead poisoning has decreased.[15] However, lead contamination of drinking water may be increasing because of lead-containing water infrastructures, changes in water sources, and changes in water treatment including disinfectant.[16–18] A soluble metal, lead leaches into drinking water via lead-based plumbing or lead particles that detach from degrading plumbing components. ("Plumbing" is derived from the Latin word for lead,

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"plumbum.") Lead was restricted in plumbing material in 1986, but older homes and neighborhoods may still contain lead service lines, lead connections, lead solder, or other lead-based plumbing materials. Lead solubility and particulate release is highly variable and depends on many factors including water softness, temperature, and acidity.[19–21] The US Environmental Protection Agency (EPA) regulates lead in public water supplies under the Safe Drinking Water Act Lead and Copper Rule, which requires action when lead levels reach 15 parts per billion (ppb).

Lead in drinking water is different from lead from other sources, as it disproportionately affects developmentally vulnerable children and pregnant mothers. Children can absorb 40% to 50% of an oral dose of water-soluble lead compared with 3% to 10% for adults.[22] In a dose–response relationship for children aged 1 to 5 years, for every 1-ppb increase in water lead, blood lead increases 35%.[23] The greatest risk of lead in water may be to infants on reconstituted formula. Among infants drinking formula made from tap water at 10 ppb, about 25% would experience a BLL above the Centers for Disease Control and Prevention (CDC) elevated blood lead level (EBLL) of 5 micrograms per deciliter (μg/dL).[24] Tap water may account for more than 85% of total lead exposure among infants consuming reconstituted formula.[25] A known abortifacient, lead has also been implicated in increased fetal deaths and reduced birth weights.[26]

As recommended by the CDC and supported by the American Academy of Pediatrics, blood lead screening is routine for high-risk populations and for children insured by Medicaid at age 1 and 2 years.[27] The CDC-recommended screening ages are based on child development (increased oral–motor behavior), which places a child most at risk for house-based lead exposure (e.g., peeling paint, soil, dust). State and national blood lead–screening programs, however, do not adequately capture the risk of lead in water because infants are at greatest risk.

Armed with reports of elevated WLLs and recognizing the lifelong consequences of lead exposure, our research team sought to analyze blood lead data before (pre) and after (post) the water source switch with a geographic information system (GIS) to determine lead exposure risk and prioritize responses. This research has immediate public policy, public health, environmental, and socioeconomic implications.

This research includes Flint, Michigan, and surrounding municipalities in Genesee County (Greater Flint). Greater Flint is a postindustrial region of nearly 500 000 people struggling from years of disinvestment by the automobile industry and associated manufacturing activities: the region has lost 77% of its manufacturing employment and 41% of employment overall since 1980.[28] National and local data sources demonstrate dismal indicators for children, especially within Flint city limits.[29–32] Greater Flint ranks toward the bottom of the state in rates of childhood poverty (42% in Flint vs 16.2% in Michigan and 14.8% in the United States), unemployment, violent crime, illicit drug use, domestic violence, preterm births, infant mortality, and overall health outcomes (81st out of 82 Michigan counties).

Greater Flint's struggles have been amplified by a history of racial discrimination, whereby exclusionary housing practices were common.[33,34] Such attitudes toward integration later precipitated White flight and emboldened home-rule governance,[35,36] causing a massive decline in tax revenue for the city. The declining industrial and residential tax bases strained the city's ability to provide basic services and reversed the public health fortunes of the city and suburbs.[37] Severely reduced city population densities reduced water demand in the distribution system, exacerbating problems with lead corrosion.

METHODS

This retrospective study includes all children younger than 5 years who had a BLL processed through the Hurley Medical Center's laboratory, which runs BLLs for most Genesee County children. The pre time period (before the water source change) was January 1, 2013, to September 15, 2013, and the post time period (after the water source change) was January 1, 2015, to September 15, 2015. The primary study group comprised children living within the city of Flint (n = 1473; pre = 736; post = 737) who received water from the city water system. Children living outside the city where the water source was unchanged served as a comparison group (n = 2202; pre = 1210; post = 992).

After institutional review board approval and Health Insurance Portability and Accountability Act waiver, we drew data from the Epic electronic medical record system including BLL, medical record number, date of birth, date of blood draw, full address, sex, and race. For each child, only the highest BLL was maintained in the data set. We coded timing (pre or post) of the BLL on the basis of the date of blood draw. We calculated age at time of blood draw.

We geocoded the data set with a dual-range address locator, and manually confirmed accuracy of geocoded addresses. We conducted a series of spatial joins to assign participant records to Greater Flint municipalities and Flint wards (including those with high WLL), enabling the calculation of the number and percentage of children with EBLLs in each geographic region for both time periods. The reference value for EBLL was 5 μg/dL or greater. We identified Flint wards with high WLLs with water lead sampling maps.[38] Wards 5, 6, and 7 had the highest WLLs; in each ward, more than 25% of samples had a WLL higher than 15 ppb. We theorized that children living in this combination of wards would have the highest incidence of EBLLs (referred to as "high WLL Flint"; the remainder of Flint was referred to as "lower WLL Flint").

We derived overall neighborhood-level socioeconomic disadvantage from census block group variables intended to measure material and social deprivation. We calculated these scores from an unweighted z score sum of rates of lone parenthood, poverty, low educational attainment, and unemployment (adapted from Pampalon et al.[39]; used previously in Flint by Sadler et al.[40]), and assigned these to each child on the basis of home address. Positive values denote higher disadvantage, and negative values denote lower disadvantage. Table 1 highlights the overall socioeconomic disadvantage score comparison by time period and area.

We created spatial references for EBLL risk and a predictive surface for BLL by using GIS, providing the ability to see otherwise invisible spatial–temporal patterns in environmental exposure.[17] Because of the need to

TABLE 1—Demographic Comparison of the Time Periods Before (Pre) and After (Post) Water Source Change From Detroit-Supplied Lake Huron Water to the Flint River, by Area: Flint, MI, 2013 and 2015

	Outside Flint		All Flint		High WLL Flint		Lower WLL Flint	
Characteristic	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Gender, %								
Male	51.6	49.5	48.6	52.9	47.6	54.4	49.1	52.3
Female	48.4	50.5	51.4	47.1	52.4	45.6	50.9	47.7
Race/ethnicity, %								
African American	24.3	24.5	69.4	70.6	74.9	78.8	67.0	66.9
Other categories	75.7	75.5	30.6	29.4	25.1	21.2	33.0	33.1
Age, y, mean	1.89	1.83	2.09	2.06	2.06	2.02	2.11	2.07
Overall socioeconomic disadvantage score	−0.83	−0.98	2.94	2.88	2.18	2.39	3.28	3.10

Note. WLL = water lead level. No statistically significant differences were found in any pre–post value within any of the 4 geographical areas.

understand spatial variations and geographically target resources, we also ran ordinary Kriging with a spherical semivariogram model on the entire data set for Greater Flint, allowing interpolation of associated BLL risks with lead in water. Previous methods for evaluating spatial variation in lead levels have ranged from multivariable analyses at the individual level[41] to interpolation methods such as inverse distance weighting[42] and Kriging.[43] Given our assumption that lead risk is spatially correlated in Greater Flint because of the age and condition of pipes, interpolation methods are appropriate for building a preliminary risk surface. Both inverse distance weighting and Kriging derive such surfaces by calculating values at unmeasured locations based on weighting nearby measured values more strongly than distant values.[44] Whereas inverse distance weighting is a deterministic procedure and relies on predetermined mathematical formulae, Kriging has the added sophistication of using geostatistical models that consider spatial autocorrelation, thereby improving accuracy of prediction surfaces (ArcGIS Desktop version 10.3, Environmental Systems Research Institute, Redlands, CA). As well, Kriging can be run with relatively few input points: adequate ranges fall between 30 and 100 total points, although Kriging has been conducted with just 7.[44]

Our city of Flint sample included 736 children in the pre period and 737 children in the post period, which amounts to a density of approximately 22 points per square mile. Kriging has become an increasingly common method for measuring variations in soil lead, and is given more in-depth treatment elsewhere.[45] To examine change in proportion of children with EBLL from the pre to post time periods, we used χ^2 analysis with continuity correction for each area (outside Flint, all Flint, high WLL Flint, and lower WLL Flint). In addition, we examined differences in overall socioeconomic disadvantage scores from the pre to post time periods by using the independent t test. Finally, we used both χ^2 analysis with continuity correction and 1-way ANOVA to assess demographic differences by area. We used post hoc least significant difference analysis following statistically significant 1-way ANOVAs.

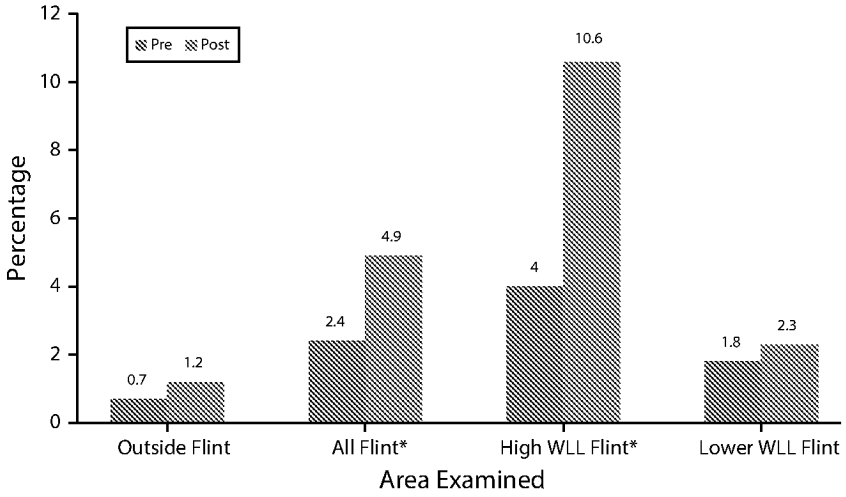
RESULTS

We uncovered a statistically significant increase in the proportion of Flint children with EBLL from the pre period to the proportion of Flint children in the post period. In the pre period, 2.4% of children in Flint had an EBLL; in the post period, 4.9% of children had an EBLL ($P < .05$). By comparison, outside of Flint water, the change in EBLL was not statistically significant (0.7% to 1.2%; $P > .05$). In high WLL Flint, EBLL increased from 4.0% to 10.6% ($P < .05$). Figure 1 shows the EBLL percentage change per area.

Results of the GIS analyses show significant clustering of EBLLs within the Flint city limits. According to ordinary Kriging, Figure 2 shows a predicted surface based on observations of actual child BLL geocoded to home address to visualize BLL variation over space (measured in μg/dL). The darkest shades of red represent the highest risk for EBLL based on existing observations. Outside Flint, the entire county falls entirely within the lowest half of the range (in shades of blue); the only locations where predicted BLL is greater than 1.75 μg/dL is within Flint city limits.

Within Figure 2, each ward is also labeled according to the percentage of water samples that exceeded 15 ppb. The areas with the highest WLLs strongly coincide with the areas with the highest predicted BLLs. In addition, the high percentage of EBLL in wards 5, 6, and 7 also correspond with the high WLLs in wards 5, 6, and 7 (the labels in Figure 2). Table 2 shows ward-specific WLLs, pre period and post period EBLL percentages, and predicted BLL and predicted change in BLL from Kriging.

Areas experiencing the highest predicted BLL in the post period (Figure 2) are generally also areas with greatest change in predicted BLL (measured in μg/dL) when compared with the pre period (Table 2; Figure A, available as a supplement to the online version of this article at http://www.ajph.org). Figure A quantifies this rate of change with a green to red scale: large increases are shown in increasingly darker shades of red, whereas large decreases are shown in increasingly darker shades of green. These once again match with city wards that experienced greater rates of EBLL percentage increase (Figure 1, Table 2). In wards 5 and 6 (which experienced a predicted 0.51 and 0.27 μg/dL increase, respectively), the EBLL percentage more than tripled. In ward 5, the EBLL percentage increased from 4.9% to 15.7% ($P < .05$). The area of intersection between wards 3, 4, and 5 (in the east side of the city) also appeared high in the Kriging analysis of Figure 2, and with a different unit of aggregation this neighborhood would also exhibit a significant increase in EBLL percentage. Ward 7 had high pre period and post period EBLL percentage levels above 5% (with a particularly high rate in the western portion of the ward). Citywide,



Note. WLL = water lead level.
*$P < .05$.

FIGURE 1—Comparison of Elevated Blood Lead Level Percentage, Before (Pre) and After (Post) Water Source Change From Detroit-Supplied Lake Huron Water to the Flint River: Flint, MI, 2013 and 2015

4 wards (1, 4, 7, and 9) experienced decreases in predicted BLL, 3 wards (2, 5, and 6) experienced large increases, and 2 wards (3 and 8) remained largely the same (Figure A).

Overall, statistically significant differences exist between the areas examined (outside Flint, high WLL Flint, and lower WLL Flint) in all demographic characteristics except sex. The overall percentage of African American children is 24.4% outside Flint, compared with 76.8% in high WLL Flint and 67.0% in lower WLL Flint ($P < .001$). Children outside Flint were younger (mean = 1.86 years [SD = 1.10]) than high WLL Flint (mean = 2.04 years [SD = 1.02]) and lower WLL Flint (mean = 2.09 years [SD = 1.07]; $P < .001$). Differences in overall socioeconomic disadvantage scores are likewise significant ($P < .001$). Post hoc least significant difference analysis shows statistically significant differences for overall socioeconomic disadvantage between outside Flint and high WLL Flint ($P < .001$), between outside Flint and lower WLL Flint ($P < .001$), and between high WLL Flint and lower WLL Flint ($P < .001$).

DISCUSSION

Our findings reveal a striking increase in the percentage of Flint children with EBLL when we considered identical seasons before and after the water source switch, with no statistically significant increase in EBLL outside Flint. The spatial and statistical analyses highlight the greatest EBLL increase within certain wards of Flint, which correspond to the areas of elevated WLLs.

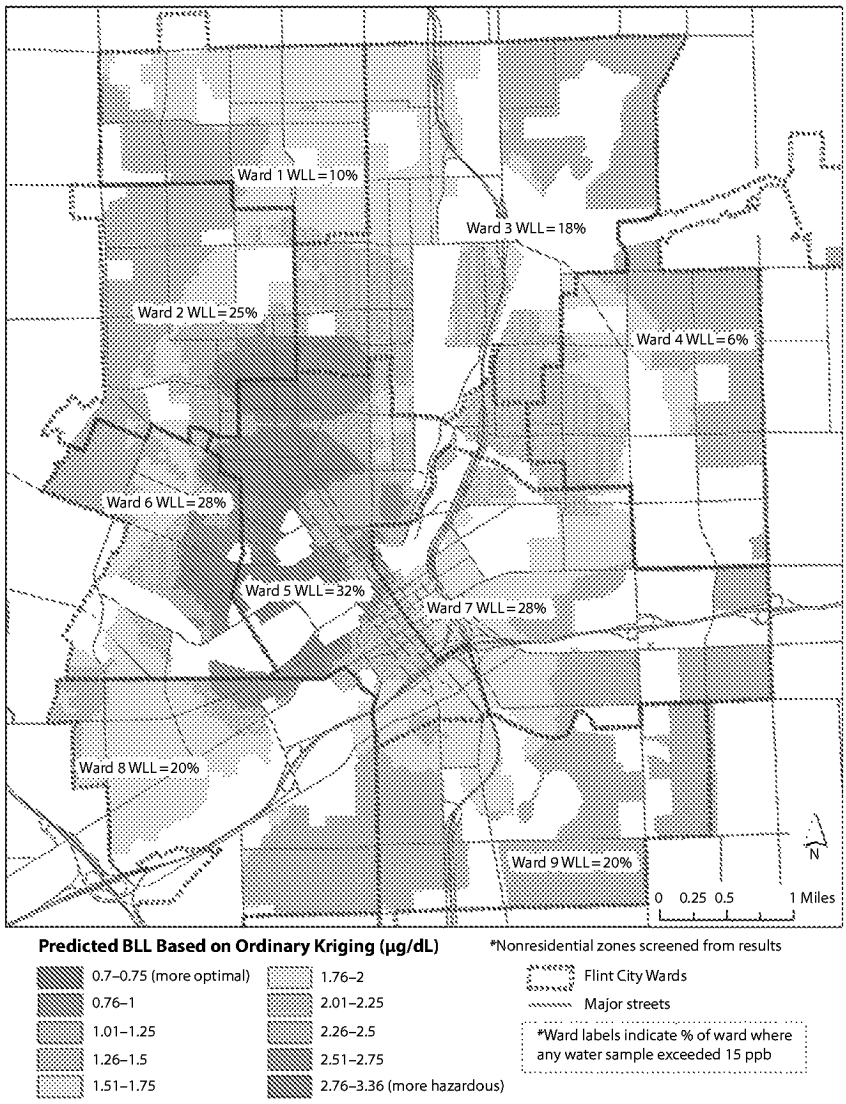
A review of alternative sources of lead exposure reveals no other potential environmental confounders during the same time period. Demolition projects by the Genesee County Land Bank Authority (Heidi Phaneuf, written communication, October 29, 2015) showed no spatial relationship to the areas of increased EBLL rates. As well, no known new lead-producing factories nor changes in indoor lead remediation programs were implemented during the study period. Although Flint has a significant automobile history, the historical location of potentially lead-using manufacturing (e.g., battery plants, paint and pigment storage, production plants) do not align with current exposures.

Because there was no known alternative source for increased lead exposure during this time period, the geospatial WLL results, the innate corrosive properties of Flint River water, and, most importantly, the lack of corrosion control, our findings strongly implicate the water source change as the probable cause for the dramatic increase in EBLL percentage.

As in many urban areas with high levels of socioeconomic disadvantage and minority populations,[46] we found a preexisting disparity in lead poisoning. In our pre water source switch data, the EBLL percentage in Flint was 2.4% compared with 0.7% outside Flint. This disparity widened with a post water source switch Flint EBLL of 4.8%, with no change in socioeconomic or demographic variables (Table 1). Flint children already suffer from risk factors that innately increase their lead exposure: poor nutrition, concentrated poverty, and older housing stock. With limited protective measures, such as low rates of breastfeeding,[47,48] and scarce resources for water alternatives, lead in water further exacerbates preexisting risk factors. Increased lead-poisoning rates have profound implications for the life course potential of an entire cohort of Flint children already rattled with toxic stress contributors (e.g., poverty, violence, unemployment, food insecurity). This is particularly troublesome in light of recent findings of the epigenetic effects of lead exposure on one's grandchildren.[49]

The Kriging analysis showed the highest predicted BLLs within the city along a wide swath north and west of downtown. This area has seen significant demographic change, an increase in poverty, and an increase in vacant properties, especially over the past 25 years (Richard Sadler, written communication, October 5, 2015). Higher BLLs were also predicted northeast of downtown and in other older neighborhoods where poverty and vacancy rates have been high for many decades. Significantly, the biggest changes in predicted BLL since 2013 were also found in these impoverished neighborhoods; more stable neighborhoods in the far north and south of the city may have experienced improved predicted BLLs because of prevention efforts taken by the more-often middle-class residents in response to the water source change. Of considerable interest is that the areas shown as having the best public health indices by Board and Dunsmore in Figure 2 of their 1948 article[37] are virtually identical to the areas with the worst lead levels today.

After our preliminary zip code–based findings (pre to post water source switch



Note. BLL = blood lead level; WLL = water lead level.

FIGURE 2—Predicted Surface of Child Blood Lead Level and Ward-Specific Elevated Water Lead Level After (Post) Water Source Change From Detroit-Supplied Lake Huron Water to the Flint River: Flint, MI, 2015

EBLL = 2.1% to 4.0%; $P < .05$) were shared at a press conference,[50] the City of Flint and the Genesee County Health Department released health advisories,[51] and the county health department subsequently declared a public health emergency.[52] Shortly after, the State of Michigan released an action plan with short- and long-term solutions focusing on additional sampling, filter distribution, and corrosion control.[53] One week later, Michigan's governor revealed WLLs in 3 schools to be in the toxic range with 1 school showing a water lead level of 101 ppb, almost 7 times the level that requires remediation.[54] A $12 million plan to reconnect to Detroit's water source was announced.[54]

We undertook our current spatial analytic approach to overcome limitations of zip code boundaries and to develop a more thorough understanding of specific areas in Flint where EBLL risk is more severe (post office addresses often do not align with municipal boundaries in Michigan, and one third of Flint mailing addresses are not in the city of Flint). This spatial analysis is valuable for understanding subneighborhood patterns in EBLL risk because aggregation by zip code or ward minimizes the richness of spatial variation and creates artificial barriers that may obscure hot spots (as in the confluence of wards 3, 4, and 5).

Such use of spatial analysis for estimating lead exposure risk has been used to target blood lead–screening programs. In our case, in addition to identifying areas of risk, spatial analysis helps guide municipal and nongovernmental relief efforts aimed at identifying vulnerable populations in specific neighborhoods for priority distribution of resources (e.g., bottled water, filters, premixed formula).

Limitations

Our research contains a few limitations. First, we may have underestimated water-based lead exposure. Our sample included all children younger than 5 years with blood lead screening, although the greatest risk from lead in water is in utero and during infancy when lead screening is not done. If lead screening were recommended at a younger age (e.g., 6 or 9 months) for children who live in homes with potential lead piping or lead service lines, more children with EBLL from water could be identified, although state and national comparison rates would be lacking. Second, lead screening is not completed for all children. It is mandated by Medicaid and CDC-recommended for other high-risk groups; such data may be skewed toward higher-risk children and thus overestimate EBLL, especially in non–high-risk areas. Third, the underserved population of Flint has significant housing instability: lead levels may reflect previous environmental exposure, and exposure often cannot be adequately estimated on the basis of current residence alone.[55]

Fourth, although large, our sample does not reflect all lead screening from Flint. We estimate that our data capture approximately 60% to 70% of the Michigan Childhood Lead Poisoning Prevention Program data for Flint. Annual data released from this program further support our findings, revealing an annual decrease in EBLL percentage from May to April 2010 to 2011 until the same period in 2013 to 2014 (4.1%,

TABLE 2—Ward-Based Comparison of Observed and Predicted Water Lead Level Percentages, Before (Pre) and After (Post) Water Source Change From Detroit-Supplied Lake Huron Water to the Flint River: Flint, MI, 2013 and 2015

Ward	WLL % >15 ppb	Pre EBLL%	Post EBLL%	Predicted Post BLL[a]	Change in Predicted BLL From Pre to Post, μg/dL
1	10	0.0	2.8	1.4	−0.10
2	25	0.0	1.4	0.7	0.19
3	18	1.0	4.5	2.9	0.05
4	6	3.1	1.7	2.4	−0.15
5[b]	32	4.9	15.7	10.3	0.51
6[b]	28	2.2	9.3	5.5	0.27
7[b]	28	5.4	5.9	5.7	-0.26
8	20	2.7	1.4	2.0	0.01
9	20	3.4	1.6	2.5	−0.43

Note. BLL = blood lead level; EBLL = elevated blood lead level; WLL = water lead level.
[a]Ordinary Kriging geostatistical analysis.
[b]Indicates wards defined as high WLL risk in this study.

3.3%, 2.7%, 2.2%, respectively[56]; Robert L. Scott, e-mail correspondence, September 25, 2015). Following the water switch in April 2014, the 4-year declining trend (as seen nationally) reversed with an annual EBLL of 3.0%.

We found consistent results (with control for age and methodology) when we analyzed Michigan Childhood Lead Poisoning Prevention Program data for both high WLL Flint (EBLL percentage increased: 6.6% to 9.6%) and outside Flint (EBLL percentage remained virtually unchanged: 2.2% to 2.3%). Our institution-processed laboratory blood lead tests, however, had an even greater proportion of children with EBLLs versus state data in the post period. This may reflect that the BLLs processed at Hurley Medical Center, the region's only safety-net public hospital, represent a patient population most at risk with limited resources to afford tap water alternatives.

Conclusions and Future Research

Future research directions include conducting more detailed geospatial analyses of lead service-line locations with locations of elevated BLLs and WLLs; repeating identical spatial and statistical analyses in the same time period in 2016 reflecting changes associated with the health advisory and return to Lake Huron source water; analyzing feeding type (breastfed or reconstituted formula) for children with EBLLs; analyzing cord blood lead of Flint newborns compared with non-Flint newborns; and conducting water lead testing from homes of children with EBLLs.

A once celebrated cost-cutting move for an economically distressed city, the water source change has now wrought untold economic, population health, and geopolitical burdens. With unchecked lead exposure for more than 18 months, it is fortunate that the duration was not longer (as was the case in Washington, DC,'s lead-in-water issue).[16] Even so, the Flint drinking water crisis is a dramatic failure of primary prevention. The legal safeguards and regulating bodies designed to protect vulnerable populations from preventable lead exposure failed.

The Lead and Copper Rule requires water utilities to notify the state of a water source or treatment change recognizing that such changes can unintentionally have an impact on the system's corrosion control.[57] Although a review is required before implementing changes, the scope of risk assessment is not specified and is subject to misinterpretation. In response to the Flint drinking water crisis, the EPA recently released a memo reiterating and clarifying the need for states to conduct corrosion control reviews before implementing changes.[58] This recommendation is especially relevant for communities with aging infrastructures, usurped city governance, and minimal water utility capacity; in such situations, there is an increased need for state and federal expertise and oversight to support decisions that protect population health.

Through vigilant public health efforts, lead exposure has fallen dramatically over the past 30 years.[13] With the increasing recognition that no identifiable BLL is safe and without deleterious and irreversible health outcomes,[13] *Healthy People 2020* identified the elimination of EBLLs and underlying disparities in lead exposure as a goal.[59] Regrettably, our research reveals that the potentially increasing threat of lead in drinking water may dampen the significant strides in childhood lead-prevention efforts. As our aging water infrastructures continue to decay, and as communities across the nation struggle with finances and water supply sources, the situation in Flint, Michigan, may be a harbinger for future safe drinking-water challenges. Ironically, even when one is surrounded by the Great Lakes, safe drinking water is not a guarantee. AJPH

CONTRIBUTORS

M. Hanna-Attisha originated the study, developed methods, interpreted analysis, and contributed to the writing of the article. J. LaChance and R. Casey Sadler assisted with the development of the methods, analyzed results, interpreted the findings, and contributed to the writing of the article. A. Champney Schnepp assisted with the interpretation of the findings and contributed to the writing of the article.

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HUMAN PARTICIPANT PROTECTION

This study was reviewed and approved by Hurley Medical Center institutional review board.

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From: Peeler, Nancy (DCH)
Sent: Thursday, September 24, 2015 9:40 AM
To: Scott, Robert L. (DCH)
Subject: FW: Childhood Lead Poisoning Prevention program documents
Attachments: Flint Testing and EBLLs_updated 092315_with notes.pdf; Pediatric Lead Exposure Flint Water.from Hurley.pdf

Importance: High

First of 3 emails, this one has the .ppt from Flint

From: Peeler, Nancy (DCH)
Sent: Wednesday, September 23, 2015 5:33 PM
To: Travis, Rashmi (DCH); Robinson, Mikelle (DCH); Lasher, Geralyn (DCH); Hertel, Elizabeth (DCH)
Cc: Fink, Brenda (DCH)
Subject: Childhood Lead Poisoning Prevention program documents
Importance: High

Hello – I'm going to send a series of emails with materials you have asked for, as a way to organize them.

The first document attached to this email is our CLPPP updated analysis of the blood lead testing data we have for children aged 0-16 in Flint. This is an update from what we sent to the Director's office earlier in the year, in that we added an additional year (2010-2011), and added data for May-August 2015 (per Geralyn's request in an email late last week).

Regarding this data:

- We are using the timeframe of May –April for this chart, because the water source change in Flint happened in April 2014. So, we started by looking at the 12 month time period from May 2014 – April 2015. Then we went back and compared that same time frame to the 4 previous years, to see if the pattern was similar, significantly different, etc.
- We included all children with a Flint address, which may not exactly conform to the city boundaries.
- We only included first time blood lead levels of $\geq$ 5 mcg/dL, not all subsequent tests a child may have received.
- We included all types of blood samples – venous blood draws, capillary samples, or unknown (e.g. not labeled as venous or capillary). Typically we would point to venous samples as the best, most reliable, but we had many non-venous samples, so to be inclusive added those in.

Looking at the charts, you can definitely see the seasonal impact associated with lead poisoning.

We do NOT see a different pattern of results for the 2014-2015 year, right after the change in water source. That year looks more like the data from 10-11, and 11-12.

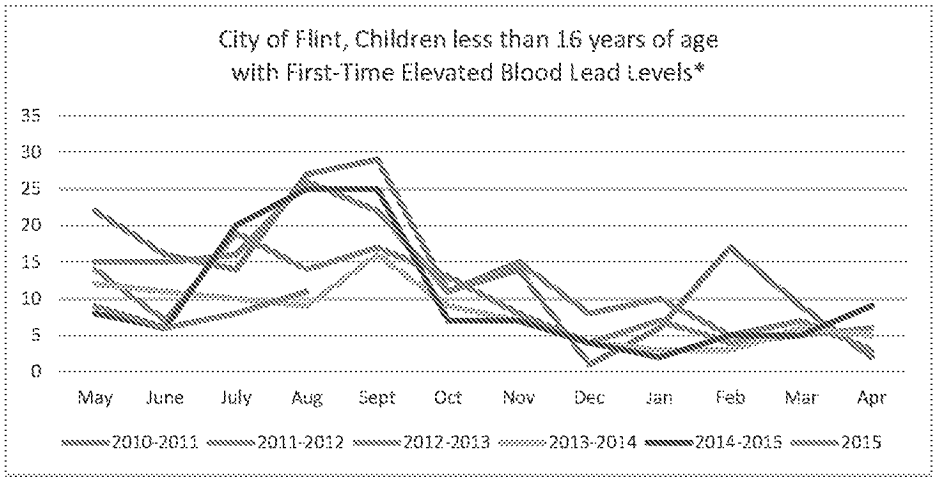
For the full 5 years worth of data, testing rates were pretty consistent, so we don't think that is driving the data. However, note that testing levels for May-August 2015 appear to be lower than in the previous 5 years.

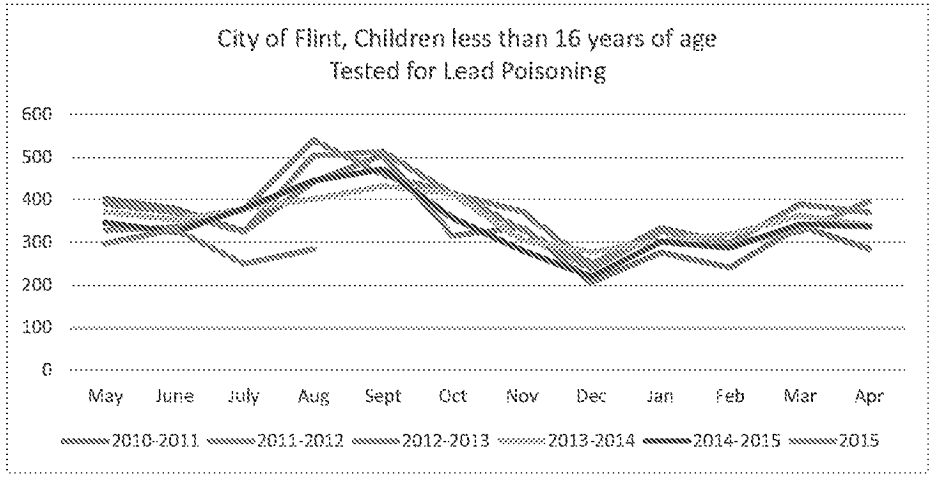
The second document I have attached is a presentation sent to us this morning by Dr. Mona Hanna-Attisha, from Hurley Medical Center. She shared this related to her data request that she sent to our program. In scanning it, we noted that

she is using different data than we did (by age, by zip code, time frames, which years she included, etc.), so comparing our data chart to her results is like comparing apples and oranges. We have not run any analyses using her parameters. We did note some slides in her document that we might disagree with, for example her statement that water is the primary source of lead (in Michigan, it remains lead paint that is our primary source of lead exposure).

Please let us know if you have questions you have about the data charts we produced. Next email will be some of our program materials, that may be of use in the upcoming outreach effort. Also, Rashmi indicated who I should include on this email, and I trust you will share with others as appropriate.

Nancy





	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr
2010-2011	22	16	14	27	29	11	14	1	6	17	9	2
2011-2012	15	15	16	26	22	11	15	8	10	5	7	3
2012-2013	14	7	19	14	17	13	8	4	7	4	5	6
2013-2014	12	11	10	9	16	9	7	4	3	3	6	5
2014-2015	8	6	20	25	25	7	7	4	2	5	5	9
2015	9	6	8	11								

	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr
2010-2011	402	379	325	442	504	315	335	206	276	240	338	285
2011-2012	390	370	324	503	512	413	372	248	333	298	389	370
2012-2013	328	335	376	540	458	416	331	237	325	298	325	397
2013-2014	371	353	378	401	432	414	305	277	304	319	363	339
2014-2015	346	324	379	445	471	357	281	219	301	287	342	337
2015	297	330	249	284								

*Children whose address is listed as "Flint"--may not conform exactly to Flint city limits
Less than 16 years of age at time of test
Includes only first-time blood lead levels >= 5 ug/dL
Includes sample type of venous, capillary or unknown

September 23, 2015
Source: MDHHS Data Warehouse, Lead Specimen table

PEDIATRIC LEAD EXPOSURE IN FLINT, MICHIGAN: A FAILURE OF PRIMARY PREVENTION

Mona Hanna-Attisha MD MPH FAAP

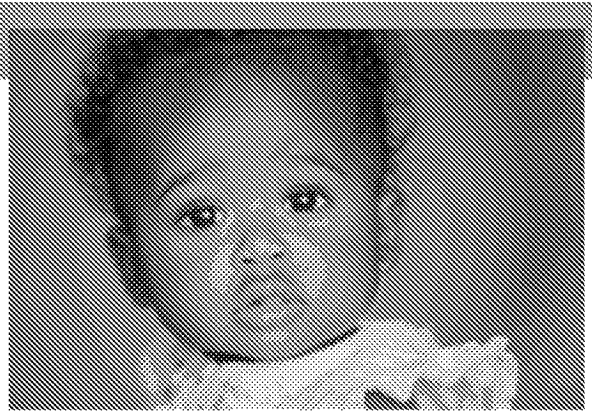
Hurley Children's Hospital

Michigan State University Department of Pediatrics and Human Development

HURLEY CHILDREN'S HOSPITAL

MICHIGAN STATE UNIVERSITY
College of Human Medicine

Introducing Makayla*



- 12 month old girl (DOB 8/15/2014) presented last week for her 1 year old check up. No concerns.
- Lives with single mom and 2 older siblings in west side (48504). Formula from WIC; powder mixed with warm tap water.
- Physical exam and development are normal. Makayla receives her 1 year old vaccines and routine lead and hemoglobin screening.
- *A couple days later, lead level comes back as 6 ug/dL.*

*Hypothetical scenario

Blood lead level of 6 ug/dL….

- Blood lead levels (BLL) above 5 ug/dL are considered elevated blood lead levels (EBL)
- Just a few years ago (2012), 10 ug/dL was cutoff
- Increasing evidence shows NO safe blood lead level
- Disproportionately impacts low income, minority children
- Primary prevention is most important

Primary Prevention

- "Because no measurable level of blood lead is known to be without deleterious effects, and because once engendered, the effects appear to be irreversible in the absence of any other interventions, public health, environmental and housing policies should encourage PREVENTION of all exposure to lead."

"Low Level Lead Exposure Harms Children: A Renewed Call for Primary Prevention." 2012 CDC Advisory Committee on Childhood Lead Poisoning Prevention.

What will happen to Makayla?

- Vast evidence supports increased likelihood of:
  - Decrease in IQ
    - An increase in BLL from 1 to 4 ug/dL, drops mean IQ -3.7 points
  - Small change in mean IQ, shifts entire population IQ distribution
    - Reduces high achievers IQs (>130) and increases kids with low IQs (<70)
    - Implications for special education services, employment, incarceration, life achievement, etc

Lanphear BP et al., Low-level environmental lead exposure and children's intellectual function: an international pooled analysis. Environ Health Perspect, 2005. 113:894-9.
Fewtrell LJ, Pruss-Ustun A, Landrigan P, and Ayuso-Mateos JL, Estimating the global burden of disease of mild mental retardation and cardiovascular diseases from environmental lead exposure. Environmental Research, 2004. 94:120-33.

Behavioral Burden

- Increased likelihood of :
  - ADHD behaviors
  - Delinquent behaviors and arrests
  - Total arrests and increased rates of arrests involving violent offenses
  - Other health effects: hematologic, cardiovascular, immunologic, endocrine, etc

Wright, JP, KN Dietrich, MD Ris, et al. 2008. Association of prenatal and childhood blood lead concentrations with criminal arrests in early adulthood. *PLoS Med* 5(5): e101
Chen, A, B Cai, KN Dietrich, et al. 2007. Lead exposure, IQ, and behavior in urban 5-7 year-olds: Does lead affect behavior only by lowering IQ? *Pediatrics* 119(3): e650-e658.
Needleman, HL, C McFarland, RB Ness, et al. 2002. Bone lead levels in adjudicated delinquents: A case control study. *Neurotoxicology and Teratology* 24(6):711-717.

The Cost

- "For childhood lead poisoning, $5.9 million in medical care costs, as well as an additional $50.9 billion (sensitivity analysis: $44.8–$60.6 billion) in lost economic productivity resulting from reduced cognitive potential from preventable childhood lead exposure."

- "The present value of Michigan's economic losses attributable to lead exposure in the 2009 cohort of 5 year-olds ranges from $3.19 (using U.S. blood lead levels) to $4.85 billion (using Michigan blood lead levels) per year in loss of future lifetime earnings."

Leonardo Trasande and Yinghua Liu. Reducing The Staggering Costs Of Environmental Disease In Children, Estimated At $76.6 Billion In 2008. *Health Affairs*, 30, no.5 (2011):863-870

The Price of Pollution: Cost Estimates of Environment-Related Childhood Diseases in Michigan. 2010 Report by Michigan Network of Children's Environmental Health

Lead in Water

- Increasing as source of lead, because of success in controlling other sources.
- Increasing due to aging water infrastructures, change in water sources, disinfectant uses, etc
- Disproportionally impacts developmentally-vulnerable formula-fed infants and pregnant mothers
  - For about 25% of infants drinking formula made from tap water at 10 ppb, blood lead would rise above the CDC level of concern of 5 micrograms/deciLiter (or ug/dL).
  - Increase in fetal death and reduced birth weights

Triantafyllidou, S., Gallagher. D. and Edwards, M. Assessing risk with increasingly stringent public health goals: the case of water lead and blood lead in children. Journal of Water and Health. doi: 10.2166/wh.2013.067 58-68 (2014).
Edwards, M. Fetal Death and Reduced Birth Rates Associated with Exposure to Lead-Contaminated Drinking Water. Env. Sci. and Tech. 2013 DOI: 10.1021/es4034952

PRELIMINARY RESULTS

Preliminary Results of Pediatric Blood Lead Levels (BLL)

HURLEY CHILDREN'S HOSPITAL

- **Methods**
  - Data from all blood lead levels processed at Hurley Medical Center
  - HMC Institutional Review Board (IRB) approved
  - All children 5 years of age and younger
  - Zip codes 48501-48507
  - Two periods of comparison:
    - PRE-SWITCH: January 1, 2013 – September 15, 2013
    - POST-SWITCH: January 1, 2015 – September 15, 2015
  - Analyzed % Elevated Blood Lead (EBL)
    - EBL = Blood lead Levels > 5 g/dL

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Blood Lead Level Analysis

- Large sample size
  - N= 1746 for Flint children (pre n=906, post n=840)
  - N= 1670 for non-Flint children (pre n=943, post n=727)

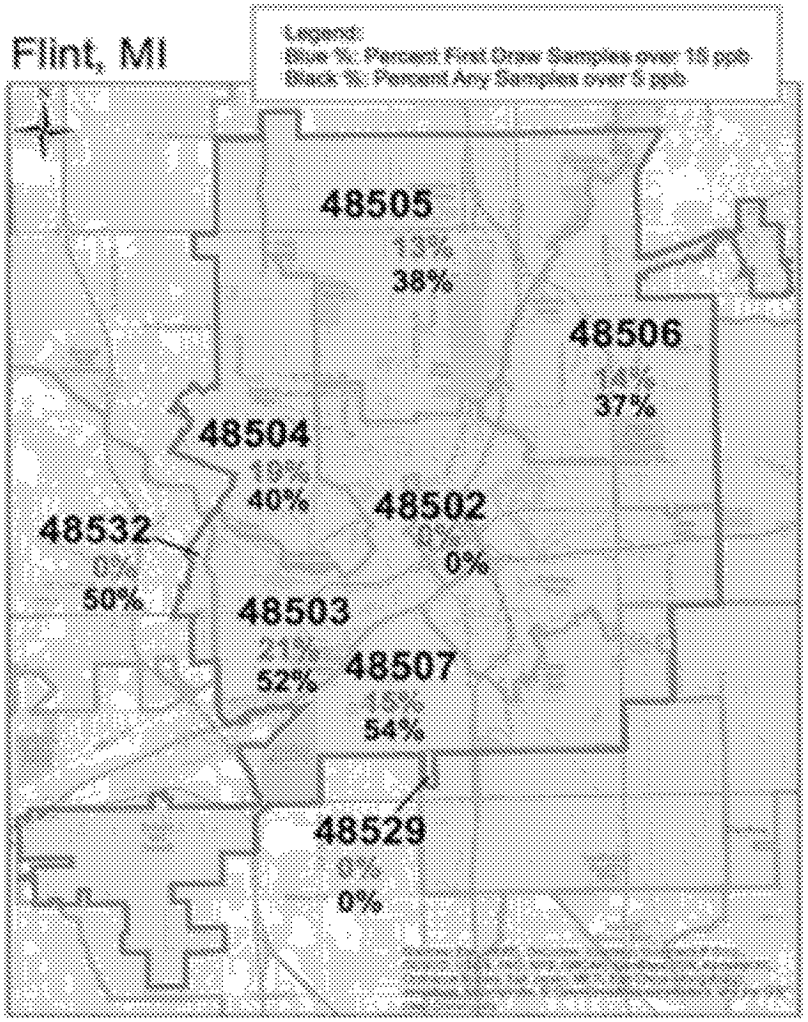
Flint results for children 5 years and under:

PRE-SWITCH % EBL: 2.1% (consistent with MDHHS data 2.2)

POST-SWITCH % EBL: 4.0%

$p < 0.05$; STATISTICALLY SIGNIFICANT CHANGE

High Risk Zip Codes Results



- Focus on zip codes (48503 and 48504) with high water lead levels
- Total n=742, pre n=394, post n=348
  - Results:
    - PRE-SWITCH % EBL: **2.5%**
    - POST-SWITCH % EBL: **6.3%**
    - **p < 0.05; STATISTICALLY SIGNIFICANT CHANGE**

What was rest of county doing?

- Analysis of same time periods for Genesee County children who live outside of City of Flint zips codes (non 48501-48507)
  - N=1670 for non-Flint children (pre n=943, post n=727)

Non-Flint results for children 5 years and under:

PRE-SWITCH % EBL: **0.6%**

POST-SWITCH % EBL: **1.0%**

p = 0.637; NO CHANGE

Blood Lead Level Analysis

- % EBL all children less than 5 years of age

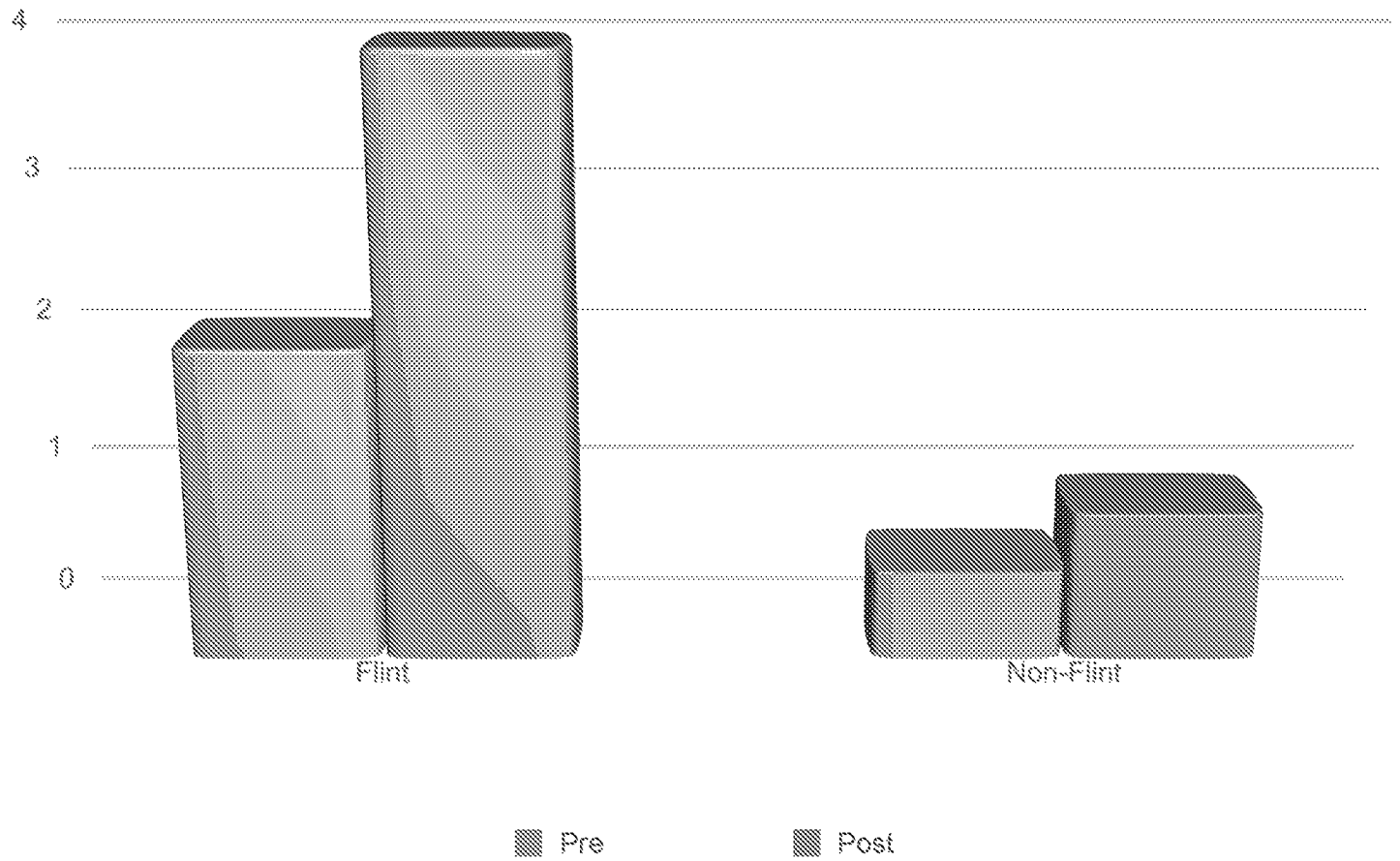
	ALL FLINT (n=1746)	HIGH-RISK FLINT (n=742)	REST OF FLINT (n=1004)	NON-FLINT (n=1670)
PRE-SWITCH	*2.1%*	*2.5%*	*1.8%*	*0.6%*
POST-SWITCH	4.0%	6.3%	2.4%	1.0%

Blood Lead Level Analysis

- % EBL children 15 months or less
  - Total Flint n=619, pre n=295, post n=324
  - Total Non-Flint n=816, pre n=443, post n=376

	HIGH-RISK FLINT (n=269)	REST OF FLINT (n=350)	NON-FLINT (n=816)
PRE-SWITCH	*1.5%*	*0.6%*	*0.5%*
POST-SWITCH	4.4%	1.1%	0.5%

Graphical Summary
Change in % EBL Flint vs Non-Flint



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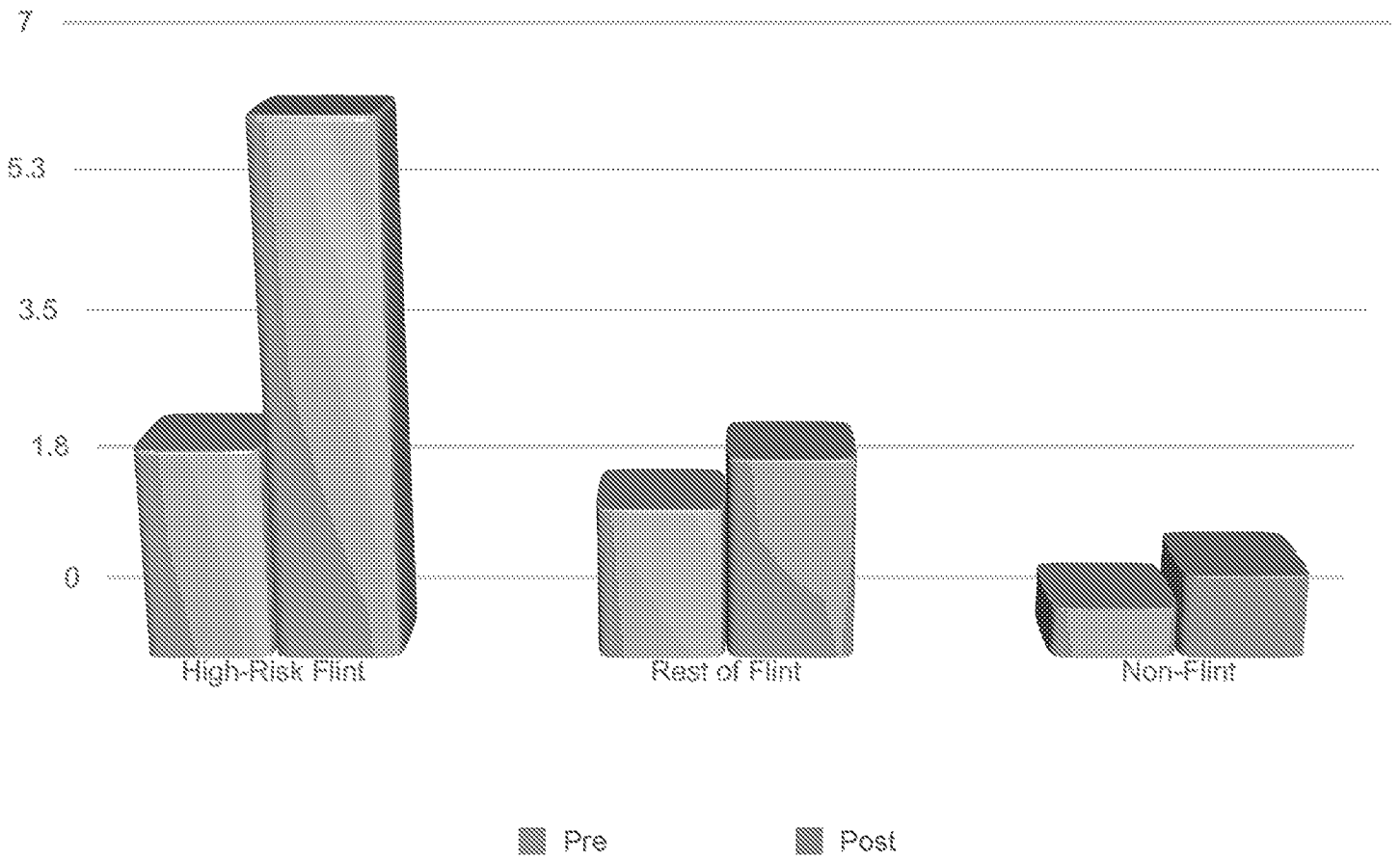
Graphical Summary
Change in % EBL by area



Conclusions from BLL analysis

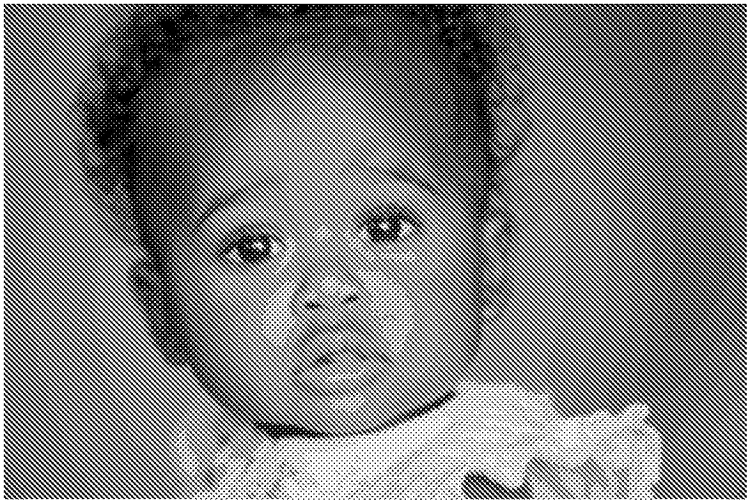
- % of children with EBL in Flint has increased
  - Most striking increase in zip codes with highest water lead levels
- Results underestimate risk: infants not screened for lead and water usage unknown.
  - *Accurate exposure largely unknown since national childhood lead screening focuses on household lead exposure (paint, soil, dust) at later ages (1 and 2 yrs)*
- Results are consistent and concerning. Primary prevention has failed.

Next Steps

- Immediately limit further exposure
  - Encourage breast feeding
  - No tap water for high risk groups: infants on formula & pregnant mothers
  - Declare health advisory: allows WIC to administer water or ready-to-feed formula and other resources (Salvation Army & United Way water supplies)
  - Distribution of lead clearing NSF-approved filters
  - Public education regarding precautions (flushing, etc)
  - Re-connect to Lake Huron water source ASAP

And Makayla…

- Asymptomatic now
- But what will her future hold and an entire generation of Flint children?



From: Maqsood, Junaid (DHHS)
Sent: Monday, December 14, 2015 3:31 PM
To: Scott, Robert L. (DHHS)
Subject: RE: PDF map of flint

Oh, I see. I'm trying to randomize the points and need to indicate which layer to display the randomized points on. Are the points outside of the Flint layer (yellow-colored layer) important to the map?

From: Scott, Robert L. (DHHS)
Sent: Monday, December 14, 2015 3:24 PM
To: Maqsood, Junaid (DHHS) <MaqsoodJ@michigan.gov>
Subject: RE: PDF map of flint

No. I was simply providing an update to a map I had provided them last year (see attached).

From: Maqsood, Junaid (DHHS)
Sent: Monday, December 14, 2015 3:21 PM
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Subject: RE: PDF map of flint

Thanks.

The map you provided isn't at the zip code level, is it?

From: Scott, Robert L. (DHHS)
Sent: Monday, December 14, 2015 3:15 PM
To: Maqsood, Junaid (DHHS) <MaqsoodJ@michigan.gov>
Subject: RE: PDF map of flint

This is the only zip code layer I have (seven attached files), but it's for the whole state, and several years old.

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Subject: RE: PDF map of flint

Bob,

Do you remember which feature class contained the relevant zip codes for the map?

Thanks,
Junaid

From: Maqsood, Junaid (DHHS)
Sent: Monday, December 14, 2015 12:58 PM

To: Scott, Robert L. (DHHS) <ScottR9@michigan.gov>
Subject: RE: PDF map of flint

Thanks Bob! I will let you know if I have any questions.

From: Scott, Robert L. (DHHS)
Sent: Monday, December 14, 2015 12:56 PM
To: Maqsood, Junaid (DHHS) <MaqsoodJ@michigan.gov>
Cc: Stanbury, Martha (DHHS) <stanburym@michigan.gov>
Subject: RE: PDF map of flint

Junaid,

Please see attached: the ArcGIS file itself, plus a zipfile with all related shapefiles. Also the PDF so you can see what's it looks like.

Let me know if you have questions.

Thanks,
Bob

From: Stanbury, Martha (DHHS)
Sent: Monday, December 14, 2015 12:11 PM
To: Scott, Robert L. (DHHS) <ScottR9@michigan.gov>
Cc: Maqsood, Junaid (DHHS) <MaqsoodJ@michigan.gov>
Subject: FW: PDF map of flint

Can you get Junaid the map and he'll try doing the randomization.

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Subject: RE: PDF map of flint

I looked up how to do randomization in GIS and think I might have found a way (http://forums.esri.com/Thread.asp?c=93&f=1113&t=280712&mc=4#msgid869058).

I can give it a try if I can access Bob's map document.

From: Stanbury, Martha (DHHS)
Sent: Monday, December 14, 2015 10:10 AM
To: Maqsood, Junaid (DHHS) <MaqsoodJ@michigan.gov>
Subject: FW: PDF map of flint

See below -- and I'll stop by.

From: Dykema, Linda D. (DHHS)
Sent: Monday, December 14, 2015 8:29 AM
To: Miller, Corinne (DHHS) <MillerC39@michigan.gov>
Cc: Stanbury, Martha (DHHS) <stanburym@michigan.gov>; Scott, Robert L. (DHHS) <ScottR9@michigan.gov>
Subject: RE: PDF map of flint

Randomization seems the best, most data protective option. Martha, can Junaid handle this or do we need some assistance from the 5th floor?

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Cc: Stanbury, Martha (DHHS) <stanburym@michigan.gov>; Scott, Robert L. (DHHS) <ScottR9@michigan.gov>
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2) Have attendees sign a confidentiality agreement but that is not going to be possible if there are more than a handful in the audience.
3) Show the map for a limited amount of time but attendees are not provided a hard copy and the map is not posted on a web site.

It helps that the data cover multiple years.

Option 1 is preferred for a public presentation. Option 3 is also doable. If the presentation is just to health department staff I don't see a problem in presenting the information as is.

From: Dykema, Linda D. (DHHS)
Sent: Friday, December 11, 2015 8:42 AM
To: Miller, Corinne (DHHS) <MillerC39@michigan.gov>
Cc: Stanbury, Martha (DHHS) <stanburym@michigan.gov>; Scott, Robert L. (DHHS) <ScottR9@michigan.gov>
Subject: FW: PDF map of flint

Corinne,

Please see the attached map. I don't see it as violating confidentiality, but I've no expertise in this. Should this be sent to Colin Boes or someone else for confirmation that it's ok to present?

Linda

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Sent: Thursday, December 10, 2015 5:38 PM
To: Dykema, Linda D. (DHHS) <DykemaL@michigan.gov>
Cc: Scott, Robert L. (DHHS) <ScottR9@michigan.gov>
Subject: FW: PDF map of flint

GCHD requested a map with kids with elevated BLLs. They want to use it in a presentation, as I understand it.. Please see attached. Does this violate confidentiality?

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Sent: Thursday, December 10, 2015 5:32 PM

To: Stanbury, Martha (DHHS) <stanburym@michigan.gov>
Subject: PDF map of flint

Please see attached.

Robert L. Scott
Childhood Lead Poisoning Prevention Program
Michigan Department of Health & Human Services
(517) 335-8178
fax (517) 335-8509

Sent: Monday, December 14, 2015 3:37 PM
To: Maqsood, Junaid (DHHS)
Subject: RE: PDF map of flint

No, the focus is on Flint.

From: Maqsood, Junaid (DHHS)
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Subject: RE: PDF map of flint

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Subject: PDF map of flint

Please see attached.

Robert L. Scott
Childhood Lead Poisoning Prevention Program Michigan Department of Health & Human Services
(517) 335-8178
fax (517) 335-8509

From: Noble, Kim <knoble@gchd.us>
Sent: Thursday, December 17, 2015 12:46 PM
To: Scott, Robert L. (DHHS)
Cc: Taylor, Sherry;July, Jori;Wenstrom, Janet
Subject: RE: excel list

Thank you.

From: Scott, Robert L. (DHHS) [mailto:ScottR9@michigan.gov]
Sent: Thursday, December 17, 2015 12:22 PM
To: Noble, Kim
Cc: Taylor, Sherry; July, Jori; Wenstrom, Janet
Subject: RE: excel list

Ah, good question! Please plan to send me the list tomorrow (Friday) as usual, and I'll return an updated list on Monday as usual.

After that, no fully-processed blood lead results will be available until Monday, January 11. So after tomorrow, the next time for you to send a list to me would be Friday, January 8.

From: Noble, Kim [mailto:knoble@gchd.us]
Sent: Thursday, December 17, 2015 11:20 AM
To: Scott, Robert L. (DHHS) <ScottR9@michigan.gov>
Cc: Taylor, Sherry <STAYLOR@gchd.us>; July, Jori <jjuly@gchd.us>; Wenstrom, Janet <jwenstrom@gchd.us>
Subject: excel list

Hello
We normally send you the list on Fridays. What kind of schedule would you like us to follow regarding 12/25 and 1/1?
Thank you
Kim

Kim Noble RN, BSN
Public Health Nurse
Genesee County Health Department
G-3373 S. Saginaw Street
Burton, MI 48529
Telephone: 810- 237-4571
Fax: 810- 237-4612

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For a copy of the Health Department's Notice of Information Practices, contact the Health Department or visit the Health Department's website at http://www.gchd.us/

From: Maqsood, Junaid (DHHS)
Sent: Monday, January 04, 2016 8:23 AM
To: Scott, Robert L. (DHHS)
Subject: RE: UPDATE: Flint map randomization

Thanks, Bob. I need some time to refresh my memory so I will schedule a time later this week to go over the randomization process.

Junaid

From: Scott, Robert L. (DHHS)
Sent: Wednesday, December 23, 2015 3:20 PM
To: Maqsood, Junaid (DHHS) <MaqsoodJ@michigan.gov>; Stanbury, Martha (DHHS) <stanburym@michigan.gov>
Subject: RE: UPDATE: Flint map randomization

Wow, Junaid, this looks really good! I agree, I think they could use this one for a meaningful presentation.

Next week, or whenever you're available, I'd like to learn how you did this.

Thanks!
Bob

From: Maqsood, Junaid (DHHS)
Sent: Tuesday, December 22, 2015 2:12 PM
To: Scott, Robert L. (DHHS) <ScottR9@michigan.gov>; Stanbury, Martha (DHHS) <stanburym@michigan.gov>
Subject: UPDATE: Flint map randomization

Martha and Bob,

Attached is a new map of EBLL cases in Flint randomized by a method used by Ed Hartwick. It's better than the previous map I generated where cases were scattered at random throughout the city. In the revised map, cases were shifted slightly from their original point so some of the clustering still holds up. This is probably the final map that GCHD could use for their presentation.

Let me know if you have any questions or if you want to discuss.

Thank you,
Junaid

From: Scott, Robert L. (DHHS)
Sent: Wednesday, December 16, 2015 2:43 PM
To: Maqsood, Junaid (DHHS) <MaqsoodJ@michigan.gov>; Stanbury, Martha (DHHS) <stanburym@michigan.gov>
Subject: RE: Flint map with randomized points

OK, thanks.

From: Maqsood, Junaid (DHHS)
Sent: Wednesday, December 16, 2015 2:26 PM
To: Stanbury, Martha (DHHS) <stanburym@michigan.gov>; Scott, Robert L. (DHHS) <ScottR9@michigan.gov>
Subject: RE: Flint map with randomized points

I'm going to try to randomize points by City (Flint) and zip code(only zip codes in city of Flint) rather than just zip code -- perhaps the output will be better? I will get the new map out sometime tomorrow.

From: Maqsood, Junaid (DHHS)
Sent: Wednesday, December 16, 2015 1:33 PM
To: Stanbury, Martha (DHHS) <stanburym@michigan.gov>; Scott, Robert L. (DHHS) <ScottR9@michigan.gov>
Subject: Flint map with randomized points

Martha and Bob,

Attached is the map of Flint with points randomized by zip code, meaning I calculated the # of cases with BLL between 5 and 9 ug/dL (inclusive) and with BLL ≥10 ug/dL for each zip code and plotted the same number of cases per zip code in random locations within the zip code boundary. Unfortunately, as we originally suspected, the clustering of cases depicted in the original map (also attached) is lost with this randomization.

Junaid

Sent: Monday, January 04, 2016 11:18 AM
To: Wells, Eden (DHHS);Miller, Corinne (DHHS)
Cc: Peeler, Nancy (DHHS);Moran, Susan (DHHS);Fink, Brenda (DHHS);Stanbury, Martha (DHHS)
Subject: RE: Flint Water

I agree—plans can view lead info in MCIR, but it's not the most efficient way to get plan-wide lead data.

In answer to Eden's question below: new lead data becomes available in the Warehouse and MCIR at the same time—generally each Monday morning.

We've been anticipating the need for a weekly file to Medicaid health plans. Daisy Peng helped me with a Warehouse query that identifies the health plan (if applicable) for each new lead result.

From: Wells, Eden (DHHS)
Sent: Saturday, January 02, 2016 1:24 PM
To: Miller, Corinne (DHHS) <MillerC39@michigan.gov>
Cc: Scott, Robert L. (DHHS) <ScottR9@michigan.gov>; Peeler, Nancy (DHHS) <PeelerN@michigan.gov>; Moran, Susan (DHHS) <MoranS@michigan.gov>; Fink, Brenda (DHHS) <FinkB@michigan.gov>
Subject: Re: Flint Water

Thank you, Corinne, will relay...

E

From: Miller, Corinne (DHHS)
Sent: Saturday, January 2, 2016 11:44 AM
To: Wells, Eden (DHHS)
Cc: Scott, Robert L. (DHHS); Peeler, Nancy (DHHS); Moran, Susan (DHHS); Fink, Brenda (DHHS)
Subject: Re: Flint Water

Ps. The plans would need to look child-by-child in the MCIR. They can accumulate names as they look them up but having Bob provide them a weekly file is going to be easier for them.

Sent from my iPhone

On Dec 30, 2015, at 5:08 PM, Wells, Eden (DHHS) <WellsE3@michigan.gov> wrote:
HI Bob and Nancy,

Is MCIR a good way for health plans to track their kids lead test results in a timely (real-time) fashion? Would MCIR post the results as fast as you post them to the Warehouse?

Eden

From: Priest, Chris (DHHS)
Sent: Wednesday, December 30, 2015 4:27 PM
To: Wells, Eden (DHHS) <WellsE3@michigan.gov>; Moran, Susan (DHHS) <MoranS@michigan.gov>
Cc: Lyon, Nick (DHHS) <LyonN2@michigan.gov>; Becker, Timothy (DHHS) <beckert1@michigan.gov>; Stiffler, Kathleen A. (DHHS) <StifflerK@michigan.gov>
Subject: Fwd: Flint Water

Sue and Dr. Wells - see below and attached. We wanted to share what UnitedHealth is doing in Flint. Thought you may find this a helpful example of what our health plan partners are implementing after our discussions. We will be following up with the other plans shortly and will pass along what we get from them too. If there is anything in here that is concerning, please let us know.

The L letter to all providers in Flint, which was sent to you both for sign off, will be going today. I also understand that we have a plan on metrics/data reporting too.

Please let us know if there is anything else Medicaid can do to be helpful.

Happy New Year!

Chris

Sent from my iPhone

Begin forwarded message:
From: "Kennedy, Brian J" <bkennedy@uhc.com>
Date: December 30, 2015 at 10:37:14 AM EST
To: "priestc1@michigan.gov" <priestc1@michigan.gov>
Cc: "Debera (egglestond@michigan.gov)" <egglestond@michigan.gov>, "stifflerk@michigan.gov" <stifflerk@michigan.gov>, "Mouras, Dennis J" <dmouras@uhc.com>
Subject: Flint Water Concerns
Chris,
In recognition of the need for an all-hands-on-deck response to the Flint Water concerns, I want to share with you the UnitedHealthcare Community Plan outline (attached) for how we will address the identification, outreach, education, and care coordination for our members in the Flint area. Critical to such efforts is coordinating care with primary care providers (PCPs) where possible, working with other agencies, and keeping our message consistent with the public health leaders at MDHHS and Genesee County Health Department.

We will convey the public health messages regarding water testing, free water filters, and dietary choices that reduce lead absorption. It is also important to communicate with the Genesee County Health Department for those children at higher risk to arrange nurse home visits to evaluate and specifically educate families. We will follow-up and coordinate with PCPs to follow blood levels and respond accordingly.

We will leverage our current relationships with the local health department, primary care providers, and our CSHCS care managers to make sure that we complete an effective outreach, education, and care coordination. Though our current membership in the Flint area is small, we expect that with the new contract, it will grow and we are prepared to continue to assist this growing customer base as they come on board.
All of this is consistent with our broader efforts for the health of our member population.
Thanks,
Brian

Brian J Kennedy, MD MBA | Chief Medical Officer, UnitedHealthcare Community Plan Michigan T 248-331-4488 | Fax 866-291-2773 bkennedy@uhc.com | uhccommunityplan.com

Our United Culture The way forward
Integrity | Compassion | Relationships | Innovation | Performance

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<UnitedHealthcare Community Plan Enhanced Blood Lead Level Screening and Education.docx>

Sent: Tuesday, January 05, 2016 9:45 AM
To: Dykema, Linda D. (DHHS);Moran, Susan (DHHS);Stanbury, Martha (DHHS)
Subject: RE: Sit Rep report 192 Kids

I currently have 187 children on the Master List for Flint.

Of those 187 children:
111 are Medicaid-eligible now and at time of EBLL (59%)
11 were Medicaid-eligible at time of EBLL, but not currently (6%)
6 were Medicaid-eligible previously, but not at time of EBLL or currently (3%)
59 were never Medicaid-eligible (32%)

From: Dykema, Linda D. (DHHS)
Sent: Monday, January 04, 2016 4:29 PM
To: Moran, Susan (DHHS) <MoranS@michigan.gov>; Stanbury, Martha (DHHS) <stanburym@michigan.gov>
Cc: Scott, Robert L. (DHHS) <ScottR9@michigan.gov>
Subject: RE: Sit Rep report 192 Kids

Copying Bob Scott for a response (Martha is working away from the office this afternoon).

From: Moran, Susan (DHHS)
Sent: Monday, January 04, 2016 4:21 PM
To: Dykema, Linda D. (DHHS) <DykemaL@michigan.gov>; Stanbury, Martha (DHHS) <stanburym@michigan.gov>
Subject: Sit Rep report 192 Kids

On sit rep report, we report 181 kids (age 0-5) with elevated lead level and 11 lids (age 6-17).
Of these 192 kids, how many have Medicaid coverage? This may be a Bob Scott question, but would like answer asap so let me know if we need Medicaid to assist in determining.

From: Scott, Robert L. (DCH)
Sent: Monday, February 09, 2015 9:00 AM
To: Carly Rachel Brin
Subject: For DLP, preliminary 2014 lead data
Attachments: 2014 Annual BLL report preliminary 020915.pdf

Carly,

Please see attached. A few more test results will trickle in before the final version, but probably not enough to change the percentages. Let me know if you have questions.

Bob

Children Tested for Lead Poisoning -- Calendar Year 2014
All Counties in Michigan

Children less than Six Years of Age

				Children Tested		Children Tested, by Highest Blood Lead Level (BLL)							
County	%Pre-1950 Housing	%Pre-1978 Housing	Children less than Six Years of Age	Number of Children Tested	% Tested	<5 ug/dL (capillary or venous)	5 to 9 ug/dL (capillary or venous)	Capillary >= 10 ug/dL, not confirmed by venous	Confirmed 10-14 ug/dL (venous only)	Confirmed 15-44 ug/dL (venous only)	Confirmed ≥45 ug/dL (venous only)	Total ≥ 5 µg/dL	% with BLL >= 5 ug/dL
Alcona	12.4	61.5	398	53	13.3	51	2	0	0	0	0	2	3.8
Alger	29.5	64.1	427	92	21.5	90	1	0	1	0	0	2	2.2
Allegan	23.2	51.1	8,806	1,204	13.7	1,173	29	2	0	0	0	31	2.6
Alpena	25.3	71.6	1,758	257	14.6	248	8	1	0	0	0	9	3.5
Antrim	18.8	52.6	1,370	260	19.0	258	2	0	0	0	0	2	0.8
Arenac	19.8	58.2	870	183	21.0	182	1	0	0	0	0	1	0.5
Baraga	34.0	71.7	477	135	28.3	134	1	0	0	0	0	1	0.7
Barry	27.1	57.3	4,143	490	11.8	467	22	0	0	0	0	23	4.7
Bay	33.9	75.6	7,322	1,408	19.2	1,358	46	2	3	4	1	50	3.6
Benzie	18.6	46.3	1,041	268	25.7	266	2	0	0	0	0	2	0.7
Berrien	28.6	72.2	11,681	1,942	16.6	1,883	45	5	4	5	0	59	3.0
Branch	30.9	65.3	3,506	668	19.1	645	19	1	3	0	0	23	3.4
Calhoun	36.1	75.3	10,149	2,390	23.5	2,290	87	0	7	6	0	100	4.2
Cass	22.4	59.9	3,444	424	12.3	412	10	1	1	0	0	12	2.8
Charlevoix	25.3	54.4	1,624	295	18.2	294	1	0	0	0	0	1	0.3
Cheboygan	20.9	53.5	1,414	285	20.2	279	6	0	0	0	0	6	2.1
Chippewa	25.1	58.6	2,345	440	18.8	436	4	0	0	0	0	4	0.9
Clare	14.5	58.8	2,083	445	21.4	441	4	0	0	0	0	4	0.9
Clinton	22.5	52.8	5,140	584	11.4	578	6	0	0	0	0	6	1.0
Crawford	13.7	55.6	727	83	11.4	82	1	0	0	0	0	1	1.2
Delta	33.3	68.0	2,388	413	17.3	397	15	0	0	1	0	16	3.9
Dickinson	38.9	71.7	1,575	318	20.2	317	1	0	0	0	0	1	0.3
Eaton	20.4	56.4	7,356	1,140	15.5	1,113	24	3	0	0	0	27	2.4
Emmet	23.0	48.3	2,042	362	17.7	362	0	0	0	0	0	0	0.0
Genesee	19.9	68.0	31,997	6,765	21.1	6,591	149	11	9	5	0	174	2.6
Gladwin	12.4	49.5	1,495	291	19.5	291	0	0	0	0	0	0	0.0
Gogebic	50.0	76.7	855	154	18.0	152	2	0	0	0	0	2	1.3
Grand Traverse	14.7	43.5	6,000	1,370	22.8	1,358	9	3	0	0	0	12	0.9
Gratiot	34.7	69.8	2,754	496	18.0	491	5	0	0	0	0	5	1.0
Hillsdale	36.5	63.2	3,283	814	24.8	795	17	2	0	0	0	19	2.3
Houghton	53.4	75.5	2,477	599	24.2	585	10	0	2	2	0	14	2.3
Huron	31.8	68.9	1,873	393	21.0	381	11	0	1	0	0	12	3.1
Ingham	24.9	68.2	19,248	4,747	24.7	4,606	119	5	11	6	0	141	3.0
Ionia	35.8	63.0	4,878	842	17.3	815	24	2	0	1	0	27	3.2
Iosco	12.7	65.6	1,233	150	12.2	146	4	0	0	0	0	4	2.7
Iron	44.1	72.1	573	138	24.1	135	3	0	0	0	0	3	2.2
Isabella	16.3	48.2	4,208	639	15.2	631	8	0	0	0	0	8	1.3
Jackson	33.0	67.9	11,296	2,751	24.4	2,596	133	15	3	4	0	155	5.6
Kalamazoo	22.5	62.6	18,588	3,260	17.5	3,174	72	7	4	2	1	86	2.6
Kalkaska	13.2	49.3	1,180	217	18.4	216	1	0	0	0	0	1	0.5
Kent	24.8	59.2	52,655	10,125	19.2	9,655	414	8	22	26	0	470	4.6
Keweenaw	46.9	77.6	115	24	20.9	22	2	0	0	0	0	2	8.3
Lake	12.5	52.6	585	120	20.5	118	2	0	0	0	0	2	1.7
Lapeer	20.4	52.9	5,687	919	16.2	890	25	3	0	1	0	29	3.2

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Children Tested for Lead Poisoning -- Calendar Year 2014
All Counties in Michigan

Children less than Six Years of Age

				Children Tested		Children Tested, by Highest Blood Lead Level (BLL)							
County	%Pre-1950 Housing	%Pre-1978 Housing	Children less than Six Years of Age	Number of Children Tested	% Tested	<5 ug/dL (capillary or venous)	5 to 9 ug/dL (capillary or venous)	Capillary >= 10 ug/dL, not confirmed by venous	Confirmed 10-14 ug/dL (venous only)	Confirmed 15-44 ug/dL (venous only)	Confirmed ≥45 ug/dL (venous only)	Total ≥ 5 µg/dL	% with BLL >= 5 ug/dL
Leelanau	17.9	46.5	1,111	239	21.5	234	4	1	0	0	0	5	2.1
Lenawee	33.6	67.2	6,911	1,212	17.5	1,090	99	16	3	4	0	122	10.1
Livingston	11.4	39.0	12,104	1,027	8.5	1,018	8	0	1	0	0	9	0.9
Luce	23.8	64.3	370	88	23.8	88	0	0	0	0	0	0	0.0
Mackinac	23.4	58.6	587	130	22.1	129	1	0	0	0	0	1	0.8
Macomb	9.3	59.1	57,878	9,471	16.4	9,343	111	6	2	7	2	128	1.4
Manistee	28.8	63.9	1,307	285	21.8	272	11	0	0	2	0	13	4.6
Marquette	27.9	69.4	4,029	471	11.7	458	11	2	0	0	0	13	2.8
Mason	32.1	64.6	1,864	414	22.2	387	27	0	0	0	0	27	6.5
Mecosta	18.2	53.4	2,520	316	12.5	314	0	0	0	2	0	2	0.6
Menominee	35.4	73.2	1,375	262	19.1	246	14	1	0	1	0	16	6.1
Midland	15.2	58.7	5,685	475	8.4	470	4	0	1	0	0	5	1.1
Missaukee	21.2	56.2	1,111	133	12.0	132	0	0	1	0	0	1	0.8
Monroe	23.0	59.0	10,355	1,568	15.1	1,550	16	1	1	0	0	18	1.1
Montcalm	27.3	57.7	4,527	743	16.4	730	11	0	1	1	0	13	1.7
Montmorency	18.1	58.6	404	83	20.5	82	1	0	0	0	0	1	1.2
Muskegon	25.8	66.2	13,224	2,547	19.3	2,395	124	13	10	5	0	152	6.0
Newaygo	19.3	53.6	3,581	449	12.5	442	6	1	0	0	0	7	1.6
Oakland	14.7	60.5	83,501	14,258	17.1	14,052	165	8	20	13	0	206	1.4
Oceana	25.8	57.8	2,091	524	25.1	514	7	0	3	0	0	10	1.9
Ogemaw	12.8	61.6	1,289	102	7.9	101	1	0	0	0	0	1	1.0
Ontonagon	39.1	73.2	251	48	19.1	46	2	0	0	0	0	2	4.2
Osceola	22.6	56.6	1,723	334	19.4	324	6	0	2	2	0	10	3.0
Oscoda	17.8	62.1	521	34	6.5	31	2	1	0	0	0	3	8.8
Otsego	12.2	50.3	1,641	325	19.8	324	1	0	0	0	0	1	0.3
Ottawa	15.7	45.3	21,390	3,002	14.0	2,921	75	5	1	0	0	81	2.7
Presque Isle	21.1	66.3	597	111	18.6	109	2	0	0	0	0	2	1.8
Roscommon	13.1	58.7	1,156	220	19.0	220	0	0	0	0	0	0	0.0
Saginaw	28.1	73.1	14,029	3,668	26.1	3,547	100	8	7	6	0	121	3.3
Saint Clair	25.8	59.4	11,046	2,726	24.7	2,650	61	7	5	3	0	76	2.8
Saint Joseph	27.5	65.1	5,125	1,012	19.7	971	34	4	2	1	0	41	4.1
Sanilac	30.7	64.6	2,879	523	18.2	517	5	0	1	0	0	6	1.1
Schoolcraft	25.5	63.3	471	99	21.0	98	1	0	0	0	0	1	1.0
Shiawassee	33.9	68.2	4,622	1,167	25.2	1,129	34	2	2	0	0	38	3.3
Tuscola	30.2	67.4	3,579	885	24.7	873	10	0	2	0	0	12	1.4
Van Buren	23.3	58.1	5,884	862	14.6	832	26	1	1	2	0	30	3.5
Washtenaw	17.2	56.5	22,833	2,604	11.4	2,572	25	2	2	3	0	32	1.2
Wayne ex Det	22.6	74.5	82,002	18,021	22.0	17,636	327	12	31	15	0	385	2.1
Wexford	23.0	53.7	2,582	362	14.0	359	1	0	0	2	0	3	0.8
Detroit, City of	62.2	93.2	59,755	23,135	38.7	21,229	1,483	51	215	153	4	1,906	8.2
MICHIGAN	24.7	64.8	710,976	142,888	20.1	137,839	4,157	213	386	285	8	5,049	3.5

February 9, 2015

Sources: US Census Bureau, Census 2010 (Pre-1950 Housing and Pre-1978 Housing) and American Community Survey 2013 5-year estimates (Detroit and county populations);

Children Tested for Lead Poisoning -- Calendar Year 2014
All Counties in Michigan

Children One and Two Years of Age

				Children Tested		Children Tested, by Highest Blood Lead Level (BLL)							
County	%Pre-1950 Housing	%Pre-1978 Housing	Children One and Two Years of Age	Number of Children Tested	% Tested	<5 ug/dL (capillary or venous)	5 to 9 ug/dL (capillary or venous)	Capillary >= 10 ug/dL, not confirmed by venous	Confirmed 10-14 ug/dL (venous only)	Confirmed 15-44 ug/dL (venous only)	Confirmed ≥45 ug/dL (venous only)	Total ≥ 5 µg/dL	% with BLL >= 5 ug/dL
Alcona	12.4	61.5	130	43	33.1	41	2	0	0	0	0	2	4.7
Alger	29.5	64.1	130	76	58.5	74	1	0	1	0	0	2	2.6
Allegan	23.2	51.1	2,888	861	29.8	837	22	2	0	0	0	24	2.8
Alpena	25.3	71.6	570	213	37.4	206	7	0	0	0	0	7	3.3
Antrim	18.8	52.6	450	188	41.8	186	2	0	0	0	0	2	1.1
Arenac	19.8	58.2	281	131	46.6	130	1	0	0	0	0	1	0.8
Baraga	34.0	71.7	165	90	54.5	90	0	0	0	0	0	0	0.0
Barry	27.1	57.3	1,328	381	28.7	365	15	0	1	0	0	16	4.2
Bay	33.9	75.6	2,410	1,185	49.2	1,148	30	2	3	2	0	37	3.1
Benzie	18.6	46.3	338	174	51.5	172	2	0	0	0	0	2	1.1
Berrien	28.6	72.2	3,855	1,581	41.0	1,533	36	5	3	4	0	48	3.0
Branch	30.9	65.3	1,157	231	20.0	224	6	0	1	0	0	7	3.0
Calhoun	36.1	75.3	3,366	1,309	38.9	1,249	52	1	4	3	0	60	4.6
Cass	22.4	59.9	1,120	360	32.1	349	9	1	1	0	0	11	3.1
Charlevoix	25.3	54.4	523	208	39.8	207	1	0	0	0	0	1	0.5
Cheboygan	20.9	53.5	457	213	46.6	208	5	0	0	0	0	5	2.3
Chippewa	25.1	58.6	775	261	33.7	258	3	0	0	0	0	3	1.1
Clare	14.5	58.8	700	356	50.9	352	4	0	0	0	0	4	1.1
Clinton	22.5	52.8	1,650	323	19.6	319	4	0	0	0	0	4	1.2
Crawford	13.7	55.6	237	65	27.4	64	1	0	0	0	0	1	1.5
Delta	33.3	68.0	782	349	44.6	333	15	0	0	1	0	16	4.6
Dickinson	38.9	71.7	529	274	51.8	273	1	0	0	0	0	1	0.4
Eaton	20.4	56.4	2,410	748	31.0	732	13	3	0	0	0	16	2.1
Emmet	23.0	48.3	656	259	39.5	259	0	0	0	0	0	0	0.0
Genesee	19.9	68.0	10,583	4,207	39.8	4,093	97	9	5	3	0	114	2.7
Gladwin	12.4	49.5	486	192	39.5	192	0	0	0	0	0	0	0.0
Gogebic	50.0	76.7	285	110	38.6	109	1	0	0	0	0	1	0.9
Grand Traverse	14.7	43.5	1,955	884	45.2	878	5	1	0	0	0	6	0.7
Gratiot	34.7	69.8	909	347	38.2	344	3	0	0	0	0	3	0.9
Hillsdale	36.5	63.2	1,079	388	36.0	378	8	2	0	0	0	10	2.6
Houghton	53.4	75.5	828	499	60.3	487	8	0	2	2	0	12	2.4
Huron	31.8	68.9	607	226	37.2	218	8	0	0	0	0	8	3.5
Ingham	24.9	68.2	6,426	2,782	43.3	2,699	70	5	6	2	0	83	3.0
Ionia	35.8	63.0	1,590	622	39.1	598	21	2	0	1	0	24	3.9
Iosco	12.7	65.6	397	124	31.2	121	3	0	0	0	0	3	2.4
Iron	44.1	72.1	193	119	61.7	117	2	0	0	0	0	2	1.7
Isabella	16.3	48.2	1,392	458	32.9	454	4	0	0	0	0	4	0.9
Jackson	33.0	67.9	3,716	1,990	53.6	1,871	105	9	2	3	0	119	6.0
Kalamazoo	22.5	62.6	6,166	1,856	30.1	1,805	42	4	3	1	1	51	2.7
Kalkaska	13.2	49.3	395	136	34.4	135	1	0	0	0	0	1	0.7
Kent	24.8	59.2	17,514	8,047	45.9	7,677	325	5	19	21	0	370	4.6
Keweenaw	46.9	77.6	39	21	53.8	19	2	0	0	0	0	2	9.5
Lake	12.5	52.6	192	85	44.3	84	1	0	0	0	0	1	1.2
Lapeer	20.4	52.9	1,780	696	39.1	671	22	2	0	1	0	25	3.6

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Children Tested for Lead Poisoning -- Calendar Year 2014
All Counties in Michigan

Children One and Two Years of Age

				Children Tested		Children Tested, by Highest Blood Lead Level (BLL)							
County	%Pre-1950 Housing	%Pre-1978 Housing	Children One and Two Years of Age	Number of Children Tested	% Tested	<5 ug/dL (capillary or venous)	5 to 9 ug/dL (capillary or venous)	Capillary >= 10 ug/dL, not confirmed by venous	Confirmed 10-14 ug/dL (venous only)	Confirmed 15-44 ug/dL (venous only)	Confirmed ≥45 ug/dL (venous only)	Total ≥ 5 µg/dL	% with BLL >= 5 ug/dL
Leelanau	17.9	46.5	350	167	47.7	163	3	1	0	0	0	4	2.4
Lenawee	33.6	67.2	2,248	694	30.9	620	63	6	2	3	0	74	10.7
Livingston	11.4	39.0	3,871	740	19.1	731	8	0	1	0	0	9	1.2
Luce	23.8	64.3	121	79	65.3	79	0	0	0	0	0	0	0.0
Mackinac	23.4	58.6	193	109	56.5	108	1	0	0	0	0	1	0.9
Macomb	9.3	59.1	19,051	6,008	31.5	5,928	69	5	2	3	1	80	1.3
Manistee	28.8	63.9	411	247	60.1	235	10	0	0	2	0	12	4.9
Marquette	27.9	69.4	1,364	406	29.8	395	10	1	0	0	0	11	2.7
Mason	32.1	64.6	620	109	17.6	104	5	0	0	0	0	5	4.6
Mecosta	18.2	53.4	851	269	31.6	267	0	0	1	1	0	2	0.7
Menominee	35.4	73.2	442	217	49.1	201	14	1	0	1	0	16	7.4
Midland	15.2	58.7	1,842	292	15.9	290	2	0	0	0	0	2	0.7
Missaukee	21.2	56.2	359	112	31.2	111	0	0	1	0	0	1	0.9
Monroe	23.0	59.0	3,378	1,133	33.5	1,118	13	1	1	0	0	15	1.3
Montcalm	27.3	57.7	1,493	479	32.1	469	8	0	1	1	0	10	2.1
Montmorency	18.1	58.6	131	63	48.1	62	1	0	0	0	0	1	1.6
Muskegon	25.8	66.2	4,384	1,618	36.9	1,517	80	9	7	5	0	101	6.2
Newaygo	19.3	53.6	1,172	389	33.2	382	6	1	0	0	0	7	1.8
Oakland	14.7	60.5	27,292	7,772	28.5	7,647	100	7	10	8	0	125	1.6
Oceana	25.8	57.8	685	278	40.6	273	4	0	1	0	0	5	1.8
Ogemaw	74.0	61.6	413	81	19.6	81	0	0	0	0	0	0	0.0
Ontonagon	39.1	73.2	82	31	37.8	29	2	0	0	0	0	2	6.5
Osceola	22.6	56.6	564	255	45.2	246	5	0	3	1	0	9	3.5
Oscoda	17.8	62.1	168	16	9.5	15	1	0	0	0	0	1	6.3
Otsego	12.2	50.3	540	195	36.1	195	0	0	0	0	0	0	0.0
Ottawa	15.7	45.3	7,046	2,542	36.1	2,473	63	5	1	0	0	69	2.7
Presque Isle	21.1	66.3	193	88	45.6	86	2	0	0	0	0	2	2.3
Roscommon	13.1	58.7	379	172	45.4	172	0	0	0	0	0	0	0.0
Saginaw	28.1	73.1	4,623	2,722	58.9	2,637	70	5	5	5	0	85	3.1
Saint Clair	25.8	59.4	3,574	1,306	36.5	1,269	29	3	3	2	0	37	2.8
Saint Joseph	27.5	65.1	1,684	680	40.4	654	20	3	2	1	0	26	3.8
Sanilac	30.7	64.6	949	281	29.6	277	3	0	1	0	0	4	1.4
Schoolcraft	25.5	63.3	151	76	50.3	76	0	0	0	0	0	0	0.0
Shiawassee	33.9	68.2	1,503	732	48.7	702	27	1	2	0	0	30	4.1
Tuscola	30.2	67.4	1,174	633	53.9	623	9	0	1	0	0	10	1.6
Van Buren	23.3	58.1	1,924	498	25.9	482	13	1	0	2	0	16	3.2
Washtenaw	17.2	56.5	7,560	1,799	23.8	1,776	16	2	2	3	0	23	1.3
Wayne ex Det	22.6	74.5	26,966	9,537	35.4	9,326	183	6	17	5	0	211	2.2
Wexford	23.0	53.7	865	305	35.3	302	1	0	0	2	0	3	1.0
Detroit, City of	62.2	93.2	20,048	9,648	48.1	8,663	751	26	114	94	0	985	10.2
MICHIGAN	24.7	64.8	234,103	86,446	36.9	83,343	2,552	137	229	183	2	3,103	3.6

February 9, 2015

Sources: US Census Bureau, Census 2010 (Pre-1950 Housing and Pre-1978 Housing) and American Community Survey 2013 5-year estimates (Detroit and county populations);

Children Tested for Lead Poisoning -- Comparing CY2013 and CY2014

All Counties in Michigan

Children less than Six Years of Age

		Children Tested					BLLs >= 5 ug/dL					
		Number		Percentage			Number			Percentage		
County	Kids<6	CY2013	CY2014	CY2013	CY2014	Δ	CY2013	CY2014	Δ	CY2013	CY2014	Δ
Alcona	398	51	53	12.8	13.3	0.5	1	2	1	2.0	3.8	1.8
Alger	427	76	92	17.8	21.5	3.7	1	2	1	1.3	2.2	0.9
Allegan	8,806	1,159	1,204	13.2	13.7	0.5	35	31	-4	3.0	2.6	-0.4
Alpena	1,758	302	257	17.2	14.6	-2.6	7	9	2	2.3	3.5	1.2
Antrim	1,370	258	260	18.8	19.0	0.1	6	2	-4	2.3	0.8	-1.6
Arenac	870	163	183	18.7	21.0	2.3	2	1	-1	1.2	0.5	-0.7
Baraga	477	128	135	26.8	28.3	1.5	1	1	0	0.8	0.7	0.0
Barry	4,143	465	490	11.2	11.8	0.6	12	23	11	2.6	4.7	2.1
Bay	7,322	1,421	1,408	19.4	19.2	-0.2	71	50	-21	5.0	3.6	-1.4
Benzie	1,041	231	268	22.2	25.7	3.6	6	2	-4	2.6	0.7	-1.9
Berrien	11,681	1,728	1,942	14.8	16.6	1.8	64	59	-5	3.7	3.0	-0.7
Branch	3,506	765	668	21.8	19.1	-2.8	39	23	-16	5.1	3.4	-1.7
Calhoun	10,149	1,970	2,390	19.4	23.5	4.1	68	100	32	3.5	4.2	0.7
Cass	3,444	458	424	13.3	12.3	-1.0	20	12	-8	4.4	2.8	-1.5
Charlevoix	1,624	297	295	18.3	18.2	-0.1	2	1	-1	0.7	0.3	-0.3
Cheboygan	1,414	266	285	18.8	20.2	1.3	2	6	4	0.8	2.1	1.4
Chippewa	2,345	435	440	18.6	18.8	0.2	5	4	-1	1.1	0.9	-0.2
Clare	2,083	414	445	19.9	21.4	1.5	3	4	1	0.7	0.9	0.2
Clinton	5,140	565	584	11.0	11.4	0.4	12	6	-6	2.1	1.0	-1.1
Crawford	727	87	83	12.0	11.4	-0.6	6	1	-5	6.9	1.2	-5.7
Delta	2,388	453	413	19.0	17.3	-1.7	18	16	-2	4.0	3.9	-0.1
Dickinson	1,575	303	318	19.2	20.2	1.0	7	1	-6	2.3	0.3	-2.0
Eaton	7,356	1,132	1,140	15.4	15.5	0.1	15	27	12	1.3	2.4	1.0
Emmet	2,042	322	362	15.8	17.7	2.0	2	0	-2	0.6	0.0	-0.6
Genesee	31,997	7,067	6,765	22.1	21.1	-0.9	158	174	16	2.2	2.6	0.3
Gladwin	1,495	245	291	16.4	19.5	3.1	5	0	-5	2.0	0.0	-2.0
Gogebic	855	193	154	22.6	18.0	-4.6	5	2	-3	2.6	1.3	-1.3
Grand Traverse	6,000	1,032	1,370	17.2	22.8	5.6	37	12	-25	3.6	0.9	-2.7
Gratiot	2,754	475	496	17.2	18.0	0.8	7	5	-2	1.5	1.0	-0.5
Hillsdale	3,283	788	814	24.0	24.8	0.8	26	19	-7	3.3	2.3	-1.0
Houghton	2,477	538	599	21.7	24.2	2.5	24	14	-10	4.5	2.3	-2.1
Huron	1,873	394	393	21.0	21.0	-0.1	23	12	-11	5.8	3.1	-2.8
Ingham	19,248	4,702	4,747	24.4	24.7	0.2	215	141	-74	4.6	3.0	-1.6
Ionia	4,878	825	842	16.9	17.3	0.3	14	27	13	1.7	3.2	1.5
Iosco	1,233	146	150	11.8	12.2	0.3	4	4	0	2.7	2.7	-0.1
Iron	573	149	138	26.0	24.1	-1.9	3	3	0	2.0	2.2	0.2
Isabella	4,208	731	639	17.4	15.2	-2.2	8	8	0	1.1	1.3	0.2
Jackson	11,296	2,965	2,751	26.2	24.4	-1.9	190	155	-35	6.4	5.6	-0.8
Kalamazoo	18,588	3,536	3,260	19.0	17.5	-1.5	127	86	-41	3.6	2.6	-1.0
Kalkaska	1,180	223	217	18.9	18.4	-0.5	4	1	-3	1.8	0.5	-1.3
Kent	52,655	10,376	10,125	19.7	19.2	-0.5	551	470	-81	5.3	4.6	-0.7
Keweenaw	115	28	24	24.3	20.9	-3.5	2	2	0	7.1	8.3	1.2
Lake	585	121	120	20.7	20.5	-0.2	1	2	1	0.8	1.7	0.8
Lapeer	5,687	1,052	919	18.5	16.2	-2.3	39	29	-10	3.7	3.2	-0.6
Leelanau	1,111	213	239	19.2	21.5	2.3	7	5	-2	3.3	2.1	-1.2

Draft

Children Tested for Lead Poisoning -- Comparing CY2013 and CY2014

All Counties in Michigan

Children less than Six Years of Age

		Children Tested					BLLs >= 5 ug/dL					
		Number		Percentage			Number			Percentage		
County	Kids<6	CY2013	CY2014	CY2013	CY2014	Δ	CY2013	CY2014	Δ	CY2013	CY2014	Δ
Lenawee	6,911	1,512	1,212	21.9	17.5	-4.3	87	122	35	5.8	10.1	4.3
Livingston	12,104	1,106	1,027	9.1	8.5	-0.7	12	9	-3	1.1	0.9	-0.2
Luce	370	73	88	19.7	23.8	4.1	2	0	-2	2.7	0.0	-2.7
Mackinac	587	116	130	19.8	22.1	2.4	6	1	-5	5.2	0.8	-4.4
Macomb	57,878	10,093	9,471	17.4	16.4	-1.1	158	128	-30	1.6	1.4	-0.2
Manistee	1,307	248	285	19.0	21.8	2.8	15	13	-2	6.0	4.6	-1.5
Marquette	4,029	514	471	12.8	11.7	-1.1	20	13	-7	3.9	2.8	-1.1
Mason	1,864	362	414	19.4	22.2	2.8	40	27	-13	11.0	6.5	-4.5
Mecosta	2,520	367	316	14.6	12.5	-2.0	6	2	-4	1.6	0.6	-1.0
Menominee	1,375	262	262	19.1	19.1	0.0	10	16	6	3.8	6.1	2.3
Midland	5,685	501	475	8.8	8.4	-0.5	8	5	-3	1.6	1.1	-0.5
Missaukee	1,111	133	133	12.0	12.0	0.0	0	1	1	0.0	0.8	0.8
Monroe	10,355	1,705	1,568	16.5	15.1	-1.3	42	18	-24	2.5	1.1	-1.3
Montcalm	4,527	615	743	13.6	16.4	2.8	8	13	5	1.3	1.7	0.4
Montmorency	404	80	83	19.8	20.5	0.7	0	1	1	0.0	1.2	1.2
Muskegon	13,224	3,022	2,547	22.9	19.3	-3.6	145	152	7	4.8	6.0	1.2
Newaygo	3,581	426	449	11.9	12.5	0.6	4	7	3	0.9	1.6	0.6
Oakland	83,501	14,244	14,258	17.1	17.1	0.0	221	206	-15	1.6	1.4	-0.1
Oceana	2,091	515	524	24.6	25.1	0.4	17	10	-7	3.3	1.9	-1.4
Ogemaw	1,289	96	102	7.4	7.9	0.5	2	1	-1	2.1	1.0	-1.1
Ontonagon	251	48	48	19.1	19.1	0.0	0	2	2	0.0	4.2	4.2
Osceola	1,723	362	334	21.0	19.4	-1.6	12	10	-2	3.3	3.0	-0.3
Oscoda	521	48	34	9.2	6.5	-2.7	1	3	2	2.1	8.8	6.7
Otsego	1,641	316	325	19.3	19.8	0.5	1	1	0	0.3	0.3	0.0
Ottawa	21,390	2,928	3,002	13.7	14.0	0.3	92	81	-11	3.1	2.7	-0.4
Presque Isle	597	121	111	20.3	18.6	-1.7	0	2	2	0.0	1.8	1.8
Roscommon	1,156	216	220	18.7	19.0	0.3	4	0	-4	1.9	0.0	-1.9
Saginaw	14,029	3,775	3,668	26.9	26.1	-0.8	129	121	-8	3.4	3.3	-0.1
Saint Clair	11,046	2,597	2,726	23.5	24.7	1.2	121	76	-45	4.7	2.8	-1.9
Saint Joseph	5,125	981	1,012	19.1	19.7	0.6	38	41	3	3.9	4.1	0.2
Sanilac	2,879	544	523	18.9	18.2	-0.7	17	6	-11	3.1	1.1	-2.0
Schoolcraft	471	88	99	18.7	21.0	2.3	0	1	1	0.0	1.0	1.0
Shiawassee	4,622	1,230	1,167	26.6	25.2	-1.4	46	38	-8	3.7	3.3	-0.5
Tuscola	3,579	906	885	25.3	24.7	-0.6	21	12	-9	2.3	1.4	-1.0
Van Buren	5,884	879	862	14.9	14.6	-0.3	20	30	10	2.3	3.5	1.2
Washtenaw	22,833	2,743	2,604	12.0	11.4	-0.6	47	32	-15	1.7	1.2	-0.5
Wayne ex Det	82,002	19,466	18,021	23.7	22.0	-1.8	489	385	-104	2.5	2.1	-0.4
Wexford	2,582	329	362	12.7	14.0	1.3	10	3	-7	3.0	0.8	-2.2
Detroit, City of	59,755	25,026	23,135	41.9	38.7	-3.2	1996	1906	-90	8.0	8.2	0.3
MICHIGAN	710,976	147,841	142,888	20.8	20.1	-0.7	5,702	5,049	-653	3.9	3.5	-0.3

February 9, 2015

Children Tested for Lead Poisoning -- Comparing CY2013 and CY2014

All Counties in Michigan

Children One and Two Years of Age

		Children Tested					BLLs >= 5 ug/dL					
		Number		Percentage			Number			Percentage		
County	Kids 1 & 2	CY2013	CY2014	CY2013	CY2014	Δ	CY2013	CY2014	Δ	CY2013	CY2014	Δ
Alcona	130	39	43	30.0	33.1	3.1	1	2	1	2.6	4.7	2.1
Alger	130	65	76	50.0	58.5	8.5	1	2	1	1.5	2.6	1.1
Allegan	2,888	758	861	26.2	29.8	3.6	26	24	-2	3.4	2.8	-0.6
Alpena	570	254	213	44.6	37.4	-7.2	6	7	1	2.4	3.3	0.9
Antrim	450	175	188	38.9	41.8	2.9	4	2	-2	2.3	1.1	-1.2
Arenac	281	127	131	45.2	46.6	1.4	1	1	0	0.8	0.8	0.0
Baraga	165	96	90	58.2	54.5	-3.6	0	0	0	0.0	0.0	0.0
Barry	1,328	368	381	27.7	28.7	1.0	8	16	8	2.2	4.2	2.0
Bay	2,410	1,238	1,185	51.4	49.2	-2.2	64	37	-27	5.2	3.1	-2.0
Benzie	338	135	174	39.9	51.5	11.5	5	2	-3	3.7	1.1	-2.6
Berrien	3,855	1,323	1,581	34.3	41.0	6.7	52	48	-4	3.9	3.0	-0.9
Branch	1,157	298	231	25.8	20.0	-5.8	21	7	-14	7.0	3.0	-4.0
Calhoun	3,366	1,184	1,309	35.2	38.9	3.7	40	60	20	3.4	4.6	1.2
Cass	1,120	373	360	33.3	32.1	-1.2	15	11	-4	4.0	3.1	-1.0
Charlevoix	523	208	208	39.8	39.8	0.0	0	1	1	0.0	0.5	0.5
Cheboygan	457	205	213	44.9	46.6	1.8	2	5	3	1.0	2.3	1.4
Chippewa	775	244	261	31.5	33.7	2.2	3	3	0	1.2	1.1	-0.1
Clare	700	332	356	47.4	50.9	3.4	1	4	3	0.3	1.1	0.8
Clinton	1,650	312	323	18.9	19.6	0.7	5	4	-1	1.6	1.2	-0.4
Crawford	237	72	65	30.4	27.4	-3.0	5	1	-4	6.9	1.5	-5.4
Delta	782	368	349	47.1	44.6	-2.4	15	16	1	4.1	4.6	0.5
Dickinson	529	272	274	51.4	51.8	0.4	6	1	-5	2.2	0.4	-1.8
Eaton	2,410	727	748	30.2	31.0	0.9	8	16	8	1.1	2.1	1.0
Emmet	656	232	259	35.4	39.5	4.1	2	0	-2	0.9	0.0	-0.9
Genesee	10,583	4,566	4,207	43.1	39.8	-3.4	116	114	-2	2.5	2.7	0.2
Gladwin	486	172	192	35.4	39.5	4.1	2	0	-2	1.2	0.0	-1.2
Gogebic	285	143	110	50.2	38.6	-11.6	3	1	-2	2.1	0.9	-1.2
Grand Traverse	1,955	558	884	28.5	45.2	16.7	23	6	-17	4.1	0.7	-3.4
Gratiot	909	307	347	33.8	38.2	4.4	5	3	-2	1.6	0.9	-0.8
Hillsdale	1,079	353	388	32.7	36.0	3.2	15	10	-5	4.2	2.6	-1.7
Houghton	828	455	499	55.0	60.3	5.3	22	12	-10	4.8	2.4	-2.4
Huron	607	222	226	36.6	37.2	0.7	14	8	-6	6.3	3.5	-2.8
Ingham	6,426	2,771	2,782	43.1	43.3	0.2	132	83	-49	4.8	3.0	-1.8
Ionia	1,590	650	622	40.9	39.1	-1.8	10	24	14	1.5	3.9	2.3
Iosco	397	103	124	25.9	31.2	5.3	1	3	2	1.0	2.4	1.4
Iron	193	109	119	56.5	61.7	5.2	3	2	-1	2.8	1.7	-1.1
Isabella	1,392	458	458	32.9	32.9	0.0	3	4	1	0.7	0.9	0.2
Jackson	3,716	2,104	1,990	56.6	53.6	-3.1	148	119	-29	7.0	6.0	-1.1
Kalamazoo	6,166	2,109	1,856	34.2	30.1	-4.1	89	51	-38	4.2	2.7	-1.5
Kalkaska	395	121	136	30.6	34.4	3.8	3	1	-2	2.5	0.7	-1.7
Kent	17,514	8,360	8,047	47.7	45.9	-1.8	435	370	-65	5.2	4.6	-0.6
Keweenaw	39	23	21	59.0	53.8	-5.1	2	2	0	8.7	9.5	0.8
Lake	192	90	85	46.9	44.3	-2.6	0	1	1	0.0	1.2	1.2
Lapeer	1,780	735	696	41.3	39.1	-2.2	32	25	-7	4.4	3.6	-0.8
Leelanau	350	114	167	32.6	47.7	15.1	5	4	-1	4.4	2.4	-2.0

Draft

Children Tested for Lead Poisoning -- Comparing CY2013 and CY2014

All Counties in Michigan

Children One and Two Years of Age

		Children Tested					BLLs >= 5 ug/dL					
		Number		Percentage			Number			Percentage		
County	Kids 1 & 2	CY2013	CY2014	CY2013	CY2014	Δ	CY2013	CY2014	Δ	CY2013	CY2014	Δ
Lenawee	2,248	959	694	42.7	30.9	-11.8	51	74	23	5.3	10.7	5.3
Livingston	3,871	826	740	21.3	19.1	-2.2	9	9	0	1.1	1.2	0.1
Luce	121	69	79	57.0	65.3	8.3	1	0	-1	1.4	0.0	-1.4
Mackinac	193	88	109	45.6	56.5	10.9	5	1	-4	5.7	0.9	-4.8
Macomb	19,051	6,319	6,008	33.2	31.5	-1.6	95	80	-15	1.5	1.3	-0.2
Manistee	411	216	247	52.6	60.1	7.5	14	12	-2	6.5	4.9	-1.6
Marquette	1,364	432	406	31.7	29.8	-1.9	19	11	-8	4.4	2.7	-1.7
Mason	620	116	109	18.7	17.6	-1.1	6	5	-1	5.2	4.6	-0.6
Mecosta	851	269	269	31.6	31.6	0.0	4	2	-2	1.5	0.7	-0.7
Menominee	442	206	217	46.6	49.1	2.5	9	16	7	4.4	7.4	3.0
Midland	1,842	291	292	15.8	15.9	0.1	4	2	-2	1.4	0.7	-0.7
Missaukee	359	102	112	28.4	31.2	2.8	0	1	1	0.0	0.9	0.9
Monroe	3,378	1,252	1,133	37.1	33.5	-3.5	27	15	-12	2.2	1.3	-0.8
Montcalm	1,493	422	479	28.3	32.1	3.8	7	10	3	1.7	2.1	0.4
Montmorency	131	64	63	48.9	48.1	-0.8	0	1	1	0.0	1.6	1.6
Muskegon	4,384	1,708	1,618	39.0	36.9	-2.1	95	101	6	5.6	6.2	0.7
Newaygo	1,172	358	389	30.5	33.2	2.6	3	7	4	0.8	1.8	1.0
Oakland	27,292	7,686	7,772	28.2	28.5	0.3	137	125	-12	1.8	1.6	-0.2
Oceana	685	252	278	36.8	40.6	3.8	7	5	-2	2.8	1.8	-1.0
Ogemaw	413	76	81	18.4	19.6	1.2	2	0	-2	2.6	0.0	-2.6
Ontonagon	82	37	31	45.1	37.8	-7.3	0	2	2	0.0	6.5	6.5
Osceola	564	259	255	45.9	45.2	-0.7	7	9	2	2.7	3.5	0.8
Oscoda	168	33	16	19.6	9.5	-10.1	0	1	1	0.0	6.3	6.3
Otsego	540	187	195	34.6	36.1	1.5	0	0	0	0.0	0.0	0.0
Ottawa	7,046	2,510	2,542	35.6	36.1	0.5	75	69	-6	3.0	2.7	-0.3
Presque Isle	193	86	88	44.6	45.6	1.0	0	2	2	0.0	2.3	2.3
Roscommon	379	180	172	47.5	45.4	-2.1	4	0	-4	2.2	0.0	-2.2
Saginaw	4,623	2,784	2,722	60.2	58.9	-1.3	93	85	-8	3.3	3.1	-0.2
Saint Clair	3,574	1,223	1,306	34.2	36.5	2.3	75	37	-38	6.1	2.8	-3.3
Saint Joseph	1,684	645	680	38.3	40.4	2.1	28	26	-2	4.3	3.8	-0.5
Sanilac	949	267	281	28.1	29.6	1.5	11	4	-7	4.1	1.4	-2.7
Schoolcraft	151	76	76	50.3	50.3	0.0	0	0	0	0.0	0.0	0.0
Shiawassee	1,503	758	732	50.4	48.7	-1.7	33	30	-3	4.4	4.1	-0.3
Tuscola	1,174	585	633	49.8	53.9	4.1	14	10	-4	2.4	1.6	-0.8
Van Buren	1,924	525	498	27.3	25.9	-1.4	12	16	4	2.3	3.2	0.9
Washtenaw	7,560	1,813	1,799	24.0	23.8	-0.2	32	23	-9	1.8	1.3	-0.5
Wayne ex Det	26,966	10,469	9,537	38.8	35.4	-3.5	277	211	-66	2.6	2.2	-0.4
Wexford	865	255	305	29.5	35.3	5.8	8	3	-5	3.1	1.0	-2.2
Detroit, City of	20,048	10,520	9,648	52.5	48.1	-4.3	1077	985	-92	10.2	10.2	0.0
MICHIGAN	234,103	88,851	86,446	38.0	36.9	-1.0	3,595	3,103	-492	4.0	3.2	-0.9

February 9, 2015

From: Scott, Robert L. (DCH)
Sent: Tuesday, March 03, 2015 1:05 PM
To: Peeler, Nancy (DCH)
Cc: Emily Houk R2P (emily@r2pconsultants.com);Lishinski Karen (LishinskiK@michigan.gov);Howard, Javier (DCH)
Subject: RE: data for Emily??
Attachments: MI BLL5 map 2014.pdf; MI BLL5 map 2014.tif

Emily,

Please see attached map as pdf and tiff.

20% of children less than six years of age were tested for lead poisoning in CY2014.
Of those tested, 5058 children were identified with blood lead levels >= 5 ug/dL (3.5%).

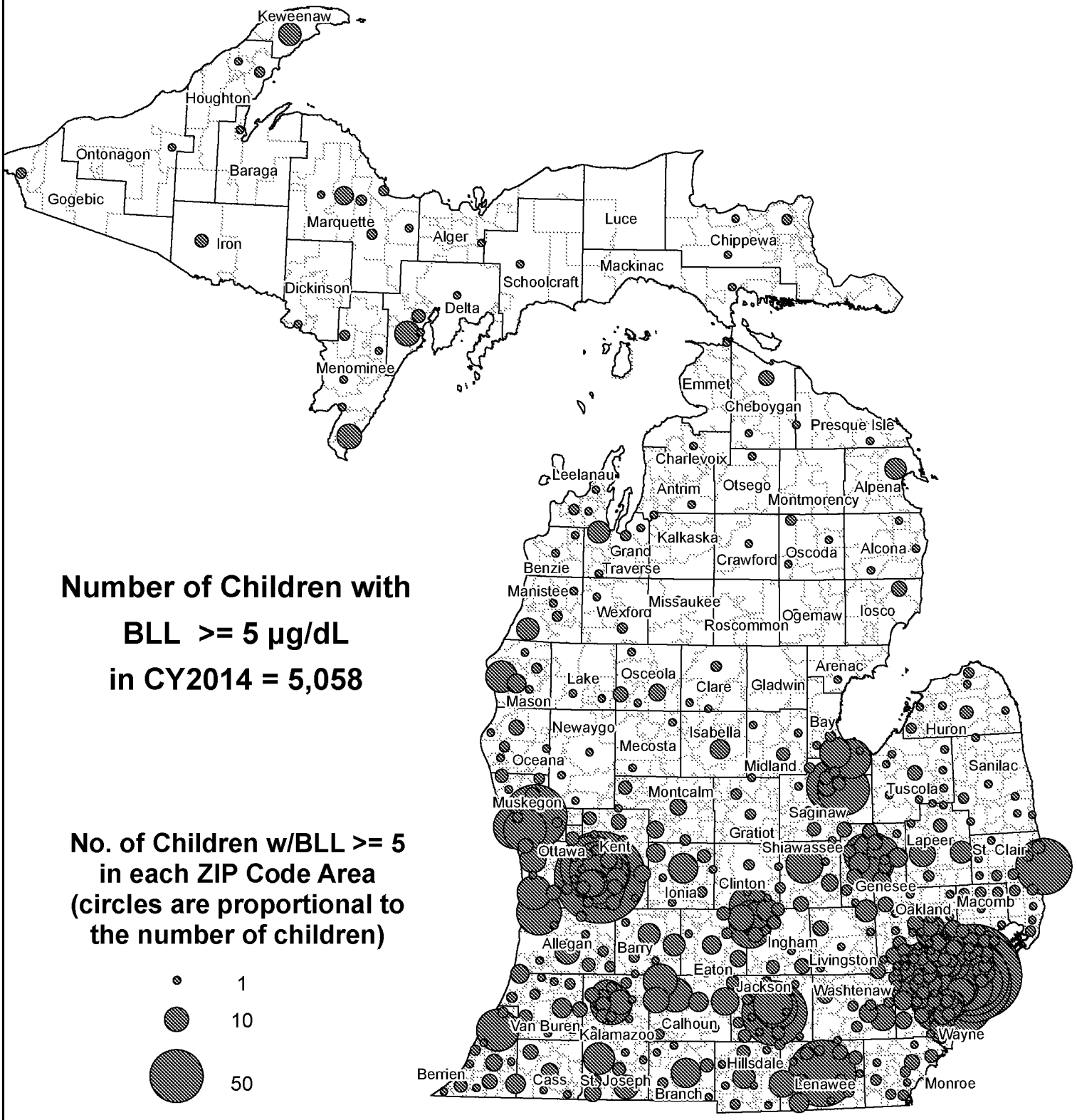
Please let me know if you need anything else, or if you want any changes to the map, or exported in a different format.

Bob

From: Peeler, Nancy (DCH)
Sent: Tuesday, March 03, 2015 1:02 PM
To: Scott, Robert L. (DCH)
Cc: Emily Houk R2P (emily@r2pconsultants.com)
Subject: data for Emily??

Bob, were you able to send data to Emily yet?

Children less than Six years of Age with Blood Lead Levels (BLL) >= 5 µg/dL Calendar Year 2014



Number of Children with BLL >= 5 µg/dL in CY2014 = 5,058

No. of Children w/BLL >= 5 in each ZIP Code Area (circles are proportional to the number of children)

1

10

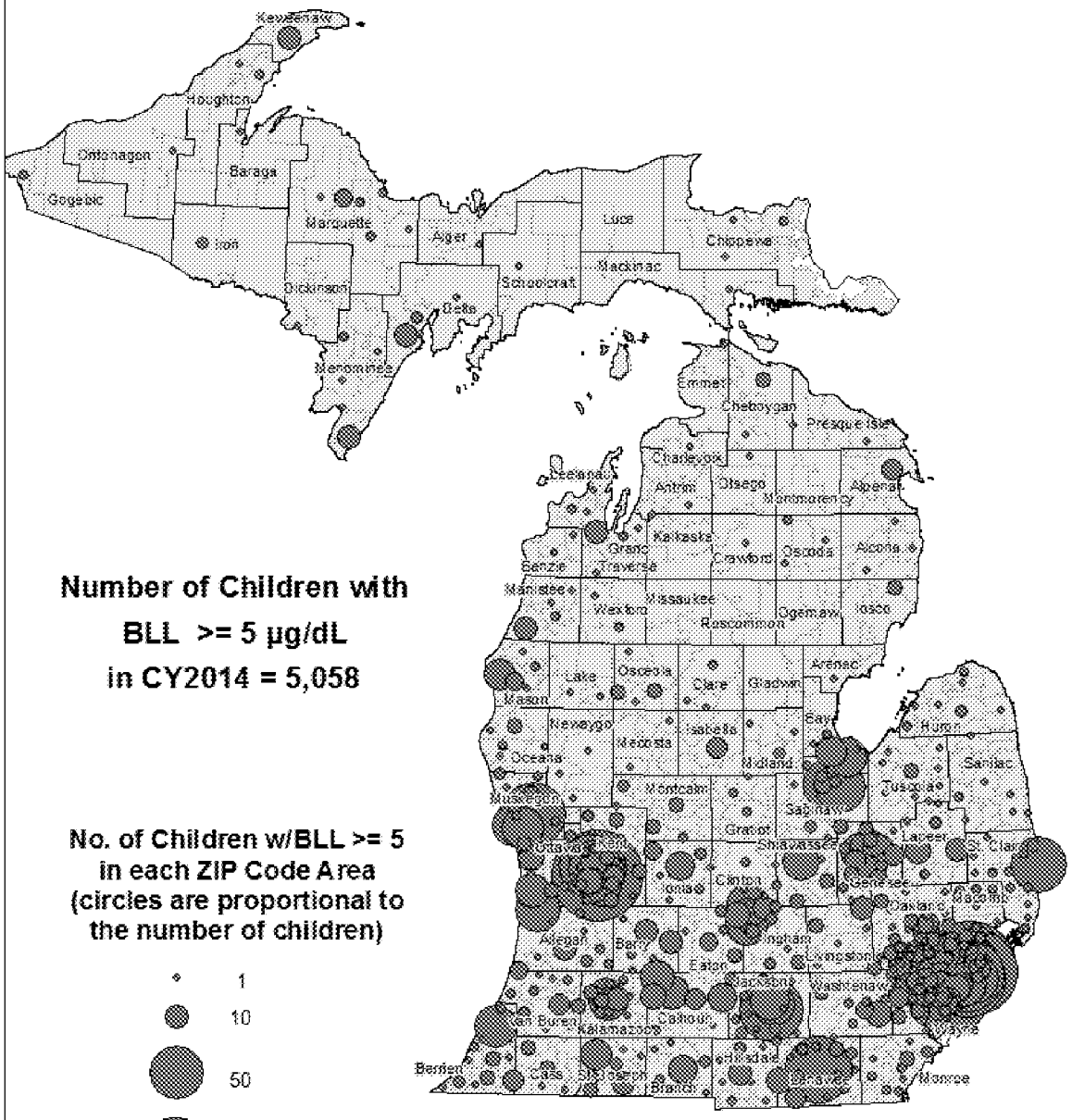
50

100

March 3, 2015

Source: MDCH CLPPP surveillance database

Children less than Six years of Age with Blood Lead Levels (BLL) >= 5 µg/dL Calendar Year 2014



Number of Children with BLL >= 5 µg/dL in CY2014 = 5,058

No. of Children w/BLL >= 5 in each ZIP Code Area (circles are proportional to the number of children)

1

10

50

100

March 3, 2015

Source: MDCH CLPPP surveillance database

From: Scott, Robert L. (DCH)
Sent: Tuesday, May 19, 2015 9:39 AM
To: Vasquez, Monica A
Subject: RE: Lead testing levels for oakland county
Attachments: 2014 Annual BLL report preliminary 020915.pdf; CLPPP 2013 Data Report.pdf

Monica,

Please see attached for 2014 and 2013. The three previous years' annual reports are available on our website: www.michigan.gov/lead Click on Policy & Research, then click on Data and Research.

Let me know if you have questions.

Bob

From: Vasquez, Monica A [mailto:vasquezm@oakgov.com]
Sent: Monday, May 18, 2015 10:29 AM
To: Scott, Robert L. (DCH)
Subject: Lead testing levels for oakland county

Can you send me the lead testing levels for Oakland County's 1-2 year olds? If you have the last five years that would be great.

Thanks so much,

Mó

OAKLAND COUNTY MICHIGAN
HEALTH DIVISION
OakGov.com/Health

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OAKLAND COUNTY HEALTH DIVISION

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Children Tested for Lead Poisoning -- Calendar Year 2014
All Counties in Michigan

Children less than Six Years of Age

				Children Tested		Children Tested, by Highest Blood Lead Level (BLL)							
County	%Pre-1950 Housing	%Pre-1978 Housing	Children less than Six Years of Age	Number of Children Tested	% Tested	<5 ug/dL (capillary or venous)	5 to 9 ug/dL (capillary or venous)	Capillary >= 10 ug/dL, not confirmed by venous	Confirmed 10-14 ug/dL (venous only)	Confirmed 15-44 ug/dL (venous only)	Confirmed ≥45 ug/dL (venous only)	Total ≥ 5 µg/dL	% with BLL >= 5 ug/dL
Alcona	12.4	61.5	398	53	13.3	51	2	0	0	0	0	2	3.8
Alger	29.5	64.1	427	92	21.5	90	1	0	1	0	0	2	2.2
Allegan	23.2	51.1	8,806	1,204	13.7	1,173	29	2	0	0	0	31	2.6
Alpena	25.3	71.6	1,758	257	14.6	248	8	1	0	0	0	9	3.5
Antrim	18.8	52.6	1,370	260	19.0	258	2	0	0	0	0	2	0.8
Arenac	19.8	58.2	870	183	21.0	182	1	0	0	0	0	1	0.5
Baraga	34.0	71.7	477	135	28.3	134	1	0	0	0	0	1	0.7
Barry	27.1	57.3	4,143	490	11.8	467	22	0	0	0	0	23	4.7
Bay	33.9	75.6	7,322	1,408	19.2	1,358	46	2	3	4	1	50	3.6
Benzie	18.6	46.3	1,041	268	25.7	266	2	0	0	0	0	2	0.7
Berrien	28.6	72.2	11,681	1,942	16.6	1,883	45	5	4	5	0	59	3.0
Branch	30.9	65.3	3,506	668	19.1	645	19	1	3	0	0	23	3.4
Calhoun	36.1	75.3	10,149	2,390	23.5	2,290	87	0	7	6	0	100	4.2
Cass	22.4	59.9	3,444	424	12.3	412	10	1	1	0	0	12	2.8
Charlevoix	25.3	54.4	1,624	295	18.2	294	1	0	0	0	0	1	0.3
Cheboygan	20.9	53.5	1,414	285	20.2	279	6	0	0	0	0	6	2.1
Chippewa	25.1	58.6	2,345	440	18.8	436	4	0	0	0	0	4	0.9
Clare	14.5	58.8	2,083	445	21.4	441	4	0	0	0	0	4	0.9
Clinton	22.5	52.8	5,140	584	11.4	578	6	0	0	0	0	6	1.0
Crawford	13.7	55.6	727	83	11.4	82	1	0	0	0	0	1	1.2
Delta	33.3	68.0	2,388	413	17.3	397	15	0	0	1	0	16	3.9
Dickinson	38.9	71.7	1,575	318	20.2	317	1	0	0	0	0	1	0.3
Eaton	20.4	56.4	7,356	1,140	15.5	1,113	24	3	0	0	0	27	2.4
Emmet	23.0	48.3	2,042	362	17.7	362	0	0	0	0	0	0	0.0
Genesee	19.9	68.0	31,997	6,765	21.1	6,591	149	11	9	5	0	174	2.6
Gladwin	12.4	49.5	1,495	291	19.5	291	0	0	0	0	0	0	0.0
Gogebic	50.0	76.7	855	154	18.0	152	2	0	0	0	0	2	1.3
Grand Traverse	14.7	43.5	6,000	1,370	22.8	1,358	9	3	0	0	0	12	0.9
Gratiot	34.7	69.8	2,754	496	18.0	491	5	0	0	0	0	5	1.0
Hillsdale	36.5	63.2	3,283	814	24.8	795	17	2	0	0	0	19	2.3
Houghton	53.4	75.5	2,477	599	24.2	585	10	0	2	2	0	14	2.3
Huron	31.8	68.9	1,873	393	21.0	381	11	0	1	0	0	12	3.1
Ingham	24.9	68.2	19,248	4,747	24.7	4,606	119	5	11	6	0	141	3.0
Ionia	35.8	63.0	4,878	842	17.3	815	24	2	0	1	0	27	3.2
Iosco	12.7	65.6	1,233	150	12.2	146	4	0	0	0	0	4	2.7
Iron	44.1	72.1	573	138	24.1	135	3	0	0	0	0	3	2.2
Isabella	16.3	48.2	4,208	639	15.2	631	8	0	0	0	0	8	1.3
Jackson	33.0	67.9	11,296	2,751	24.4	2,596	133	15	3	4	0	155	5.6
Kalamazoo	22.5	62.6	18,588	3,260	17.5	3,174	72	7	4	2	1	86	2.6
Kalkaska	13.2	49.3	1,180	217	18.4	216	1	0	0	0	0	1	0.5
Kent	24.8	59.2	52,655	10,125	19.2	9,655	414	8	22	26	0	470	4.6
Keweenaw	46.9	77.6	115	24	20.9	22	2	0	0	0	0	2	8.3
Lake	12.5	52.6	585	120	20.5	118	2	0	0	0	0	2	1.7
Lapeer	20.4	52.9	5,687	919	16.2	890	25	3	0	1	0	29	3.2

Draft

Children Tested for Lead Poisoning -- Calendar Year 2014
All Counties in Michigan

Children less than Six Years of Age

				Children Tested		Children Tested, by Highest Blood Lead Level (BLL)							
County	%Pre-1950 Housing	%Pre-1978 Housing	Children less than Six Years of Age	Number of Children Tested	% Tested	<5 ug/dL (capillary or venous)	5 to 9 ug/dL (capillary or venous)	Capillary >= 10 ug/dL, not confirmed by venous	Confirmed 10-14 ug/dL (venous only)	Confirmed 15-44 ug/dL (venous only)	Confirmed ≥45 ug/dL (venous only)	Total ≥ 5 µg/dL	% with BLL >= 5 ug/dL
Leelanau	17.9	46.5	1,111	239	21.5	234	4	1	0	0	0	5	2.1
Lenawee	33.6	67.2	6,911	1,212	17.5	1,090	99	16	3	4	0	122	10.1
Livingston	11.4	39.0	12,104	1,027	8.5	1,018	8	0	1	0	0	9	0.9
Luce	23.8	64.3	370	88	23.8	88	0	0	0	0	0	0	0.0
Mackinac	23.4	58.6	587	130	22.1	129	1	0	0	0	0	1	0.8
Macomb	9.3	59.1	57,878	9,471	16.4	9,343	111	6	2	7	2	128	1.4
Manistee	28.8	63.9	1,307	285	21.8	272	11	0	0	2	0	13	4.6
Marquette	27.9	69.4	4,029	471	11.7	458	11	2	0	0	0	13	2.8
Mason	32.1	64.6	1,864	414	22.2	387	27	0	0	0	0	27	6.5
Mecosta	18.2	53.4	2,520	316	12.5	314	0	0	0	2	0	2	0.6
Menominee	35.4	73.2	1,375	262	19.1	246	14	1	0	1	0	16	6.1
Midland	15.2	58.7	5,685	475	8.4	470	4	0	1	0	0	5	1.1
Missaukee	21.2	56.2	1,111	133	12.0	132	0	0	1	0	0	1	0.8
Monroe	23.0	59.0	10,355	1,568	15.1	1,550	16	1	1	0	0	18	1.1
Montcalm	27.3	57.7	4,527	743	16.4	730	11	0	1	1	0	13	1.7
Montmorency	18.1	58.6	404	83	20.5	82	1	0	0	0	0	1	1.2
Muskegon	25.8	66.2	13,224	2,547	19.3	2,395	124	13	10	5	0	152	6.0
Newaygo	19.3	53.6	3,581	449	12.5	442	6	1	0	0	0	7	1.6
Oakland	14.7	60.5	83,501	14,258	17.1	14,052	165	8	20	13	0	206	1.4
Oceana	25.8	57.8	2,091	524	25.1	514	7	0	3	0	0	10	1.9
Ogemaw	12.8	61.6	1,289	102	7.9	101	1	0	0	0	0	1	1.0
Ontonagon	39.1	73.2	251	48	19.1	46	2	0	0	0	0	2	4.2
Osceola	22.6	56.6	1,723	334	19.4	324	6	0	2	2	0	10	3.0
Oscoda	17.8	62.1	521	34	6.5	31	2	1	0	0	0	3	8.8
Otsego	12.2	50.3	1,641	325	19.8	324	1	0	0	0	0	1	0.3
Ottawa	15.7	45.3	21,390	3,002	14.0	2,921	75	5	1	0	0	81	2.7
Presque Isle	21.1	66.3	597	111	18.6	109	2	0	0	0	0	2	1.8
Roscommon	13.1	58.7	1,156	220	19.0	220	0	0	0	0	0	0	0.0
Saginaw	28.1	73.1	14,029	3,668	26.1	3,547	100	8	7	6	0	121	3.3
Saint Clair	25.8	59.4	11,046	2,726	24.7	2,650	61	7	5	3	0	76	2.8
Saint Joseph	27.5	65.1	5,125	1,012	19.7	971	34	4	2	1	0	41	4.1
Sanilac	30.7	64.6	2,879	523	18.2	517	5	0	1	0	0	6	1.1
Schoolcraft	25.5	63.3	471	99	21.0	98	1	0	0	0	0	1	1.0
Shiawassee	33.9	68.2	4,622	1,167	25.2	1,129	34	2	2	0	0	38	3.3
Tuscola	30.2	67.4	3,579	885	24.7	873	10	0	2	0	0	12	1.4
Van Buren	23.3	58.1	5,884	862	14.6	832	26	1	1	2	0	30	3.5
Washtenaw	17.2	56.5	22,833	2,604	11.4	2,572	25	2	2	3	0	32	1.2
Wayne ex Det	22.6	74.5	82,002	18,021	22.0	17,636	327	12	31	15	0	385	2.1
Wexford	23.0	53.7	2,582	362	14.0	359	1	0	0	2	0	3	0.8
Detroit, City of	62.2	93.2	59,755	23,135	38.7	21,229	1,483	51	215	153	4	1,906	8.2
MICHIGAN	24.7	64.8	710,976	142,888	20.1	137,839	4,157	213	386	285	8	5,049	3.5

February 9, 2015

Sources: US Census Bureau, Census 2010 (Pre-1950 Housing and Pre-1978 Housing) and American Community Survey 2013 5-year estimates (Detroit and county populations);

Children Tested for Lead Poisoning -- Calendar Year 2014
All Counties in Michigan

Children One and Two Years of Age

				Children Tested		Children Tested, by Highest Blood Lead Level (BLL)							
County	%Pre-1950 Housing	%Pre-1978 Housing	Children One and Two Years of Age	Number of Children Tested	% Tested	<5 ug/dL (capillary or venous)	5 to 9 ug/dL (capillary or venous)	Capillary >= 10 ug/dL, not confirmed by venous	Confirmed 10-14 ug/dL (venous only)	Confirmed 15-44 ug/dL (venous only)	Confirmed ≥45 ug/dL (venous only)	Total ≥ 5 µg/dL	% with BLL >= 5 ug/dL
Alcona	12.4	61.5	130	43	33.1	41	2	0	0	0	0	2	4.7
Alger	29.5	64.1	130	76	58.5	74	1	0	1	0	0	2	2.6
Allegan	23.2	51.1	2,888	861	29.8	837	22	2	0	0	0	24	2.8
Alpena	25.3	71.6	570	213	37.4	206	7	0	0	0	0	7	3.3
Antrim	18.8	52.6	450	188	41.8	186	2	0	0	0	0	2	1.1
Arenac	19.8	58.2	281	131	46.6	130	1	0	0	0	0	1	0.8
Baraga	34.0	71.7	165	90	54.5	90	0	0	0	0	0	0	0.0
Barry	27.1	57.3	1,328	381	28.7	365	15	0	1	0	0	16	4.2
Bay	33.9	75.6	2,410	1,185	49.2	1,148	30	2	3	2	0	37	3.1
Benzie	18.6	46.3	338	174	51.5	172	2	0	0	0	0	2	1.1
Berrien	28.6	72.2	3,855	1,581	41.0	1,533	36	5	3	4	0	48	3.0
Branch	30.9	65.3	1,157	231	20.0	224	6	0	1	0	0	7	3.0
Calhoun	36.1	75.3	3,366	1,309	38.9	1,249	52	1	4	3	0	60	4.6
Cass	22.4	59.9	1,120	360	32.1	349	9	1	1	0	0	11	3.1
Charlevoix	25.3	54.4	523	208	39.8	207	1	0	0	0	0	1	0.5
Cheboygan	20.9	53.5	457	213	46.6	208	5	0	0	0	0	5	2.3
Chippewa	25.1	58.6	775	261	33.7	258	3	0	0	0	0	3	1.1
Clare	14.5	58.8	700	356	50.9	352	4	0	0	0	0	4	1.1
Clinton	22.5	52.8	1,650	323	19.6	319	4	0	0	0	0	4	1.2
Crawford	13.7	55.6	237	65	27.4	64	1	0	0	0	0	1	1.5
Delta	33.3	68.0	782	349	44.6	333	15	0	0	1	0	16	4.6
Dickinson	38.9	71.7	529	274	51.8	273	1	0	0	0	0	1	0.4
Eaton	20.4	56.4	2,410	748	31.0	732	13	3	0	0	0	16	2.1
Emmet	23.0	48.3	656	259	39.5	259	0	0	0	0	0	0	0.0
Genesee	19.9	68.0	10,583	4,207	39.8	4,093	97	9	5	3	0	114	2.7
Gladwin	12.4	49.5	486	192	39.5	192	0	0	0	0	0	0	0.0
Gogebic	50.0	76.7	285	110	38.6	109	1	0	0	0	0	1	0.9
Grand Traverse	14.7	43.5	1,955	884	45.2	878	5	1	0	0	0	6	0.7
Gratiot	34.7	69.8	909	347	38.2	344	3	0	0	0	0	3	0.9
Hillsdale	36.5	63.2	1,079	388	36.0	378	8	2	0	0	0	10	2.6
Houghton	53.4	75.5	828	499	60.3	487	8	0	2	2	0	12	2.4
Huron	31.8	68.9	607	226	37.2	218	8	0	0	0	0	8	3.5
Ingham	24.9	68.2	6,426	2,782	43.3	2,699	70	5	6	2	0	83	3.0
Ionia	35.8	63.0	1,590	622	39.1	598	21	2	0	1	0	24	3.9
Iosco	12.7	65.6	397	124	31.2	121	3	0	0	0	0	3	2.4
Iron	44.1	72.1	193	119	61.7	117	2	0	0	0	0	2	1.7
Isabella	16.3	48.2	1,392	458	32.9	454	4	0	0	0	0	4	0.9
Jackson	33.0	67.9	3,716	1,990	53.6	1,871	105	9	2	3	0	119	6.0
Kalamazoo	22.5	62.6	6,166	1,856	30.1	1,805	42	4	3	1	1	51	2.7
Kalkaska	13.2	49.3	395	136	34.4	135	1	0	0	0	0	1	0.7
Kent	24.8	59.2	17,514	8,047	45.9	7,677	325	5	19	21	0	370	4.6
Keweenaw	46.9	77.6	39	21	53.8	19	2	0	0	0	0	2	9.5
Lake	12.5	52.6	192	85	44.3	84	1	0	0	0	0	1	1.2
Lapeer	20.4	52.9	1,780	696	39.1	671	22	2	0	1	0	25	3.6

Draft

Children Tested for Lead Poisoning -- Calendar Year 2014
All Counties in Michigan

Children One and Two Years of Age

				Children Tested		Children Tested, by Highest Blood Lead Level (BLL)							
County	%Pre-1950 Housing	%Pre-1978 Housing	Children One and Two Years of Age	Number of Children Tested	% Tested	<5 ug/dL (capillary or venous)	5 to 9 ug/dL (capillary or venous)	Capillary >= 10 ug/dL, not confirmed by venous	Confirmed 10-14 ug/dL (venous only)	Confirmed 15-44 ug/dL (venous only)	Confirmed ≥45 ug/dL (venous only)	Total ≥ 5 µg/dL	% with BLL >= 5 ug/dL
Leelanau	17.9	46.5	350	167	47.7	163	3	1	0	0	0	4	2.4
Lenawee	33.6	67.2	2,248	694	30.9	620	63	6	2	3	0	74	10.7
Livingston	11.4	39.0	3,871	740	19.1	731	8	0	1	0	0	9	1.2
Luce	23.8	64.3	121	79	65.3	79	0	0	0	0	0	0	0.0
Mackinac	23.4	58.6	193	109	56.5	108	1	0	0	0	0	1	0.9
Macomb	9.3	59.1	19,051	6,008	31.5	5,928	69	5	2	3	1	80	1.3
Manistee	28.8	63.9	411	247	60.1	235	10	0	0	2	0	12	4.9
Marquette	27.9	69.4	1,364	406	29.8	395	10	1	0	0	0	11	2.7
Mason	32.1	64.6	620	109	17.6	104	5	0	0	0	0	5	4.6
Mecosta	18.2	53.4	851	269	31.6	267	0	0	1	1	0	2	0.7
Menominee	35.4	73.2	442	217	49.1	201	14	1	0	1	0	16	7.4
Midland	15.2	58.7	1,842	292	15.9	290	2	0	0	0	0	2	0.7
Missaukee	21.2	56.2	359	112	31.2	111	0	0	1	0	0	1	0.9
Monroe	23.0	59.0	3,378	1,133	33.5	1,118	13	1	1	0	0	15	1.3
Montcalm	27.3	57.7	1,493	479	32.1	469	8	0	1	1	0	10	2.1
Montmorency	18.1	58.6	131	63	48.1	62	1	0	0	0	0	1	1.6
Muskegon	25.8	66.2	4,384	1,618	36.9	1,517	80	9	7	5	0	101	6.2
Newaygo	19.3	53.6	1,172	389	33.2	382	6	1	0	0	0	7	1.8
Oakland	14.7	60.5	27,292	7,772	28.5	7,647	100	7	10	8	0	125	1.6
Oceana	25.8	57.8	685	278	40.6	273	4	0	1	0	0	5	1.8
Ogemaw	74.0	61.6	413	81	19.6	81	0	0	0	0	0	0	0.0
Ontonagon	39.1	73.2	82	31	37.8	29	2	0	0	0	0	2	6.5
Osceola	22.6	56.6	564	255	45.2	246	5	0	3	1	0	9	3.5
Oscoda	17.8	62.1	168	16	9.5	15	1	0	0	0	0	1	6.3
Otsego	12.2	50.3	540	195	36.1	195	0	0	0	0	0	0	0.0
Ottawa	15.7	45.3	7,046	2,542	36.1	2,473	63	5	1	0	0	69	2.7
Presque Isle	21.1	66.3	193	88	45.6	86	2	0	0	0	0	2	2.3
Roscommon	13.1	58.7	379	172	45.4	172	0	0	0	0	0	0	0.0
Saginaw	28.1	73.1	4,623	2,722	58.9	2,637	70	5	5	5	0	85	3.1
Saint Clair	25.8	59.4	3,574	1,306	36.5	1,269	29	3	3	2	0	37	2.8
Saint Joseph	27.5	65.1	1,684	680	40.4	654	20	3	2	1	0	26	3.8
Sanilac	30.7	64.6	949	281	29.6	277	3	0	1	0	0	4	1.4
Schoolcraft	25.5	63.3	151	76	50.3	76	0	0	0	0	0	0	0.0
Shiawassee	33.9	68.2	1,503	732	48.7	702	27	1	2	0	0	30	4.1
Tuscola	30.2	67.4	1,174	633	53.9	623	9	0	1	0	0	10	1.6
Van Buren	23.3	58.1	1,924	498	25.9	482	13	1	0	2	0	16	3.2
Washtenaw	17.2	56.5	7,560	1,799	23.8	1,776	16	2	2	3	0	23	1.3
Wayne ex Det	22.6	74.5	26,966	9,537	35.4	9,326	183	6	17	5	0	211	2.2
Wexford	23.0	53.7	865	305	35.3	302	1	0	0	2	0	3	1.0
Detroit, City of	62.2	93.2	20,048	9,648	48.1	8,663	751	26	114	94	0	985	10.2
MICHIGAN	24.7	64.8	234,103	86,446	36.9	83,343	2,552	137	229	183	2	3,103	3.6

February 9, 2015

Sources: US Census Bureau, Census 2010 (Pre-1950 Housing and Pre-1978 Housing) and American Community Survey 2013 5-year estimates (Detroit and county populations);

Children Tested for Lead Poisoning -- Comparing CY2013 and CY2014

All Counties in Michigan

Children less than Six Years of Age

		Children Tested					BLLs >= 5 ug/dL					
		Number		Percentage			Number			Percentage		
County	Kids<6	CY2013	CY2014	CY2013	CY2014	Δ	CY2013	CY2014	Δ	CY2013	CY2014	Δ
Alcona	398	51	53	12.8	13.3	0.5	1	2	1	2.0	3.8	1.8
Alger	427	76	92	17.8	21.5	3.7	1	2	1	1.3	2.2	0.9
Allegan	8,806	1,159	1,204	13.2	13.7	0.5	35	31	-4	3.0	2.6	-0.4
Alpena	1,758	302	257	17.2	14.6	-2.6	7	9	2	2.3	3.5	1.2
Antrim	1,370	258	260	18.8	19.0	0.1	6	2	-4	2.3	0.8	-1.6
Arenac	870	163	183	18.7	21.0	2.3	2	1	-1	1.2	0.5	-0.7
Baraga	477	128	135	26.8	28.3	1.5	1	1	0	0.8	0.7	0.0
Barry	4,143	465	490	11.2	11.8	0.6	12	23	11	2.6	4.7	2.1
Bay	7,322	1,421	1,408	19.4	19.2	-0.2	71	50	-21	5.0	3.6	-1.4
Benzie	1,041	231	268	22.2	25.7	3.6	6	2	-4	2.6	0.7	-1.9
Berrien	11,681	1,728	1,942	14.8	16.6	1.8	64	59	-5	3.7	3.0	-0.7
Branch	3,506	765	668	21.8	19.1	-2.8	39	23	-16	5.1	3.4	-1.7
Calhoun	10,149	1,970	2,390	19.4	23.5	4.1	68	100	32	3.5	4.2	0.7
Cass	3,444	458	424	13.3	12.3	-1.0	20	12	-8	4.4	2.8	-1.5
Charlevoix	1,624	297	295	18.3	18.2	-0.1	2	1	-1	0.7	0.3	-0.3
Cheboygan	1,414	266	285	18.8	20.2	1.3	2	6	4	0.8	2.1	1.4
Chippewa	2,345	435	440	18.6	18.8	0.2	5	4	-1	1.1	0.9	-0.2
Clare	2,083	414	445	19.9	21.4	1.5	3	4	1	0.7	0.9	0.2
Clinton	5,140	565	584	11.0	11.4	0.4	12	6	-6	2.1	1.0	-1.1
Crawford	727	87	83	12.0	11.4	-0.6	6	1	-5	6.9	1.2	-5.7
Delta	2,388	453	413	19.0	17.3	-1.7	18	16	-2	4.0	3.9	-0.1
Dickinson	1,575	303	318	19.2	20.2	1.0	7	1	-6	2.3	0.3	-2.0
Eaton	7,356	1,132	1,140	15.4	15.5	0.1	15	27	12	1.3	2.4	1.0
Emmet	2,042	322	362	15.8	17.7	2.0	2	0	-2	0.6	0.0	-0.6
Genesee	31,997	7,067	6,765	22.1	21.1	-0.9	158	174	16	2.2	2.6	0.3
Gladwin	1,495	245	291	16.4	19.5	3.1	5	0	-5	2.0	0.0	-2.0
Gogebic	855	193	154	22.6	18.0	-4.6	5	2	-3	2.6	1.3	-1.3
Grand Traverse	6,000	1,032	1,370	17.2	22.8	5.6	37	12	-25	3.6	0.9	-2.7
Gratiot	2,754	475	496	17.2	18.0	0.8	7	5	-2	1.5	1.0	-0.5
Hillsdale	3,283	788	814	24.0	24.8	0.8	26	19	-7	3.3	2.3	-1.0
Houghton	2,477	538	599	21.7	24.2	2.5	24	14	-10	4.5	2.3	-2.1
Huron	1,873	394	393	21.0	21.0	-0.1	23	12	-11	5.8	3.1	-2.8
Ingham	19,248	4,702	4,747	24.4	24.7	0.2	215	141	-74	4.6	3.0	-1.6
Ionia	4,878	825	842	16.9	17.3	0.3	14	27	13	1.7	3.2	1.5
Iosco	1,233	146	150	11.8	12.2	0.3	4	4	0	2.7	2.7	-0.1
Iron	573	149	138	26.0	24.1	-1.9	3	3	0	2.0	2.2	0.2
Isabella	4,208	731	639	17.4	15.2	-2.2	8	8	0	1.1	1.3	0.2
Jackson	11,296	2,965	2,751	26.2	24.4	-1.9	190	155	-35	6.4	5.6	-0.8
Kalamazoo	18,588	3,536	3,260	19.0	17.5	-1.5	127	86	-41	3.6	2.6	-1.0
Kalkaska	1,180	223	217	18.9	18.4	-0.5	4	1	-3	1.8	0.5	-1.3
Kent	52,655	10,376	10,125	19.7	19.2	-0.5	551	470	-81	5.3	4.6	-0.7
Keweenaw	115	28	24	24.3	20.9	-3.5	2	2	0	7.1	8.3	1.2
Lake	585	121	120	20.7	20.5	-0.2	1	2	1	0.8	1.7	0.8
Lapeer	5,687	1,052	919	18.5	16.2	-2.3	39	29	-10	3.7	3.2	-0.6
Leelanau	1,111	213	239	19.2	21.5	2.3	7	5	-2	3.3	2.1	-1.2

Draft

Children Tested for Lead Poisoning -- Comparing CY2013 and CY2014

All Counties in Michigan

Children less than Six Years of Age

		Children Tested					BLLs >= 5 ug/dL					
		Number		Percentage			Number			Percentage		
County	Kids<6	CY2013	CY2014	CY2013	CY2014	Δ	CY2013	CY2014	Δ	CY2013	CY2014	Δ
Lenawee	6,911	1,512	1,212	21.9	17.5	-4.3	87	122	35	5.8	10.1	4.3
Livingston	12,104	1,106	1,027	9.1	8.5	-0.7	12	9	-3	1.1	0.9	-0.2
Luce	370	73	88	19.7	23.8	4.1	2	0	-2	2.7	0.0	-2.7
Mackinac	587	116	130	19.8	22.1	2.4	6	1	-5	5.2	0.8	-4.4
Macomb	57,878	10,093	9,471	17.4	16.4	-1.1	158	128	-30	1.6	1.4	-0.2
Manistee	1,307	248	285	19.0	21.8	2.8	15	13	-2	6.0	4.6	-1.5
Marquette	4,029	514	471	12.8	11.7	-1.1	20	13	-7	3.9	2.8	-1.1
Mason	1,864	362	414	19.4	22.2	2.8	40	27	-13	11.0	6.5	-4.5
Mecosta	2,520	367	316	14.6	12.5	-2.0	6	2	-4	1.6	0.6	-1.0
Menominee	1,375	262	262	19.1	19.1	0.0	10	16	6	3.8	6.1	2.3
Midland	5,685	501	475	8.8	8.4	-0.5	8	5	-3	1.6	1.1	-0.5
Missaukee	1,111	133	133	12.0	12.0	0.0	0	1	1	0.0	0.8	0.8
Monroe	10,355	1,705	1,568	16.5	15.1	-1.3	42	18	-24	2.5	1.1	-1.3
Montcalm	4,527	615	743	13.6	16.4	2.8	8	13	5	1.3	1.7	0.4
Montmorency	404	80	83	19.8	20.5	0.7	0	1	1	0.0	1.2	1.2
Muskegon	13,224	3,022	2,547	22.9	19.3	-3.6	145	152	7	4.8	6.0	1.2
Newaygo	3,581	426	449	11.9	12.5	0.6	4	7	3	0.9	1.6	0.6
Oakland	83,501	14,244	14,258	17.1	17.1	0.0	221	206	-15	1.6	1.4	-0.1
Oceana	2,091	515	524	24.6	25.1	0.4	17	10	-7	3.3	1.9	-1.4
Ogemaw	1,289	96	102	7.4	7.9	0.5	2	1	-1	2.1	1.0	-1.1
Ontonagon	251	48	48	19.1	19.1	0.0	0	2	2	0.0	4.2	4.2
Osceola	1,723	362	334	21.0	19.4	-1.6	12	10	-2	3.3	3.0	-0.3
Oscoda	521	48	34	9.2	6.5	-2.7	1	3	2	2.1	8.8	6.7
Otsego	1,641	316	325	19.3	19.8	0.5	1	1	0	0.3	0.3	0.0
Ottawa	21,390	2,928	3,002	13.7	14.0	0.3	92	81	-11	3.1	2.7	-0.4
Presque Isle	597	121	111	20.3	18.6	-1.7	0	2	2	0.0	1.8	1.8
Roscommon	1,156	216	220	18.7	19.0	0.3	4	0	-4	1.9	0.0	-1.9
Saginaw	14,029	3,775	3,668	26.9	26.1	-0.8	129	121	-8	3.4	3.3	-0.1
Saint Clair	11,046	2,597	2,726	23.5	24.7	1.2	121	76	-45	4.7	2.8	-1.9
Saint Joseph	5,125	981	1,012	19.1	19.7	0.6	38	41	3	3.9	4.1	0.2
Sanilac	2,879	544	523	18.9	18.2	-0.7	17	6	-11	3.1	1.1	-2.0
Schoolcraft	471	88	99	18.7	21.0	2.3	0	1	1	0.0	1.0	1.0
Shiawassee	4,622	1,230	1,167	26.6	25.2	-1.4	46	38	-8	3.7	3.3	-0.5
Tuscola	3,579	906	885	25.3	24.7	-0.6	21	12	-9	2.3	1.4	-1.0
Van Buren	5,884	879	862	14.9	14.6	-0.3	20	30	10	2.3	3.5	1.2
Washtenaw	22,833	2,743	2,604	12.0	11.4	-0.6	47	32	-15	1.7	1.2	-0.5
Wayne ex Det	82,002	19,466	18,021	23.7	22.0	-1.8	489	385	-104	2.5	2.1	-0.4
Wexford	2,582	329	362	12.7	14.0	1.3	10	3	-7	3.0	0.8	-2.2
Detroit, City of	59,755	25,026	23,135	41.9	38.7	-3.2	1996	1906	-90	8.0	8.2	0.3
MICHIGAN	710,976	147,841	142,888	20.8	20.1	-0.7	5,702	5,049	-653	3.9	3.5	-0.3

February 9, 2015

Children Tested for Lead Poisoning -- Comparing CY2013 and CY2014

All Counties in Michigan

Children One and Two Years of Age

		Children Tested					BLLs >= 5 ug/dL					
		Number		Percentage			Number			Percentage		
County	Kids 1 & 2	CY2013	CY2014	CY2013	CY2014	Δ	CY2013	CY2014	Δ	CY2013	CY2014	Δ
Alcona	130	39	43	30.0	33.1	3.1	1	2	1	2.6	4.7	2.1
Alger	130	65	76	50.0	58.5	8.5	1	2	1	1.5	2.6	1.1
Allegan	2,888	758	861	26.2	29.8	3.6	26	24	-2	3.4	2.8	-0.6
Alpena	570	254	213	44.6	37.4	-7.2	6	7	1	2.4	3.3	0.9
Antrim	450	175	188	38.9	41.8	2.9	4	2	-2	2.3	1.1	-1.2
Arenac	281	127	131	45.2	46.6	1.4	1	1	0	0.8	0.8	0.0
Baraga	165	96	90	58.2	54.5	-3.6	0	0	0	0.0	0.0	0.0
Barry	1,328	368	381	27.7	28.7	1.0	8	16	8	2.2	4.2	2.0
Bay	2,410	1,238	1,185	51.4	49.2	-2.2	64	37	-27	5.2	3.1	-2.0
Benzie	338	135	174	39.9	51.5	11.5	5	2	-3	3.7	1.1	-2.6
Berrien	3,855	1,323	1,581	34.3	41.0	6.7	52	48	-4	3.9	3.0	-0.9
Branch	1,157	298	231	25.8	20.0	-5.8	21	7	-14	7.0	3.0	-4.0
Calhoun	3,366	1,184	1,309	35.2	38.9	3.7	40	60	20	3.4	4.6	1.2
Cass	1,120	373	360	33.3	32.1	-1.2	15	11	-4	4.0	3.1	-1.0
Charlevoix	523	208	208	39.8	39.8	0.0	0	1	1	0.0	0.5	0.5
Cheboygan	457	205	213	44.9	46.6	1.8	2	5	3	1.0	2.3	1.4
Chippewa	775	244	261	31.5	33.7	2.2	3	3	0	1.2	1.1	-0.1
Clare	700	332	356	47.4	50.9	3.4	1	4	3	0.3	1.1	0.8
Clinton	1,650	312	323	18.9	19.6	0.7	5	4	-1	1.6	1.2	-0.4
Crawford	237	72	65	30.4	27.4	-3.0	5	1	-4	6.9	1.5	-5.4
Delta	782	368	349	47.1	44.6	-2.4	15	16	1	4.1	4.6	0.5
Dickinson	529	272	274	51.4	51.8	0.4	6	1	-5	2.2	0.4	-1.8
Eaton	2,410	727	748	30.2	31.0	0.9	8	16	8	1.1	2.1	1.0
Emmet	656	232	259	35.4	39.5	4.1	2	0	-2	0.9	0.0	-0.9
Genesee	10,583	4,566	4,207	43.1	39.8	-3.4	116	114	-2	2.5	2.7	0.2
Gladwin	486	172	192	35.4	39.5	4.1	2	0	-2	1.2	0.0	-1.2
Gogebic	285	143	110	50.2	38.6	-11.6	3	1	-2	2.1	0.9	-1.2
Grand Traverse	1,955	558	884	28.5	45.2	16.7	23	6	-17	4.1	0.7	-3.4
Gratiot	909	307	347	33.8	38.2	4.4	5	3	-2	1.6	0.9	-0.8
Hillsdale	1,079	353	388	32.7	36.0	3.2	15	10	-5	4.2	2.6	-1.7
Houghton	828	455	499	55.0	60.3	5.3	22	12	-10	4.8	2.4	-2.4
Huron	607	222	226	36.6	37.2	0.7	14	8	-6	6.3	3.5	-2.8
Ingham	6,426	2,771	2,782	43.1	43.3	0.2	132	83	-49	4.8	3.0	-1.8
Ionia	1,590	650	622	40.9	39.1	-1.8	10	24	14	1.5	3.9	2.3
Iosco	397	103	124	25.9	31.2	5.3	1	3	2	1.0	2.4	1.4
Iron	193	109	119	56.5	61.7	5.2	3	2	-1	2.8	1.7	-1.1
Isabella	1,392	458	458	32.9	32.9	0.0	3	4	1	0.7	0.9	0.2
Jackson	3,716	2,104	1,990	56.6	53.6	-3.1	148	119	-29	7.0	6.0	-1.1
Kalamazoo	6,166	2,109	1,856	34.2	30.1	-4.1	89	51	-38	4.2	2.7	-1.5
Kalkaska	395	121	136	30.6	34.4	3.8	3	1	-2	2.5	0.7	-1.7
Kent	17,514	8,360	8,047	47.7	45.9	-1.8	435	370	-65	5.2	4.6	-0.6
Keweenaw	39	23	21	59.0	53.8	-5.1	2	2	0	8.7	9.5	0.8
Lake	192	90	85	46.9	44.3	-2.6	0	1	1	0.0	1.2	1.2
Lapeer	1,780	735	696	41.3	39.1	-2.2	32	25	-7	4.4	3.6	-0.8
Leelanau	350	114	167	32.6	47.7	15.1	5	4	-1	4.4	2.4	-2.0

Draft

Children Tested for Lead Poisoning -- Comparing CY2013 and CY2014

All Counties in Michigan

Children One and Two Years of Age

		Children Tested					BLLs >= 5 ug/dL					
		Number		Percentage			Number			Percentage		
County	Kids 1 & 2	CY2013	CY2014	CY2013	CY2014	Δ	CY2013	CY2014	Δ	CY2013	CY2014	Δ
Lenawee	2,248	959	694	42.7	30.9	-11.8	51	74	23	5.3	10.7	5.3
Livingston	3,871	826	740	21.3	19.1	-2.2	9	9	0	1.1	1.2	0.1
Luce	121	69	79	57.0	65.3	8.3	1	0	-1	1.4	0.0	-1.4
Mackinac	193	88	109	45.6	56.5	10.9	5	1	-4	5.7	0.9	-4.8
Macomb	19,051	6,319	6,008	33.2	31.5	-1.6	95	80	-15	1.5	1.3	-0.2
Manistee	411	216	247	52.6	60.1	7.5	14	12	-2	6.5	4.9	-1.6
Marquette	1,364	432	406	31.7	29.8	-1.9	19	11	-8	4.4	2.7	-1.7
Mason	620	116	109	18.7	17.6	-1.1	6	5	-1	5.2	4.6	-0.6
Mecosta	851	269	269	31.6	31.6	0.0	4	2	-2	1.5	0.7	-0.7
Menominee	442	206	217	46.6	49.1	2.5	9	16	7	4.4	7.4	3.0
Midland	1,842	291	292	15.8	15.9	0.1	4	2	-2	1.4	0.7	-0.7
Missaukee	359	102	112	28.4	31.2	2.8	0	1	1	0.0	0.9	0.9
Monroe	3,378	1,252	1,133	37.1	33.5	-3.5	27	15	-12	2.2	1.3	-0.8
Montcalm	1,493	422	479	28.3	32.1	3.8	7	10	3	1.7	2.1	0.4
Montmorency	131	64	63	48.9	48.1	-0.8	0	1	1	0.0	1.6	1.6
Muskegon	4,384	1,708	1,618	39.0	36.9	-2.1	95	101	6	5.6	6.2	0.7
Newaygo	1,172	358	389	30.5	33.2	2.6	3	7	4	0.8	1.8	1.0
Oakland	27,292	7,686	7,772	28.2	28.5	0.3	137	125	-12	1.8	1.6	-0.2
Oceana	685	252	278	36.8	40.6	3.8	7	5	-2	2.8	1.8	-1.0
Ogemaw	413	76	81	18.4	19.6	1.2	2	0	-2	2.6	0.0	-2.6
Ontonagon	82	37	31	45.1	37.8	-7.3	0	2	2	0.0	6.5	6.5
Osceola	564	259	255	45.9	45.2	-0.7	7	9	2	2.7	3.5	0.8
Oscoda	168	33	16	19.6	9.5	-10.1	0	1	1	0.0	6.3	6.3
Otsego	540	187	195	34.6	36.1	1.5	0	0	0	0.0	0.0	0.0
Ottawa	7,046	2,510	2,542	35.6	36.1	0.5	75	69	-6	3.0	2.7	-0.3
Presque Isle	193	86	88	44.6	45.6	1.0	0	2	2	0.0	2.3	2.3
Roscommon	379	180	172	47.5	45.4	-2.1	4	0	-4	2.2	0.0	-2.2
Saginaw	4,623	2,784	2,722	60.2	58.9	-1.3	93	85	-8	3.3	3.1	-0.2
Saint Clair	3,574	1,223	1,306	34.2	36.5	2.3	75	37	-38	6.1	2.8	-3.3
Saint Joseph	1,684	645	680	38.3	40.4	2.1	28	26	-2	4.3	3.8	-0.5
Sanilac	949	267	281	28.1	29.6	1.5	11	4	-7	4.1	1.4	-2.7
Schoolcraft	151	76	76	50.3	50.3	0.0	0	0	0	0.0	0.0	0.0
Shiawassee	1,503	758	732	50.4	48.7	-1.7	33	30	-3	4.4	4.1	-0.3
Tuscola	1,174	585	633	49.8	53.9	4.1	14	10	-4	2.4	1.6	-0.8
Van Buren	1,924	525	498	27.3	25.9	-1.4	12	16	4	2.3	3.2	0.9
Washtenaw	7,560	1,813	1,799	24.0	23.8	-0.2	32	23	-9	1.8	1.3	-0.5
Wayne ex Det	26,966	10,469	9,537	38.8	35.4	-3.5	277	211	-66	2.6	2.2	-0.4
Wexford	865	255	305	29.5	35.3	5.8	8	3	-5	3.1	1.0	-2.2
Detroit, City of	20,048	10,520	9,648	52.5	48.1	-4.3	1077	985	-92	10.2	10.2	0.0
MICHIGAN	234,103	88,851	86,446	38.0	36.9	-1.0	3,595	3,103	-492	4.0	3.2	-0.9

February 9, 2015

From: Scott, Robert L. (DCH)
Sent: Tuesday, June 23, 2015 12:45 PM
To: Alanna M. Woolley
Cc: Katelyn Mary Burkart;Lyke Thompson;Angie Sarb
Subject: RE: 2014 EBL Numbers
Attachments: 2014 Annual BLL report preliminary 020915.pdf

Working on it now, will have it for you today. The preliminary is attached, just in case.

-----Original Message-----
From: Alanna M. Woolley [mailto:du3374@wayne.edu]
Sent: Tuesday, June 23, 2015 12:42 PM
To: Scott, Robert L. (DCH)
Cc: Katelyn Mary Burkart; Lyke Thompson; Angie Sarb
Subject: Re: 2014 EBL Numbers

Hi Bob,

If you aren't able to give us the final data by Thursday, may we please have the preliminary data?

Thank you!

Best,

Alanna
--
Alanna Woolley, MPA
Research Assistant
Center for Urban Studies
Wayne State University
E: du3374@wayne.edu
P: (313) 577-2207

----- Original Message -----
From: "Robert L. Scott (DCH)" <ScottR9@michigan.gov>
To: "Alanna M. Woolley" <du3374@wayne.edu>
Cc: "Katelyn Mary Burkart" <dv2491@wayne.edu>, "Lyke Thompson" <lykethompson@gmail.com>, "Angie Sarb" <angela.sarb@wayne.edu>
Sent: Friday, June 19, 2015 10:35:44 AM
Subject: RE: 2014 EBL Numbers

I might have given her preliminary 2014 data, don't remember for sure. I don't think I've described any 2014 data as "final" yet.

-----Original Message-----
From: Alanna M. Woolley [mailto:du3374@wayne.edu]
Sent: Friday, June 19, 2015 10:32 AM
To: Scott, Robert L. (DCH)

Cc: Katelyn Mary Burkart; Lyke Thompson; Angie Sarb
Subject: Re: 2014 EBL Numbers

Hi Bob,

At a meeting yesterday with Regina Royan from DHWP she said that she had the 2014 EBL numbers, I just wanted to verify that they aren't out yet.

Thanks!

Best,

Alanna

--
Alanna Woolley, MPA
Research Assistant
Center for Urban Studies
Wayne State University
E: du3374@wayne.edu
P: (313) 577-2207

----- Original Message -----
From: "Robert L. Scott (DCH)" <ScottR9@michigan.gov>
To: "Alanna M. Woolley" <du3374@wayne.edu>
Cc: "Katelyn Mary Burkart" <dv2491@wayne.edu>, "Lyke Thompson" <lykethompson@gmail.com>, "Angie Sarb" <angela.sarb@wayne.edu>
Sent: Wednesday, June 17, 2015 2:18:51 PM
Subject: RE: 2014 EBL Numbers

Yes. I won't have a complete annual data report by then, but can get you a FINAL county-plus-Detroit spreadsheet.

-----Original Message-----
From: Alanna M. Woolley [mailto:du3374@wayne.edu]
Sent: Wednesday, June 17, 2015 2:13 PM
To: Scott, Robert L. (DCH)
Cc: Katelyn Mary Burkart; Lyke Thompson; Angie Sarb
Subject: Fwd: 2014 EBL Numbers

Hi Bob,

We were hoping to do an update on 2014 EBL numbers at the next GHHI meeting on 6/25. Is there any chance that you'll have them ready before then?

Thank you!

Best,

Alanna

--

Alanna Woolley, MPA
Research Assistant
Center for Urban Studies
Wayne State University
E: du3374@wayne.edu
P: (313) 577-2207

----- Original Message -----
From: "Robert L. Scott (DCH)" <ScottR9@michigan.gov>
To: "Alanna M. Woolley" <du3374@wayne.edu>
Sent: Monday, June 1, 2015 10:26:43 AM
Subject: RE: 2014 EBL Numbers

Alanna,

I hope to work on that this week. Will send them ASAP.

Bob

-----Original Message-----
From: Alanna M. Woolley [mailto:du3374@wayne.edu]
Sent: Thursday, May 28, 2015 4:44 PM
To: Scott, Robert L. (DCH)
Subject: 2014 EBL Numbers

Hi Bob!

If you have the 2014 EBL numbers could you please send them to me?

Thank you!

Best,

Alanna

--
Alanna Woolley, MPA
Research Assistant
Center for Urban Studies
Wayne State University
E: du3374@wayne.edu
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Children Tested for Lead Poisoning -- Calendar Year 2014
All Counties in Michigan

Children less than Six Years of Age

				Children Tested		Children Tested, by Highest Blood Lead Level (BLL)							
County	%Pre-1950 Housing	%Pre-1978 Housing	Children less than Six Years of Age	Number of Children Tested	% Tested	<5 ug/dL (capillary or venous)	5 to 9 ug/dL (capillary or venous)	Capillary >= 10 ug/dL, not confirmed by venous	Confirmed 10-14 ug/dL (venous only)	Confirmed 15-44 ug/dL (venous only)	Confirmed ≥45 ug/dL (venous only)	Total ≥ 5 µg/dL	% with BLL >= 5 ug/dL
Alcona	12.4	61.5	398	53	13.3	51	2	0	0	0	0	2	3.8
Alger	29.5	64.1	427	92	21.5	90	1	0	1	0	0	2	2.2
Allegan	23.2	51.1	8,806	1,204	13.7	1,173	29	2	0	0	0	31	2.6
Alpena	25.3	71.6	1,758	257	14.6	248	8	1	0	0	0	9	3.5
Antrim	18.8	52.6	1,370	260	19.0	258	2	0	0	0	0	2	0.8
Arenac	19.8	58.2	870	183	21.0	182	1	0	0	0	0	1	0.5
Baraga	34.0	71.7	477	135	28.3	134	1	0	0	0	0	1	0.7
Barry	27.1	57.3	4,143	490	11.8	467	22	0	0	0	0	23	4.7
Bay	33.9	75.6	7,322	1,408	19.2	1,358	46	2	3	4	1	50	3.6
Benzie	18.6	46.3	1,041	268	25.7	266	2	0	0	0	0	2	0.7
Berrien	28.6	72.2	11,681	1,942	16.6	1,883	45	5	4	5	0	59	3.0
Branch	30.9	65.3	3,506	668	19.1	645	19	1	3	0	0	23	3.4
Calhoun	36.1	75.3	10,149	2,390	23.5	2,290	87	0	7	6	0	100	4.2
Cass	22.4	59.9	3,444	424	12.3	412	10	1	1	0	0	12	2.8
Charlevoix	25.3	54.4	1,624	295	18.2	294	1	0	0	0	0	1	0.3
Cheboygan	20.9	53.5	1,414	285	20.2	279	6	0	0	0	0	6	2.1
Chippewa	25.1	58.6	2,345	440	18.8	436	4	0	0	0	0	4	0.9
Clare	14.5	58.8	2,083	445	21.4	441	4	0	0	0	0	4	0.9
Clinton	22.5	52.8	5,140	584	11.4	578	6	0	0	0	0	6	1.0
Crawford	13.7	55.6	727	83	11.4	82	1	0	0	0	0	1	1.2
Delta	33.3	68.0	2,388	413	17.3	397	15	0	0	1	0	16	3.9
Dickinson	38.9	71.7	1,575	318	20.2	317	1	0	0	0	0	1	0.3
Eaton	20.4	56.4	7,356	1,140	15.5	1,113	24	3	0	0	0	27	2.4
Emmet	23.0	48.3	2,042	362	17.7	362	0	0	0	0	0	0	0.0
Genesee	19.9	68.0	31,997	6,765	21.1	6,591	149	11	9	5	0	174	2.6
Gladwin	12.4	49.5	1,495	291	19.5	291	0	0	0	0	0	0	0.0
Gogebic	50.0	76.7	855	154	18.0	152	2	0	0	0	0	2	1.3
Grand Traverse	14.7	43.5	6,000	1,370	22.8	1,358	9	3	0	0	0	12	0.9
Gratiot	34.7	69.8	2,754	496	18.0	491	5	0	0	0	0	5	1.0
Hillsdale	36.5	63.2	3,283	814	24.8	795	17	2	0	0	0	19	2.3
Houghton	53.4	75.5	2,477	599	24.2	585	10	0	2	2	0	14	2.3
Huron	31.8	68.9	1,873	393	21.0	381	11	0	1	0	0	12	3.1
Ingham	24.9	68.2	19,248	4,747	24.7	4,606	119	5	11	6	0	141	3.0
Ionia	35.8	63.0	4,878	842	17.3	815	24	2	0	1	0	27	3.2
Iosco	12.7	65.6	1,233	150	12.2	146	4	0	0	0	0	4	2.7
Iron	44.1	72.1	573	138	24.1	135	3	0	0	0	0	3	2.2
Isabella	16.3	48.2	4,208	639	15.2	631	8	0	0	0	0	8	1.3
Jackson	33.0	67.9	11,296	2,751	24.4	2,596	133	15	3	4	0	155	5.6
Kalamazoo	22.5	62.6	18,588	3,260	17.5	3,174	72	7	4	2	1	86	2.6
Kalkaska	13.2	49.3	1,180	217	18.4	216	1	0	0	0	0	1	0.5
Kent	24.8	59.2	52,655	10,125	19.2	9,655	414	8	22	26	0	470	4.6
Keweenaw	46.9	77.6	115	24	20.9	22	2	0	0	0	0	2	8.3
Lake	12.5	52.6	585	120	20.5	118	2	0	0	0	0	2	1.7
Lapeer	20.4	52.9	5,687	919	16.2	890	25	3	0	1	0	29	3.2

Draft

Children Tested for Lead Poisoning -- Calendar Year 2014
All Counties in Michigan

Children less than Six Years of Age

				Children Tested		Children Tested, by Highest Blood Lead Level (BLL)							
County	%Pre-1950 Housing	%Pre-1978 Housing	Children less than Six Years of Age	Number of Children Tested	% Tested	<5 ug/dL (capillary or venous)	5 to 9 ug/dL (capillary or venous)	Capillary >= 10 ug/dL, not confirmed by venous	Confirmed 10-14 ug/dL (venous only)	Confirmed 15-44 ug/dL (venous only)	Confirmed ≥45 ug/dL (venous only)	Total ≥ 5 µg/dL	% with BLL >= 5 ug/dL
Leelanau	17.9	46.5	1,111	239	21.5	234	4	1	0	0	0	5	2.1
Lenawee	33.6	67.2	6,911	1,212	17.5	1,090	99	16	3	4	0	122	10.1
Livingston	11.4	39.0	12,104	1,027	8.5	1,018	8	0	1	0	0	9	0.9
Luce	23.8	64.3	370	88	23.8	88	0	0	0	0	0	0	0.0
Mackinac	23.4	58.6	587	130	22.1	129	1	0	0	0	0	1	0.8
Macomb	9.3	59.1	57,878	9,471	16.4	9,343	111	6	2	7	2	128	1.4
Manistee	28.8	63.9	1,307	285	21.8	272	11	0	0	2	0	13	4.6
Marquette	27.9	69.4	4,029	471	11.7	458	11	2	0	0	0	13	2.8
Mason	32.1	64.6	1,864	414	22.2	387	27	0	0	0	0	27	6.5
Mecosta	18.2	53.4	2,520	316	12.5	314	0	0	0	2	0	2	0.6
Menominee	35.4	73.2	1,375	262	19.1	246	14	1	0	1	0	16	6.1
Midland	15.2	58.7	5,685	475	8.4	470	4	0	1	0	0	5	1.1
Missaukee	21.2	56.2	1,111	133	12.0	132	0	0	1	0	0	1	0.8
Monroe	23.0	59.0	10,355	1,568	15.1	1,550	16	1	1	0	0	18	1.1
Montcalm	27.3	57.7	4,527	743	16.4	730	11	0	1	1	0	13	1.7
Montmorency	18.1	58.6	404	83	20.5	82	1	0	0	0	0	1	1.2
Muskegon	25.8	66.2	13,224	2,547	19.3	2,395	124	13	10	5	0	152	6.0
Newaygo	19.3	53.6	3,581	449	12.5	442	6	1	0	0	0	7	1.6
Oakland	14.7	60.5	83,501	14,258	17.1	14,052	165	8	20	13	0	206	1.4
Oceana	25.8	57.8	2,091	524	25.1	514	7	0	3	0	0	10	1.9
Ogemaw	12.8	61.6	1,289	102	7.9	101	1	0	0	0	0	1	1.0
Ontonagon	39.1	73.2	251	48	19.1	46	2	0	0	0	0	2	4.2
Osceola	22.6	56.6	1,723	334	19.4	324	6	0	2	2	0	10	3.0
Oscoda	17.8	62.1	521	34	6.5	31	2	1	0	0	0	3	8.8
Otsego	12.2	50.3	1,641	325	19.8	324	1	0	0	0	0	1	0.3
Ottawa	15.7	45.3	21,390	3,002	14.0	2,921	75	5	1	0	0	81	2.7
Presque Isle	21.1	66.3	597	111	18.6	109	2	0	0	0	0	2	1.8
Roscommon	13.1	58.7	1,156	220	19.0	220	0	0	0	0	0	0	0.0
Saginaw	28.1	73.1	14,029	3,668	26.1	3,547	100	8	7	6	0	121	3.3
Saint Clair	25.8	59.4	11,046	2,726	24.7	2,650	61	7	5	3	0	76	2.8
Saint Joseph	27.5	65.1	5,125	1,012	19.7	971	34	4	2	1	0	41	4.1
Sanilac	30.7	64.6	2,879	523	18.2	517	5	0	1	0	0	6	1.1
Schoolcraft	25.5	63.3	471	99	21.0	98	1	0	0	0	0	1	1.0
Shiawassee	33.9	68.2	4,622	1,167	25.2	1,129	34	2	2	0	0	38	3.3
Tuscola	30.2	67.4	3,579	885	24.7	873	10	0	2	0	0	12	1.4
Van Buren	23.3	58.1	5,884	862	14.6	832	26	1	1	2	0	30	3.5
Washtenaw	17.2	56.5	22,833	2,604	11.4	2,572	25	2	2	3	0	32	1.2
Wayne ex Det	22.6	74.5	82,002	18,021	22.0	17,636	327	12	31	15	0	385	2.1
Wexford	23.0	53.7	2,582	362	14.0	359	1	0	0	2	0	3	0.8
Detroit, City of	62.2	93.2	59,755	23,135	38.7	21,229	1,483	51	215	153	4	1,906	8.2
MICHIGAN	24.7	64.8	710,976	142,888	20.1	137,839	4,157	213	386	285	8	5,049	3.5

February 9, 2015

Sources: US Census Bureau, Census 2010 (Pre-1950 Housing and Pre-1978 Housing) and American Community Survey 2013 5-year estimates (Detroit and county populations);

Children Tested for Lead Poisoning -- Calendar Year 2014
All Counties in Michigan

Children One and Two Years of Age

				Children Tested		Children Tested, by Highest Blood Lead Level (BLL)							
County	%Pre-1950 Housing	%Pre-1978 Housing	Children One and Two Years of Age	Number of Children Tested	% Tested	<5 ug/dL (capillary or venous)	5 to 9 ug/dL (capillary or venous)	Capillary >= 10 ug/dL, not confirmed by venous	Confirmed 10-14 ug/dL (venous only)	Confirmed 15-44 ug/dL (venous only)	Confirmed ≥45 ug/dL (venous only)	Total ≥ 5 µg/dL	% with BLL >= 5 ug/dL
Alcona	12.4	61.5	130	43	33.1	41	2	0	0	0	0	2	4.7
Alger	29.5	64.1	130	76	58.5	74	1	0	1	0	0	2	2.6
Allegan	23.2	51.1	2,888	861	29.8	837	22	2	0	0	0	24	2.8
Alpena	25.3	71.6	570	213	37.4	206	7	0	0	0	0	7	3.3
Antrim	18.8	52.6	450	188	41.8	186	2	0	0	0	0	2	1.1
Arenac	19.8	58.2	281	131	46.6	130	1	0	0	0	0	1	0.8
Baraga	34.0	71.7	165	90	54.5	90	0	0	0	0	0	0	0.0
Barry	27.1	57.3	1,328	381	28.7	365	15	0	1	0	0	16	4.2
Bay	33.9	75.6	2,410	1,185	49.2	1,148	30	2	3	2	0	37	3.1
Benzie	18.6	46.3	338	174	51.5	172	2	0	0	0	0	2	1.1
Berrien	28.6	72.2	3,855	1,581	41.0	1,533	36	5	3	4	0	48	3.0
Branch	30.9	65.3	1,157	231	20.0	224	6	0	1	0	0	7	3.0
Calhoun	36.1	75.3	3,366	1,309	38.9	1,249	52	1	4	3	0	60	4.6
Cass	22.4	59.9	1,120	360	32.1	349	9	1	1	0	0	11	3.1
Charlevoix	25.3	54.4	523	208	39.8	207	1	0	0	0	0	1	0.5
Cheboygan	20.9	53.5	457	213	46.6	208	5	0	0	0	0	5	2.3
Chippewa	25.1	58.6	775	261	33.7	258	3	0	0	0	0	3	1.1
Clare	14.5	58.8	700	356	50.9	352	4	0	0	0	0	4	1.1
Clinton	22.5	52.8	1,650	323	19.6	319	4	0	0	0	0	4	1.2
Crawford	13.7	55.6	237	65	27.4	64	1	0	0	0	0	1	1.5
Delta	33.3	68.0	782	349	44.6	333	15	0	0	1	0	16	4.6
Dickinson	38.9	71.7	529	274	51.8	273	1	0	0	0	0	1	0.4
Eaton	20.4	56.4	2,410	748	31.0	732	13	3	0	0	0	16	2.1
Emmet	23.0	48.3	656	259	39.5	259	0	0	0	0	0	0	0.0
Genesee	19.9	68.0	10,583	4,207	39.8	4,093	97	9	5	3	0	114	2.7
Gladwin	12.4	49.5	486	192	39.5	192	0	0	0	0	0	0	0.0
Gogebic	50.0	76.7	285	110	38.6	109	1	0	0	0	0	1	0.9
Grand Traverse	14.7	43.5	1,955	884	45.2	878	5	1	0	0	0	6	0.7
Gratiot	34.7	69.8	909	347	38.2	344	3	0	0	0	0	3	0.9
Hillsdale	36.5	63.2	1,079	388	36.0	378	8	2	0	0	0	10	2.6
Houghton	53.4	75.5	828	499	60.3	487	8	0	2	2	0	12	2.4
Huron	31.8	68.9	607	226	37.2	218	8	0	0	0	0	8	3.5
Ingham	24.9	68.2	6,426	2,782	43.3	2,699	70	5	6	2	0	83	3.0
Ionia	35.8	63.0	1,590	622	39.1	598	21	2	0	1	0	24	3.9
Iosco	12.7	65.6	397	124	31.2	121	3	0	0	0	0	3	2.4
Iron	44.1	72.1	193	119	61.7	117	2	0	0	0	0	2	1.7
Isabella	16.3	48.2	1,392	458	32.9	454	4	0	0	0	0	4	0.9
Jackson	33.0	67.9	3,716	1,990	53.6	1,871	105	9	2	3	0	119	6.0
Kalamazoo	22.5	62.6	6,166	1,856	30.1	1,805	42	4	3	1	1	51	2.7
Kalkaska	13.2	49.3	395	136	34.4	135	1	0	0	0	0	1	0.7
Kent	24.8	59.2	17,514	8,047	45.9	7,677	325	5	19	21	0	370	4.6
Keweenaw	46.9	77.6	39	21	53.8	19	2	0	0	0	0	2	9.5
Lake	12.5	52.6	192	85	44.3	84	1	0	0	0	0	1	1.2
Lapeer	20.4	52.9	1,780	696	39.1	671	22	2	0	1	0	25	3.6

Draft

Children Tested for Lead Poisoning -- Calendar Year 2014
All Counties in Michigan

Children One and Two Years of Age

				Children Tested		Children Tested, by Highest Blood Lead Level (BLL)							
County	%Pre-1950 Housing	%Pre-1978 Housing	Children One and Two Years of Age	Number of Children Tested	% Tested	<5 ug/dL (capillary or venous)	5 to 9 ug/dL (capillary or venous)	Capillary >= 10 ug/dL, not confirmed by venous	Confirmed 10-14 ug/dL (venous only)	Confirmed 15-44 ug/dL (venous only)	Confirmed ≥45 ug/dL (venous only)	Total ≥ 5 µg/dL	% with BLL >= 5 ug/dL
Leelanau	17.9	46.5	350	167	47.7	163	3	1	0	0	0	4	2.4
Lenawee	33.6	67.2	2,248	694	30.9	620	63	6	2	3	0	74	10.7
Livingston	11.4	39.0	3,871	740	19.1	731	8	0	1	0	0	9	1.2
Luce	23.8	64.3	121	79	65.3	79	0	0	0	0	0	0	0.0
Mackinac	23.4	58.6	193	109	56.5	108	1	0	0	0	0	1	0.9
Macomb	9.3	59.1	19,051	6,008	31.5	5,928	69	5	2	3	1	80	1.3
Manistee	28.8	63.9	411	247	60.1	235	10	0	0	2	0	12	4.9
Marquette	27.9	69.4	1,364	406	29.8	395	10	1	0	0	0	11	2.7
Mason	32.1	64.6	620	109	17.6	104	5	0	0	0	0	5	4.6
Mecosta	18.2	53.4	851	269	31.6	267	0	0	1	1	0	2	0.7
Menominee	35.4	73.2	442	217	49.1	201	14	1	0	1	0	16	7.4
Midland	15.2	58.7	1,842	292	15.9	290	2	0	0	0	0	2	0.7
Missaukee	21.2	56.2	359	112	31.2	111	0	0	1	0	0	1	0.9
Monroe	23.0	59.0	3,378	1,133	33.5	1,118	13	1	1	0	0	15	1.3
Montcalm	27.3	57.7	1,493	479	32.1	469	8	0	1	1	0	10	2.1
Montmorency	18.1	58.6	131	63	48.1	62	1	0	0	0	0	1	1.6
Muskegon	25.8	66.2	4,384	1,618	36.9	1,517	80	9	7	5	0	101	6.2
Newaygo	19.3	53.6	1,172	389	33.2	382	6	1	0	0	0	7	1.8
Oakland	14.7	60.5	27,292	7,772	28.5	7,647	100	7	10	8	0	125	1.6
Oceana	25.8	57.8	685	278	40.6	273	4	0	1	0	0	5	1.8
Ogemaw	74.0	61.6	413	81	19.6	81	0	0	0	0	0	0	0.0
Ontonagon	39.1	73.2	82	31	37.8	29	2	0	0	0	0	2	6.5
Osceola	22.6	56.6	564	255	45.2	246	5	0	3	1	0	9	3.5
Oscoda	17.8	62.1	168	16	9.5	15	1	0	0	0	0	1	6.3
Otsego	12.2	50.3	540	195	36.1	195	0	0	0	0	0	0	0.0
Ottawa	15.7	45.3	7,046	2,542	36.1	2,473	63	5	1	0	0	69	2.7
Presque Isle	21.1	66.3	193	88	45.6	86	2	0	0	0	0	2	2.3
Roscommon	13.1	58.7	379	172	45.4	172	0	0	0	0	0	0	0.0
Saginaw	28.1	73.1	4,623	2,722	58.9	2,637	70	5	5	5	0	85	3.1
Saint Clair	25.8	59.4	3,574	1,306	36.5	1,269	29	3	3	2	0	37	2.8
Saint Joseph	27.5	65.1	1,684	680	40.4	654	20	3	2	1	0	26	3.8
Sanilac	30.7	64.6	949	281	29.6	277	3	0	1	0	0	4	1.4
Schoolcraft	25.5	63.3	151	76	50.3	76	0	0	0	0	0	0	0.0
Shiawassee	33.9	68.2	1,503	732	48.7	702	27	1	2	0	0	30	4.1
Tuscola	30.2	67.4	1,174	633	53.9	623	9	0	1	0	0	10	1.6
Van Buren	23.3	58.1	1,924	498	25.9	482	13	1	0	2	0	16	3.2
Washtenaw	17.2	56.5	7,560	1,799	23.8	1,776	16	2	2	3	0	23	1.3
Wayne ex Det	22.6	74.5	26,966	9,537	35.4	9,326	183	6	17	5	0	211	2.2
Wexford	23.0	53.7	865	305	35.3	302	1	0	0	2	0	3	1.0
Detroit, City of	62.2	93.2	20,048	9,648	48.1	8,663	751	26	114	94	0	985	10.2
MICHIGAN	24.7	64.8	234,103	86,446	36.9	83,343	2,552	137	229	183	2	3,103	3.6

February 9, 2015

Sources: US Census Bureau, Census 2010 (Pre-1950 Housing and Pre-1978 Housing) and American Community Survey 2013 5-year estimates (Detroit and county populations);

Children Tested for Lead Poisoning -- Comparing CY2013 and CY2014

All Counties in Michigan

Children less than Six Years of Age

		Children Tested					BLLs >= 5 ug/dL					
		Number		Percentage			Number			Percentage		
County	Kids<6	CY2013	CY2014	CY2013	CY2014	Δ	CY2013	CY2014	Δ	CY2013	CY2014	Δ
Alcona	398	51	53	12.8	13.3	0.5	1	2	1	2.0	3.8	1.8
Alger	427	76	92	17.8	21.5	3.7	1	2	1	1.3	2.2	0.9
Allegan	8,806	1,159	1,204	13.2	13.7	0.5	35	31	-4	3.0	2.6	-0.4
Alpena	1,758	302	257	17.2	14.6	-2.6	7	9	2	2.3	3.5	1.2
Antrim	1,370	258	260	18.8	19.0	0.1	6	2	-4	2.3	0.8	-1.6
Arenac	870	163	183	18.7	21.0	2.3	2	1	-1	1.2	0.5	-0.7
Baraga	477	128	135	26.8	28.3	1.5	1	1	0	0.8	0.7	0.0
Barry	4,143	465	490	11.2	11.8	0.6	12	23	11	2.6	4.7	2.1
Bay	7,322	1,421	1,408	19.4	19.2	-0.2	71	50	-21	5.0	3.6	-1.4
Benzie	1,041	231	268	22.2	25.7	3.6	6	2	-4	2.6	0.7	-1.9
Berrien	11,681	1,728	1,942	14.8	16.6	1.8	64	59	-5	3.7	3.0	-0.7
Branch	3,506	765	668	21.8	19.1	-2.8	39	23	-16	5.1	3.4	-1.7
Calhoun	10,149	1,970	2,390	19.4	23.5	4.1	68	100	32	3.5	4.2	0.7
Cass	3,444	458	424	13.3	12.3	-1.0	20	12	-8	4.4	2.8	-1.5
Charlevoix	1,624	297	295	18.3	18.2	-0.1	2	1	-1	0.7	0.3	-0.3
Cheboygan	1,414	266	285	18.8	20.2	1.3	2	6	4	0.8	2.1	1.4
Chippewa	2,345	435	440	18.6	18.8	0.2	5	4	-1	1.1	0.9	-0.2
Clare	2,083	414	445	19.9	21.4	1.5	3	4	1	0.7	0.9	0.2
Clinton	5,140	565	584	11.0	11.4	0.4	12	6	-6	2.1	1.0	-1.1
Crawford	727	87	83	12.0	11.4	-0.6	6	1	-5	6.9	1.2	-5.7
Delta	2,388	453	413	19.0	17.3	-1.7	18	16	-2	4.0	3.9	-0.1
Dickinson	1,575	303	318	19.2	20.2	1.0	7	1	-6	2.3	0.3	-2.0
Eaton	7,356	1,132	1,140	15.4	15.5	0.1	15	27	12	1.3	2.4	1.0
Emmet	2,042	322	362	15.8	17.7	2.0	2	0	-2	0.6	0.0	-0.6
Genesee	31,997	7,067	6,765	22.1	21.1	-0.9	158	174	16	2.2	2.6	0.3
Gladwin	1,495	245	291	16.4	19.5	3.1	5	0	-5	2.0	0.0	-2.0
Gogebic	855	193	154	22.6	18.0	-4.6	5	2	-3	2.6	1.3	-1.3
Grand Traverse	6,000	1,032	1,370	17.2	22.8	5.6	37	12	-25	3.6	0.9	-2.7
Gratiot	2,754	475	496	17.2	18.0	0.8	7	5	-2	1.5	1.0	-0.5
Hillsdale	3,283	788	814	24.0	24.8	0.8	26	19	-7	3.3	2.3	-1.0
Houghton	2,477	538	599	21.7	24.2	2.5	24	14	-10	4.5	2.3	-2.1
Huron	1,873	394	393	21.0	21.0	-0.1	23	12	-11	5.8	3.1	-2.8
Ingham	19,248	4,702	4,747	24.4	24.7	0.2	215	141	-74	4.6	3.0	-1.6
Ionia	4,878	825	842	16.9	17.3	0.3	14	27	13	1.7	3.2	1.5
Iosco	1,233	146	150	11.8	12.2	0.3	4	4	0	2.7	2.7	-0.1
Iron	573	149	138	26.0	24.1	-1.9	3	3	0	2.0	2.2	0.2
Isabella	4,208	731	639	17.4	15.2	-2.2	8	8	0	1.1	1.3	0.2
Jackson	11,296	2,965	2,751	26.2	24.4	-1.9	190	155	-35	6.4	5.6	-0.8
Kalamazoo	18,588	3,536	3,260	19.0	17.5	-1.5	127	86	-41	3.6	2.6	-1.0
Kalkaska	1,180	223	217	18.9	18.4	-0.5	4	1	-3	1.8	0.5	-1.3
Kent	52,655	10,376	10,125	19.7	19.2	-0.5	551	470	-81	5.3	4.6	-0.7
Keweenaw	115	28	24	24.3	20.9	-3.5	2	2	0	7.1	8.3	1.2
Lake	585	121	120	20.7	20.5	-0.2	1	2	1	0.8	1.7	0.8
Lapeer	5,687	1,052	919	18.5	16.2	-2.3	39	29	-10	3.7	3.2	-0.6
Leelanau	1,111	213	239	19.2	21.5	2.3	7	5	-2	3.3	2.1	-1.2

Draft

Children Tested for Lead Poisoning -- Comparing CY2013 and CY2014

All Counties in Michigan

Children less than Six Years of Age

		Children Tested					BLLs >= 5 ug/dL					
		Number		Percentage			Number			Percentage		
County	Kids<6	CY2013	CY2014	CY2013	CY2014	Δ	CY2013	CY2014	Δ	CY2013	CY2014	Δ
Lenawee	6,911	1,512	1,212	21.9	17.5	-4.3	87	122	35	5.8	10.1	4.3
Livingston	12,104	1,106	1,027	9.1	8.5	-0.7	12	9	-3	1.1	0.9	-0.2
Luce	370	73	88	19.7	23.8	4.1	2	0	-2	2.7	0.0	-2.7
Mackinac	587	116	130	19.8	22.1	2.4	6	1	-5	5.2	0.8	-4.4
Macomb	57,878	10,093	9,471	17.4	16.4	-1.1	158	128	-30	1.6	1.4	-0.2
Manistee	1,307	248	285	19.0	21.8	2.8	15	13	-2	6.0	4.6	-1.5
Marquette	4,029	514	471	12.8	11.7	-1.1	20	13	-7	3.9	2.8	-1.1
Mason	1,864	362	414	19.4	22.2	2.8	40	27	-13	11.0	6.5	-4.5
Mecosta	2,520	367	316	14.6	12.5	-2.0	6	2	-4	1.6	0.6	-1.0
Menominee	1,375	262	262	19.1	19.1	0.0	10	16	6	3.8	6.1	2.3
Midland	5,685	501	475	8.8	8.4	-0.5	8	5	-3	1.6	1.1	-0.5
Missaukee	1,111	133	133	12.0	12.0	0.0	0	1	1	0.0	0.8	0.8
Monroe	10,355	1,705	1,568	16.5	15.1	-1.3	42	18	-24	2.5	1.1	-1.3
Montcalm	4,527	615	743	13.6	16.4	2.8	8	13	5	1.3	1.7	0.4
Montmorency	404	80	83	19.8	20.5	0.7	0	1	1	0.0	1.2	1.2
Muskegon	13,224	3,022	2,547	22.9	19.3	-3.6	145	152	7	4.8	6.0	1.2
Newaygo	3,581	426	449	11.9	12.5	0.6	4	7	3	0.9	1.6	0.6
Oakland	83,501	14,244	14,258	17.1	17.1	0.0	221	206	-15	1.6	1.4	-0.1
Oceana	2,091	515	524	24.6	25.1	0.4	17	10	-7	3.3	1.9	-1.4
Ogemaw	1,289	96	102	7.4	7.9	0.5	2	1	-1	2.1	1.0	-1.1
Ontonagon	251	48	48	19.1	19.1	0.0	0	2	2	0.0	4.2	4.2
Osceola	1,723	362	334	21.0	19.4	-1.6	12	10	-2	3.3	3.0	-0.3
Oscoda	521	48	34	9.2	6.5	-2.7	1	3	2	2.1	8.8	6.7
Otsego	1,641	316	325	19.3	19.8	0.5	1	1	0	0.3	0.3	0.0
Ottawa	21,390	2,928	3,002	13.7	14.0	0.3	92	81	-11	3.1	2.7	-0.4
Presque Isle	597	121	111	20.3	18.6	-1.7	0	2	2	0.0	1.8	1.8
Roscommon	1,156	216	220	18.7	19.0	0.3	4	0	-4	1.9	0.0	-1.9
Saginaw	14,029	3,775	3,668	26.9	26.1	-0.8	129	121	-8	3.4	3.3	-0.1
Saint Clair	11,046	2,597	2,726	23.5	24.7	1.2	121	76	-45	4.7	2.8	-1.9
Saint Joseph	5,125	981	1,012	19.1	19.7	0.6	38	41	3	3.9	4.1	0.2
Sanilac	2,879	544	523	18.9	18.2	-0.7	17	6	-11	3.1	1.1	-2.0
Schoolcraft	471	88	99	18.7	21.0	2.3	0	1	1	0.0	1.0	1.0
Shiawassee	4,622	1,230	1,167	26.6	25.2	-1.4	46	38	-8	3.7	3.3	-0.5
Tuscola	3,579	906	885	25.3	24.7	-0.6	21	12	-9	2.3	1.4	-1.0
Van Buren	5,884	879	862	14.9	14.6	-0.3	20	30	10	2.3	3.5	1.2
Washtenaw	22,833	2,743	2,604	12.0	11.4	-0.6	47	32	-15	1.7	1.2	-0.5
Wayne ex Det	82,002	19,466	18,021	23.7	22.0	-1.8	489	385	-104	2.5	2.1	-0.4
Wexford	2,582	329	362	12.7	14.0	1.3	10	3	-7	3.0	0.8	-2.2
Detroit, City of	59,755	25,026	23,135	41.9	38.7	-3.2	1996	1906	-90	8.0	8.2	0.3
MICHIGAN	710,976	147,841	142,888	20.8	20.1	-0.7	5,702	5,049	-653	3.9	3.5	-0.3

February 9, 2015

Children Tested for Lead Poisoning -- Comparing CY2013 and CY2014

All Counties in Michigan

Children One and Two Years of Age

		Children Tested					BLLs >= 5 ug/dL					
		Number		Percentage			Number			Percentage		
County	Kids 1 & 2	CY2013	CY2014	CY2013	CY2014	Δ	CY2013	CY2014	Δ	CY2013	CY2014	Δ
Alcona	130	39	43	30.0	33.1	3.1	1	2	1	2.6	4.7	2.1
Alger	130	65	76	50.0	58.5	8.5	1	2	1	1.5	2.6	1.1
Allegan	2,888	758	861	26.2	29.8	3.6	26	24	-2	3.4	2.8	-0.6
Alpena	570	254	213	44.6	37.4	-7.2	6	7	1	2.4	3.3	0.9
Antrim	450	175	188	38.9	41.8	2.9	4	2	-2	2.3	1.1	-1.2
Arenac	281	127	131	45.2	46.6	1.4	1	1	0	0.8	0.8	0.0
Baraga	165	96	90	58.2	54.5	-3.6	0	0	0	0.0	0.0	0.0
Barry	1,328	368	381	27.7	28.7	1.0	8	16	8	2.2	4.2	2.0
Bay	2,410	1,238	1,185	51.4	49.2	-2.2	64	37	-27	5.2	3.1	-2.0
Benzie	338	135	174	39.9	51.5	11.5	5	2	-3	3.7	1.1	-2.6
Berrien	3,855	1,323	1,581	34.3	41.0	6.7	52	48	-4	3.9	3.0	-0.9
Branch	1,157	298	231	25.8	20.0	-5.8	21	7	-14	7.0	3.0	-4.0
Calhoun	3,366	1,184	1,309	35.2	38.9	3.7	40	60	20	3.4	4.6	1.2
Cass	1,120	373	360	33.3	32.1	-1.2	15	11	-4	4.0	3.1	-1.0
Charlevoix	523	208	208	39.8	39.8	0.0	0	1	1	0.0	0.5	0.5
Cheboygan	457	205	213	44.9	46.6	1.8	2	5	3	1.0	2.3	1.4
Chippewa	775	244	261	31.5	33.7	2.2	3	3	0	1.2	1.1	-0.1
Clare	700	332	356	47.4	50.9	3.4	1	4	3	0.3	1.1	0.8
Clinton	1,650	312	323	18.9	19.6	0.7	5	4	-1	1.6	1.2	-0.4
Crawford	237	72	65	30.4	27.4	-3.0	5	1	-4	6.9	1.5	-5.4
Delta	782	368	349	47.1	44.6	-2.4	15	16	1	4.1	4.6	0.5
Dickinson	529	272	274	51.4	51.8	0.4	6	1	-5	2.2	0.4	-1.8
Eaton	2,410	727	748	30.2	31.0	0.9	8	16	8	1.1	2.1	1.0
Emmet	656	232	259	35.4	39.5	4.1	2	0	-2	0.9	0.0	-0.9
Genesee	10,583	4,566	4,207	43.1	39.8	-3.4	116	114	-2	2.5	2.7	0.2
Gladwin	486	172	192	35.4	39.5	4.1	2	0	-2	1.2	0.0	-1.2
Gogebic	285	143	110	50.2	38.6	-11.6	3	1	-2	2.1	0.9	-1.2
Grand Traverse	1,955	558	884	28.5	45.2	16.7	23	6	-17	4.1	0.7	-3.4
Gratiot	909	307	347	33.8	38.2	4.4	5	3	-2	1.6	0.9	-0.8
Hillsdale	1,079	353	388	32.7	36.0	3.2	15	10	-5	4.2	2.6	-1.7
Houghton	828	455	499	55.0	60.3	5.3	22	12	-10	4.8	2.4	-2.4
Huron	607	222	226	36.6	37.2	0.7	14	8	-6	6.3	3.5	-2.8
Ingham	6,426	2,771	2,782	43.1	43.3	0.2	132	83	-49	4.8	3.0	-1.8
Ionia	1,590	650	622	40.9	39.1	-1.8	10	24	14	1.5	3.9	2.3
Iosco	397	103	124	25.9	31.2	5.3	1	3	2	1.0	2.4	1.4
Iron	193	109	119	56.5	61.7	5.2	3	2	-1	2.8	1.7	-1.1
Isabella	1,392	458	458	32.9	32.9	0.0	3	4	1	0.7	0.9	0.2
Jackson	3,716	2,104	1,990	56.6	53.6	-3.1	148	119	-29	7.0	6.0	-1.1
Kalamazoo	6,166	2,109	1,856	34.2	30.1	-4.1	89	51	-38	4.2	2.7	-1.5
Kalkaska	395	121	136	30.6	34.4	3.8	3	1	-2	2.5	0.7	-1.7
Kent	17,514	8,360	8,047	47.7	45.9	-1.8	435	370	-65	5.2	4.6	-0.6
Keweenaw	39	23	21	59.0	53.8	-5.1	2	2	0	8.7	9.5	0.8
Lake	192	90	85	46.9	44.3	-2.6	0	1	1	0.0	1.2	1.2
Lapeer	1,780	735	696	41.3	39.1	-2.2	32	25	-7	4.4	3.6	-0.8
Leelanau	350	114	167	32.6	47.7	15.1	5	4	-1	4.4	2.4	-2.0

Draft

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		Number		Percentage			Number			Percentage		
County	Kids 1 & 2	CY2013	CY2014	CY2013	CY2014	Δ	CY2013	CY2014	Δ	CY2013	CY2014	Δ
Lenawee	2,248	959	694	42.7	30.9	-11.8	51	74	23	5.3	10.7	5.3
Livingston	3,871	826	740	21.3	19.1	-2.2	9	9	0	1.1	1.2	0.1
Luce	121	69	79	57.0	65.3	8.3	1	0	-1	1.4	0.0	-1.4
Mackinac	193	88	109	45.6	56.5	10.9	5	1	-4	5.7	0.9	-4.8
Macomb	19,051	6,319	6,008	33.2	31.5	-1.6	95	80	-15	1.5	1.3	-0.2
Manistee	411	216	247	52.6	60.1	7.5	14	12	-2	6.5	4.9	-1.6
Marquette	1,364	432	406	31.7	29.8	-1.9	19	11	-8	4.4	2.7	-1.7
Mason	620	116	109	18.7	17.6	-1.1	6	5	-1	5.2	4.6	-0.6
Mecosta	851	269	269	31.6	31.6	0.0	4	2	-2	1.5	0.7	-0.7
Menominee	442	206	217	46.6	49.1	2.5	9	16	7	4.4	7.4	3.0
Midland	1,842	291	292	15.8	15.9	0.1	4	2	-2	1.4	0.7	-0.7
Missaukee	359	102	112	28.4	31.2	2.8	0	1	1	0.0	0.9	0.9
Monroe	3,378	1,252	1,133	37.1	33.5	-3.5	27	15	-12	2.2	1.3	-0.8
Montcalm	1,493	422	479	28.3	32.1	3.8	7	10	3	1.7	2.1	0.4
Montmorency	131	64	63	48.9	48.1	-0.8	0	1	1	0.0	1.6	1.6
Muskegon	4,384	1,708	1,618	39.0	36.9	-2.1	95	101	6	5.6	6.2	0.7
Newaygo	1,172	358	389	30.5	33.2	2.6	3	7	4	0.8	1.8	1.0
Oakland	27,292	7,686	7,772	28.2	28.5	0.3	137	125	-12	1.8	1.6	-0.2
Oceana	685	252	278	36.8	40.6	3.8	7	5	-2	2.8	1.8	-1.0
Ogemaw	413	76	81	18.4	19.6	1.2	2	0	-2	2.6	0.0	-2.6
Ontonagon	82	37	31	45.1	37.8	-7.3	0	2	2	0.0	6.5	6.5
Osceola	564	259	255	45.9	45.2	-0.7	7	9	2	2.7	3.5	0.8
Oscoda	168	33	16	19.6	9.5	-10.1	0	1	1	0.0	6.3	6.3
Otsego	540	187	195	34.6	36.1	1.5	0	0	0	0.0	0.0	0.0
Ottawa	7,046	2,510	2,542	35.6	36.1	0.5	75	69	-6	3.0	2.7	-0.3
Presque Isle	193	86	88	44.6	45.6	1.0	0	2	2	0.0	2.3	2.3
Roscommon	379	180	172	47.5	45.4	-2.1	4	0	-4	2.2	0.0	-2.2
Saginaw	4,623	2,784	2,722	60.2	58.9	-1.3	93	85	-8	3.3	3.1	-0.2
Saint Clair	3,574	1,223	1,306	34.2	36.5	2.3	75	37	-38	6.1	2.8	-3.3
Saint Joseph	1,684	645	680	38.3	40.4	2.1	28	26	-2	4.3	3.8	-0.5
Sanilac	949	267	281	28.1	29.6	1.5	11	4	-7	4.1	1.4	-2.7
Schoolcraft	151	76	76	50.3	50.3	0.0	0	0	0	0.0	0.0	0.0
Shiawassee	1,503	758	732	50.4	48.7	-1.7	33	30	-3	4.4	4.1	-0.3
Tuscola	1,174	585	633	49.8	53.9	4.1	14	10	-4	2.4	1.6	-0.8
Van Buren	1,924	525	498	27.3	25.9	-1.4	12	16	4	2.3	3.2	0.9
Washtenaw	7,560	1,813	1,799	24.0	23.8	-0.2	32	23	-9	1.8	1.3	-0.5
Wayne ex Det	26,966	10,469	9,537	38.8	35.4	-3.5	277	211	-66	2.6	2.2	-0.4
Wexford	865	255	305	29.5	35.3	5.8	8	3	-5	3.1	1.0	-2.2
Detroit, City of	20,048	10,520	9,648	52.5	48.1	-4.3	1077	985	-92	10.2	10.2	0.0
MICHIGAN	234,103	88,851	86,446	38.0	36.9	-1.0	3,595	3,103	-492	4.0	3.2	-0.9

From: Scott, Robert L. (DCH)
Sent: Tuesday, June 23, 2015 4:20 PM
To: Alanna M. Woolley
Cc: Katelyn Mary Burkart;Lyke Thompson;Angie Sarb
Subject: RE: 2014 EBL Numbers
Attachments: 2014 Lead Testing and EBLL 062315.pdf; MonthlyDetroit.pdf

Please see attached. Let me know if you have questions.

-----Original Message-----
From: Alanna M. Woolley [mailto:du3374@wayne.edu]
Sent: Wednesday, June 17, 2015 2:13 PM
To: Scott, Robert L. (DCH)
Cc: Katelyn Mary Burkart; Lyke Thompson; Angie Sarb
Subject: Fwd: 2014 EBL Numbers

Hi Bob,

We were hoping to do an update on 2014 EBL numbers at the next GHHI meeting on 6/25. Is there any chance that you'll have them ready before then?

Thank you!

Best,

Alanna

--
Alanna Woolley, MPA
Research Assistant
Center for Urban Studies
Wayne State University
E: du3374@wayne.edu
P: (313) 577-2207

----- Original Message -----
From: "Robert L. Scott (DCH)" <ScottR9@michigan.gov>
To: "Alanna M. Woolley" <du3374@wayne.edu>
Sent: Monday, June 1, 2015 10:26:43 AM
Subject: RE: 2014 EBL Numbers

Alanna,

I hope to work on that this week. Will send them ASAP.

Bob

-----Original Message-----

From: Alanna M. Woolley [mailto:du3374@wayne.edu]
Sent: Thursday, May 28, 2015 4:44 PM
To: Scott, Robert L. (DCH)
Subject: 2014 EBL Numbers

Hi Bob!

If you have the 2014 EBL numbers could you please send them to me?

Thank you!

Best,

Alanna

--
Alanna Woolley, MPA
Research Assistant
Center for Urban Studies
Wayne State University
E: du3374@wayne.edu
P: (313) 577-2207

--
Alanna Woolley, MPA
Research Assistant
Center for Urban Studies
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P: (313) 577-2207

Children Tested for Lead Poisoning -- Calendar Year 2014
All Counties in Michigan

Children less than Six Years of Age

				Children Tested		Children Tested, by Highest Blood Lead Level (BLL)										
County	%Pre-1950 Housing	%Pre-1978 Housing	Children less than Six Years of Age	Number of Children Tested	% Tested	<5 ug/dL	5 to 9 ug/dL, not confirmed	>= 10 ug/dL, not confirmed	Confirmed* 5-9 ug/dL	Confirmed* 10-14 ug/dL	Confirmed* 15-44 ug/dL	Confirmed* ≥45 ug/dL	Total confirmed* ≥ 5 µg/dL	% with confirmed* BLL >= 5 ug/dL	Total ≥ 5 µg/dL, confirmed & unconfirmed **	% with BLL >= 5 ug/dL, confirmed & unconfirmed **
Alcona	12.4	61.5	398	53	13.3	51	2	0	0	0	0	0	0	0.0	2	3.8
Alger	29.5	64.1	427	92	21.5	90	1	0	0	1	0	0	1	1.1	2	2.2
Allegan	23.2	51.1	8,806	1,208	13.7	1,182	21	2	3	0	0	0	3	0.2	26	2.2
Alpena	25.3	71.6	1,758	257	14.6	248	7	1	1	0	0	0	1	0.4	9	3.5
Antrim	18.8	52.6	1,370	260	19.0	258	0	0	2	0	0	0	2	0.8	2	0.8
Arenac	19.8	58.2	870	186	21.4	185	1	0	0	0	0	0	0	0.0	1	0.5
Baraga	34.0	71.7	477	135	28.3	134	1	0	0	0	0	0	0	0.0	1	0.7
Barry	27.1	57.3	4,143	491	11.9	471	16	0	3	1	0	0	4	0.8	20	4.1
Bay	33.9	75.6	7,322	1,408	19.2	1,363	26	1	10	3	4	1	18	1.3	45	3.2
Benzie	18.6	46.3	1,041	268	25.7	267	1	0	0	0	0	0	0	0.0	1	0.4
Berrien	28.6	72.2	11,681	1,943	16.6	1,887	21	4	21	4	6	0	31	1.6	56	2.9
Branch	30.9	65.3	3,506	668	19.1	647	16	1	1	3	0	0	4	0.6	21	3.1
Calhoun	36.1	75.3	10,149	2,390	23.5	2,299	27	0	51	7	6	0	64	2.7	91	3.8
Cass	22.4	59.9	3,444	426	12.4	415	6	1	3	1	0	0	4	0.9	11	2.6
Charlevoix	25.3	54.4	1,624	295	18.2	294	1	0	0	0	0	0	0	0.0	1	0.3
Cheboygan	20.9	53.5	1,414	286	20.2	279	6	0	1	0	0	0	1	0.3	7	2.4
Chippewa	25.1	58.6	2,345	440	18.8	437	0	0	3	0	0	0	3	0.7	3	0.7
Clare	14.5	58.8	2,083	446	21.4	442	4	0	0	0	0	0	0	0.0	4	0.9
Clinton	22.5	52.8	5,140	585	11.4	579	1	0	5	0	0	0	5	0.9	6	1.0
Crawford	13.7	55.6	727	85	11.7	84	1	0	0	0	0	0	0	0.0	1	1.2
Delta	33.3	68.0	2,388	413	17.3	398	13	0	1	0	1	0	2	0.5	15	3.6
Dickinson	38.9	71.7	1,575	318	20.2	317	0	0	1	0	0	0	1	0.3	1	0.3
Eaton	20.4	56.4	7,356	1,140	15.5	1,115	18	3	4	0	0	0	4	0.4	25	2.2
Emmet	23.0	48.3	2,042	362	17.7	362	0	0	0	0	0	0	0	0.0	0	0.0
Genesee	19.9	68.0	31,997	6,824	21.3	6,658	88	6	57	10	5	0	72	1.1	166	2.4
Gladwin	12.4	49.5	1,495	291	19.5	291	0	0	0	0	0	0	0	0.0	0	0.0
Gogebic	50.0	76.7	855	154	18.0	152	2	0	0	0	0	0	0	0.0	2	1.3
Grand Traverse	14.7	43.5	6,000	1,371	22.9	1,361	3	3	4	0	0	0	4	0.3	10	0.7
Gratiot	34.7	69.8	2,754	496	18.0	492	3	0	1	0	0	0	1	0.2	4	0.8
Hillsdale	36.5	63.2	3,283	814	24.8	798	12	1	3	0	0	0	3	0.4	16	2.0
Houghton	53.4	75.5	2,477	599	24.2	585	6	0	4	2	2	0	8	1.3	14	2.3
Huron	31.8	68.9	1,873	393	21.0	381	9	0	2	1	0	0	3	0.8	12	3.1
Ingham	24.9	68.2	19,248	4,747	24.7	4,614	87	4	25	11	6	0	42	0.9	133	2.8
Ionia	35.8	63.0	4,878	843	17.3	822	15	1	4	0	1	0	5	0.6	21	2.5
Iosco	12.7	65.6	1,233	150	12.2	146	3	0	1	0	0	0	1	0.7	4	2.7
Iron	44.1	72.1	573	138	24.1	135	3	0	0	0	0	0	0	0.0	3	2.2
Isabella	16.3	48.2	4,208	640	15.2	632	5	0	3	0	0	0	3	0.5	8	1.3
Jackson	33.0	67.9	11,296	2,757	24.4	2,616	88	12	34	3	4	0	41	1.5	141	5.1
Kalamazoo	22.5	62.6	18,588	3,257	17.5	3,181	42	4	23	4	2	1	30	0.9	76	2.3
Kalkaska	13.2	49.3	1,180	217	18.4	216	1	0	0	0	0	0	0	0.0	1	0.5
Kent	24.8	59.2	52,655	10,114	19.2	9,670	292	8	96	22	26	0	144	1.4	444	4.4
Keweenaw	46.9	77.6	115	25	21.7	24	1	0	0	0	0	0	0	0.0	1	4.0
Lake	12.5	52.6	585	120	20.5	119	1	0	0	0	0	0	0	0.0	1	0.8
Lapeer	20.4	52.9	5,687	919	16.2	895	18	2	3	0	1	0	4	0.4	24	2.6
Leelanau	17.9	46.5	1,111	239	21.5	235	3	1	0	0	0	0	0	0.0	4	1.7
Lenawee	33.6	67.2	6,911	1,196	17.3	1,093	62	12	22	3	4	0	29	2.4	103	8.6

Children Tested for Lead Poisoning -- Calendar Year 2014
All Counties in Michigan

Children less than Six Years of Age

				Children Tested		Children Tested, by Highest Blood Lead Level (BLL)										
County	%Pre-1950 Housing	%Pre-1978 Housing	Children less than Six Years of Age	Number of Children Tested	% Tested	<5 ug/dL	5 to 9 ug/dL, not confirmed	>= 10 ug/dL, not confirmed	Confirmed* 5-9 ug/dL	Confirmed* 10-14 ug/dL	Confirmed* 15-44 ug/dL	Confirmed* ≥45 ug/dL	Total confirmed* ≥ 5 µg/dL	% with confirmed* BLL >= 5 ug/dL	Total ≥ 5 µg/dL, confirmed & unconfirmed **	% with BLL >= 5 ug/dL, confirmed & unconfirmed **
Livingston	11.4	39.0	12,104	1,026	8.5	1,018	3	0	4	1	0	0	5	0.5	8	0.8
Luce	23.8	64.3	370	88	23.8	88	0	0	0	0	0	0	0	0.0	0	0.0
Mackinac	23.4	58.6	587	130	22.1	129	1	0	0	0	0	0	0	0.0	1	0.8
Macomb	9.3	59.1	57,878	9,526	16.5	9,408	64	5	38	2	7	2	49	0.5	118	1.2
Manistee	28.8	63.9	1,307	284	21.7	273	6	0	3	0	2	0	5	1.8	11	3.9
Marquette	27.9	69.4	4,029	471	11.7	458	3	2	8	0	0	0	8	1.7	13	2.8
Mason	32.1	64.6	1,864	414	22.2	387	24	0	3	0	0	0	3	0.7	27	6.5
Mecosta	18.2	53.4	2,520	316	12.5	314	0	0	0	0	2	0	2	0.6	2	0.6
Menominee	35.4	73.2	1,375	261	19.0	246	11	0	3	0	1	0	4	1.5	15	5.7
Midland	15.2	58.7	5,685	477	8.4	472	2	0	2	1	0	0	3	0.6	5	1.0
Missaukee	21.2	56.2	1,111	133	12.0	132	0	0	0	1	0	0	1	0.8	1	0.8
Monroe	23.0	59.0	10,355	1,571	15.2	1,555	13	1	1	1	0	0	2	0.1	16	1.0
Montcalm	27.3	57.7	4,527	749	16.5	736	6	0	5	1	1	0	7	0.9	13	1.7
Montmorency	18.1	58.6	404	83	20.5	82	1	0	0	0	0	0	0	0.0	1	1.2
Muskegon	25.8	66.2	13,224	2,572	19.4	2,425	56	9	66	10	6	0	82	3.2	147	5.7
Newaygo	19.3	53.6	3,581	447	12.5	440	6	1	0	0	0	0	0	0.0	7	1.6
Oakland	14.7	60.5	83,501	14,308	17.1	14,121	74	6	73	21	13	0	107	0.7	187	1.3
Oceana	25.8	57.8	2,091	516	24.7	506	5	0	2	3	0	0	5	1.0	10	1.9
Ogemaw	12.8	61.6	1,289	102	7.9	101	0	0	1	0	0	0	1	1.0	1	1.0
Ontonagon	39.1	73.2	251	48	19.1	46	1	0	1	0	0	0	1	2.1	2	4.2
Osceola	22.6	56.6	1,723	334	19.4	326	2	0	2	2	2	0	6	1.8	8	2.4
Oscoda	17.8	62.1	521	35	6.7	34	1	0	0	0	0	0	0	0.0	1	2.9
Otsego	12.2	50.3	1,641	325	19.8	325	0	0	0	0	0	0	0	0.0	0	0.0
Ottawa	15.7	45.3	21,390	3,012	14.1	2,937	53	4	17	1	0	0	18	0.6	75	2.5
Presque Isle	21.1	66.3	597	111	18.6	109	2	0	0	0	0	0	0	0.0	2	1.8
Roscommon	13.1	58.7	1,156	218	18.9	218	0	0	0	0	0	0	0	0.0	0	0.0
Saginaw	28.1	73.1	14,029	3,670	26.2	3,563	60	6	28	7	6	0	41	1.1	107	2.9
Saint Clair	25.8	59.4	11,046	2,731	24.7	2,661	35	7	20	5	3	0	28	1.0	70	2.6
Saint Joseph	27.5	65.1	5,125	1,012	19.7	975	20	2	12	2	1	0	15	1.5	37	3.7
Sanilac	30.7	64.6	2,879	523	18.2	519	1	0	2	1	0	0	3	0.6	4	0.8
Schoolcraft	25.5	63.3	471	99	21.0	98	0	0	1	0	0	0	1	1.0	1	1.0
Shiawassee	33.9	68.2	4,622	1,169	25.3	1,134	16	2	15	2	0	0	17	1.5	35	3.0
Tuscola	30.2	67.4	3,579	886	24.8	876	8	0	0	2	0	0	2	0.2	10	1.1
Van Buren	23.3	58.1	5,884	862	14.6	832	9	1	17	1	2	0	20	2.3	30	3.5
Washtenaw	17.2	56.5	22,833	2,604	11.4	2,577	10	1	11	2	3	0	16	0.6	27	1.0
Wayne ex Det	22.6	74.5	82,002	18,065	22.0	17,702	135	8	175	32	13	0	220	1.2	363	2.0
Wexford	23.0	53.7	2,582	362	14.0	359	1	0	0	0	2	0	2	0.6	3	0.8
Detroit, City of	62.2	93.2	59,755	23,123	38.7	21,254	246	43	1,213	215	148	4	1,580	6.8	1,869	8.1
MICHIGAN	24.7	64.8	710,976	143,122	20.1	138,356	1,809	165	2,115	389	280	8	2,792	2.0	4,766	3.3

*Confirmed: one venous result or two capillary results in that BLL range

**These columns are for comparison with previous years' data

June 23, 2015

Sources: US Census Bureau, Census 2010 (Pre-1950 Housing and Pre-1978 Housing) and American Community Survey 2013 5-year estimates (Detroit and county populations);
MDCH Data Warehouse (children tested)

From: Scott, Robert L. (DCH)
Sent: Monday, July 13, 2015 12:49 PM
To: Pamela Pugh
Cc: Pat Ritter
Subject: RE: Childhood Blood Lead Levels
Attachments: 2014 Lead Testing and EBLL 062315.pdf

Pam,

Please see attached for the latest 2014 data, which can be considered "final." It hasn't been made into a complete data report, or distributed widely—still trying to get there.

Bob

From: Pamela Pugh [mailto:pamela@urbanregenerationllc.com]
Sent: Thursday, July 09, 2015 7:20 AM
To: Scott, Robert L. (DCH)
Cc: Pat Ritter
Subject: Re: Childhood Blood Lead Levels

Greetings Bob,

Can you tell me if these are the most up-to-date and accurate figures for Saginaw County/Saginaw City:

Childhood Blood Lead Level (BLL) (Percentage)[2]	**2014**	**Target**
Children≥ 5 years old Tested for BLL	3,668 (26.1%)	
Children≥ 5 years with BLL ≥ 10 µg/dL	13 (0.35%)	0**
Children≥ 5 years with BLL ≥ 5 µg/dL	121 (3.3%)	

This data is needed for our Saginaw County Community Health Improvement Planning work. Thanks.

Pamela L. Pugh, DrPH, MS
pamela@urbanregenerationllc.com
(989) 992-6353

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Children Tested for Lead Poisoning -- Calendar Year 2014
All Counties in Michigan

Children less than Six Years of Age

				Children Tested		Children Tested, by Highest Blood Lead Level (BLL)										
County	%Pre-1950 Housing	%Pre-1978 Housing	Children less than Six Years of Age	Number of Children Tested	% Tested	<5 ug/dL	5 to 9 ug/dL, not confirmed	>= 10 ug/dL, not confirmed	Confirmed* 5-9 ug/dL	Confirmed* 10-14 ug/dL	Confirmed* 15-44 ug/dL	Confirmed* ≥45 ug/dL	Total confirmed* ≥ 5 µg/dL	% with confirmed* BLL >= 5 ug/dL	Total ≥ 5 µg/dL, confirmed & unconfirmed **	% with BLL >= 5 ug/dL, confirmed & unconfirmed **
Not Responsive																
Genesee	19.9	68.0	31,997	6,824	21.3	6,658	88	6	57	10	5	0	72	1.1	166	2.4
Not Responsive																

0.0
1.3
0.7
0.8
2.0
2.3
3.1
2.8
2.5
2.7
2.2
1.3
5.1
2.3
0.5
4.4
4.0
0.8
2.6
1.7
8.6

Children Tested for Lead Poisoning -- Calendar Year 2014
All Counties in Michigan

Children less than Six Years of Age

				Children Tested		Children Tested, by Highest Blood Lead Level (BLL)										
County	%Pre-1950 Housing	%Pre-1978 Housing	Children less than Six Years of Age	Number of Children Tested	% Tested	<5 ug/dL	5 to 9 ug/dL, not confirmed	>= 10 ug/dL, not confirmed	Confirmed* 5-9 ug/dL	Confirmed* 10-14 ug/dL	Confirmed* 15-44 ug/dL	Confirmed* ≥45 ug/dL	Total confirmed* ≥ 5 µg/dL	% with confirmed* BLL >= 5 ug/dL	Total ≥ 5 µg/dL, confirmed & unconfirmed **	% with BLL >= 5 ug/dL, confirmed & unconfirmed **

Not Responsive

*Confirmed: one venous result or two capillary results in that BLL range

**These columns are for comparison with previous years' data

June 23, 2015

Sources: US Census Bureau, Census 2010 (Pre-1950 Housing and Pre-1978 Housing) and American Community Survey 2013 5-year estimates (Detroit and county populations); MDCH Data Warehouse (children tested)

From: Scott, Robert L. (DCH)
Sent: Tuesday, July 14, 2015 12:18 PM
To: Brianna Hampton
Subject: RE: Data Reports on Blood Lead Levels
Attachments: 2014 Lead Testing and EBLL 062315.pdf

Only this so far (see attached). It can be considered "final." A more complete annual report will be out one of these days.

From: Brianna Hampton [mailto:BHampton@co.jackson.mi.us]
Sent: Tuesday, July 14, 2015 12:00 PM
To: Scott, Robert L. (DCH)
Subject: Data Reports on Blood Lead Levels

Hi Bob,

I wanted to check in to see if there is any updated (2014) Data Reports on Blood Lead Levels. We use some of the information from these reports in our presentations, and I just wanted to make sure we had the most recent information that is available.

I appreciate any direction you can provide. Thanks!

Brianna Hampton
Childhood Lead Poisoning Prevention Health Educator
Jackson County Health Department
1715 Lansing Ave. Ste 221
Jackson, MI. 49202
BHampton@co.jackson.mi.us
Phone (517) 414-3902
Fax (517) 788-4373

Children Tested for Lead Poisoning -- Calendar Year 2014
All Counties in Michigan

Children less than Six Years of Age

				Children Tested		Children Tested, by Highest Blood Lead Level (BLL)										
County	%Pre-1950 Housing	%Pre-1978 Housing	Children less than Six Years of Age	Number of Children Tested	% Tested	<5 ug/dL	5 to 9 ug/dL, not confirmed	>= 10 ug/dL, not confirmed	Confirmed* 5-9 ug/dL	Confirmed* 10-14 ug/dL	Confirmed* 15-44 ug/dL	Confirmed* ≥45 ug/dL	Total confirmed* ≥ 5 µg/dL	% with confirmed* BLL >= 5 ug/dL	Total ≥ 5 µg/dL, confirmed & unconfirmed **	% with BLL >= 5 ug/dL, confirmed & unconfirmed **
Alcona	12.4	61.5	398	53	13.3	51	2	0	0	0	0	0	0	0.0	2	3.8
Alger	29.5	64.1	427	92	21.5	90	1	0	0	1	0	0	1	1.1	2	2.2
Allegan	23.2	51.1	8,806	1,208	13.7	1,182	21	2	3	0	0	0	3	0.2	26	2.2
Alpena	25.3	71.6	1,758	257	14.6	248	7	1	1	0	0	0	1	0.4	9	3.5
Antrim	18.8	52.6	1,370	260	19.0	258	0	0	2	0	0	0	2	0.8	2	0.8
Arenac	19.8	58.2	870	186	21.4	185	1	0	0	0	0	0	0	0.0	1	0.5
Baraga	34.0	71.7	477	135	28.3	134	1	0	0	0	0	0	0	0.0	1	0.7
Barry	27.1	57.3	4,143	491	11.9	471	16	0	3	1	0	0	4	0.8	20	4.1
Bay	33.9	75.6	7,322	1,408	19.2	1,363	26	1	10	3	4	1	18	1.3	45	3.2
Benzie	18.6	46.3	1,041	268	25.7	267	1	0	0	0	0	0	0	0.0	1	0.4
Berrien	28.6	72.2	11,681	1,943	16.6	1,887	21	4	21	4	6	0	31	1.6	56	2.9
Branch	30.9	65.3	3,506	668	19.1	647	16	1	1	3	0	0	4	0.6	21	3.1
Calhoun	36.1	75.3	10,149	2,390	23.5	2,299	27	0	51	7	6	0	64	2.7	91	3.8
Cass	22.4	59.9	3,444	426	12.4	415	6	1	3	1	0	0	4	0.9	11	2.6
Charlevoix	25.3	54.4	1,624	295	18.2	294	1	0	0	0	0	0	0	0.0	1	0.3
Cheboygan	20.9	53.5	1,414	286	20.2	279	6	0	1	0	0	0	1	0.3	7	2.4
Chippewa	25.1	58.6	2,345	440	18.8	437	0	0	3	0	0	0	3	0.7	3	0.7
Clare	14.5	58.8	2,083	446	21.4	442	4	0	0	0	0	0	0	0.0	4	0.9
Clinton	22.5	52.8	5,140	585	11.4	579	1	0	5	0	0	0	5	0.9	6	1.0
Crawford	13.7	55.6	727	85	11.7	84	1	0	0	0	0	0	0	0.0	1	1.2
Delta	33.3	68.0	2,388	413	17.3	398	13	0	1	0	1	0	2	0.5	15	3.6
Dickinson	38.9	71.7	1,575	318	20.2	317	0	0	1	0	0	0	1	0.3	1	0.3
Eaton	20.4	56.4	7,356	1,140	15.5	1,115	18	3	4	0	0	0	4	0.4	25	2.2
Emmet	23.0	48.3	2,042	362	17.7	362	0	0	0	0	0	0	0	0.0	0	0.0
Genesee	19.9	68.0	31,997	6,824	21.3	6,658	88	6	57	10	5	0	72	1.1	166	2.4
Gladwin	12.4	49.5	1,495	291	19.5	291	0	0	0	0	0	0	0	0.0	0	0.0
Gogebic	50.0	76.7	855	154	18.0	152	2	0	0	0	0	0	0	0.0	2	1.3
Grand Traverse	14.7	43.5	6,000	1,371	22.9	1,361	3	3	4	0	0	0	4	0.3	10	0.7
Gratiot	34.7	69.8	2,754	496	18.0	492	3	0	1	0	0	0	1	0.2	4	0.8
Hillsdale	36.5	63.2	3,283	814	24.8	798	12	1	3	0	0	0	3	0.4	16	2.0
Houghton	53.4	75.5	2,477	599	24.2	585	6	0	4	2	2	0	8	1.3	14	2.3
Huron	31.8	68.9	1,873	393	21.0	381	9	0	2	1	0	0	3	0.8	12	3.1
Ingham	24.9	68.2	19,248	4,747	24.7	4,614	87	4	25	11	6	0	42	0.9	133	2.8
Ionia	35.8	63.0	4,878	843	17.3	822	15	1	4	0	1	0	5	0.6	21	2.5
Iosco	12.7	65.6	1,233	150	12.2	146	3	0	1	0	0	0	1	0.7	4	2.7
Iron	44.1	72.1	573	138	24.1	135	3	0	0	0	0	0	0	0.0	3	2.2
Isabella	16.3	48.2	4,208	640	15.2	632	5	0	3	0	0	0	3	0.5	8	1.3
Jackson	33.0	67.9	11,296	2,757	24.4	2,616	88	12	34	3	4	0	41	1.5	141	5.1
Kalamazoo	22.5	62.6	18,588	3,257	17.5	3,181	42	4	23	4	2	1	30	0.9	76	2.3
Kalkaska	13.2	49.3	1,180	217	18.4	216	1	0	0	0	0	0	0	0.0	1	0.5
Kent	24.8	59.2	52,655	10,114	19.2	9,670	292	8	96	22	26	0	144	1.4	444	4.4
Keweenaw	46.9	77.6	115	25	21.7	24	1	0	0	0	0	0	0	0.0	1	4.0
Lake	12.5	52.6	585	120	20.5	119	1	0	0	0	0	0	0	0.0	1	0.8
Lapeer	20.4	52.9	5,687	919	16.2	895	18	2	3	0	1	0	4	0.4	24	2.6
Leelanau	17.9	46.5	1,111	239	21.5	235	3	1	0	0	0	0	0	0.0	4	1.7
Lenawee	33.6	67.2	6,911	1,196	17.3	1,093	62	12	22	3	4	0	29	2.4	103	8.6

Children Tested for Lead Poisoning -- Calendar Year 2014
All Counties in Michigan

Children less than Six Years of Age

				Children Tested		Children Tested, by Highest Blood Lead Level (BLL)										
County	%Pre-1950 Housing	%Pre-1978 Housing	Children less than Six Years of Age	Number of Children Tested	% Tested	<5 ug/dL	5 to 9 ug/dL, not confirmed	>= 10 ug/dL, not confirmed	Confirmed* 5-9 ug/dL	Confirmed* 10-14 ug/dL	Confirmed* 15-44 ug/dL	Confirmed* ≥45 ug/dL	Total confirmed* ≥ 5 µg/dL	% with confirmed* BLL >= 5 ug/dL	Total ≥ 5 µg/dL, confirmed & unconfirmed **	% with BLL >= 5 ug/dL, confirmed & unconfirmed **
Livingston	11.4	39.0	12,104	1,026	8.5	1,018	3	0	4	1	0	0	5	0.5	8	0.8
Luce	23.8	64.3	370	88	23.8	88	0	0	0	0	0	0	0	0.0	0	0.0
Mackinac	23.4	58.6	587	130	22.1	129	1	0	0	0	0	0	0	0.0	1	0.8
Macomb	9.3	59.1	57,878	9,526	16.5	9,408	64	5	38	2	7	2	49	0.5	118	1.2
Manistee	28.8	63.9	1,307	284	21.7	273	6	0	3	0	2	0	5	1.8	11	3.9
Marquette	27.9	69.4	4,029	471	11.7	458	3	2	8	0	0	0	8	1.7	13	2.8
Mason	32.1	64.6	1,864	414	22.2	387	24	0	3	0	0	0	3	0.7	27	6.5
Mecosta	18.2	53.4	2,520	316	12.5	314	0	0	0	0	2	0	2	0.6	2	0.6
Menominee	35.4	73.2	1,375	261	19.0	246	11	0	3	0	1	0	4	1.5	15	5.7
Midland	15.2	58.7	5,685	477	8.4	472	2	0	2	1	0	0	3	0.6	5	1.0
Missaukee	21.2	56.2	1,111	133	12.0	132	0	0	0	1	0	0	1	0.8	1	0.8
Monroe	23.0	59.0	10,355	1,571	15.2	1,555	13	1	1	1	0	0	2	0.1	16	1.0
Montcalm	27.3	57.7	4,527	749	16.5	736	6	0	5	1	1	0	7	0.9	13	1.7
Montmorency	18.1	58.6	404	83	20.5	82	1	0	0	0	0	0	0	0.0	1	1.2
Muskegon	25.8	66.2	13,224	2,572	19.4	2,425	56	9	66	10	6	0	82	3.2	147	5.7
Newaygo	19.3	53.6	3,581	447	12.5	440	6	1	0	0	0	0	0	0.0	7	1.6
Oakland	14.7	60.5	83,501	14,308	17.1	14,121	74	6	73	21	13	0	107	0.7	187	1.3
Oceana	25.8	57.8	2,091	516	24.7	506	5	0	2	3	0	0	5	1.0	10	1.9
Ogemaw	12.8	61.6	1,289	102	7.9	101	0	0	1	0	0	0	1	1.0	1	1.0
Ontonagon	39.1	73.2	251	48	19.1	46	1	0	1	0	0	0	1	2.1	2	4.2
Osceola	22.6	56.6	1,723	334	19.4	326	2	0	2	2	2	0	6	1.8	8	2.4
Oscoda	17.8	62.1	521	35	6.7	34	1	0	0	0	0	0	0	0.0	1	2.9
Otsego	12.2	50.3	1,641	325	19.8	325	0	0	0	0	0	0	0	0.0	0	0.0
Ottawa	15.7	45.3	21,390	3,012	14.1	2,937	53	4	17	1	0	0	18	0.6	75	2.5
Presque Isle	21.1	66.3	597	111	18.6	109	2	0	0	0	0	0	0	0.0	2	1.8
Roscommon	13.1	58.7	1,156	218	18.9	218	0	0	0	0	0	0	0	0.0	0	0.0
Saginaw	28.1	73.1	14,029	3,670	26.2	3,563	60	6	28	7	6	0	41	1.1	107	2.9
Saint Clair	25.8	59.4	11,046	2,731	24.7	2,661	35	7	20	5	3	0	28	1.0	70	2.6
Saint Joseph	27.5	65.1	5,125	1,012	19.7	975	20	2	12	2	1	0	15	1.5	37	3.7
Sanilac	30.7	64.6	2,879	523	18.2	519	1	0	2	1	0	0	3	0.6	4	0.8
Schoolcraft	25.5	63.3	471	99	21.0	98	0	0	1	0	0	0	1	1.0	1	1.0
Shiawassee	33.9	68.2	4,622	1,169	25.3	1,134	16	2	15	2	0	0	17	1.5	35	3.0
Tuscola	30.2	67.4	3,579	886	24.8	876	8	0	0	2	0	0	2	0.2	10	1.1
Van Buren	23.3	58.1	5,884	862	14.6	832	9	1	17	1	2	0	20	2.3	30	3.5
Washtenaw	17.2	56.5	22,833	2,604	11.4	2,577	10	1	11	2	3	0	16	0.6	27	1.0
Wayne ex Det	22.6	74.5	82,002	18,065	22.0	17,702	135	8	175	32	13	0	220	1.2	363	2.0
Wexford	23.0	53.7	2,582	362	14.0	359	1	0	0	0	2	0	2	0.6	3	0.8
Detroit, City of	62.2	93.2	59,755	23,123	38.7	21,254	246	43	1,213	215	148	4	1,580	6.8	1,869	8.1
MICHIGAN	24.7	64.8	710,976	143,122	20.1	138,356	1,809	165	2,115	389	280	8	2,792	2.0	4,766	3.3

*Confirmed: one venous result or two capillary results in that BLL range

**These columns are for comparison with previous years' data

June 23, 2015

Sources: US Census Bureau, Census 2010 (Pre-1950 Housing and Pre-1978 Housing) and American Community Survey 2013 5-year estimates (Detroit and county populations);
MDCH Data Warehouse (children tested)

From: Scott, Robert L. (DCH)
Sent: Monday, July 20, 2015 12:59 PM
To: Paul Diefenbach
Subject: RE: Medicaid Lead Testing reports
Attachments: 2014 Cities 072015.xlsx; 2014 Lead Testing and EBLL 1-2 072015.xlsx; 2014 Medicaid 072015.xlsx

Paul,

Please see three attached files. Let me know if you have questions.

Bob

From: Paul Diefenbach [mailto:pdiefenbach@mlpp.org]
Sent: Wednesday, July 15, 2015 9:12 AM
To: Scott, Robert L. (DCH)
Subject: RE: Medicaid Lead Testing reports

I didn't get an attachment. We use the data for 12 cities – all but Benton Harbor and Hamtramck.

From: Scott, Robert L. (DCH) [mailto:ScottR9@michigan.gov]
Sent: Tuesday, July 14, 2015 4:28 PM
To: Paul Diefenbach
Subject: RE: Medicaid Lead Testing reports

Paul,

I apologize for letting the target date slip by. I think I can work on them now, will try to have them to you by the end of this week. Please see attached—do you need all of those cities, or are you looking for specific ones?

Thanks,
Bob

From: Paul Diefenbach [mailto:pdiefenbach@mlpp.org]
Sent: Tuesday, July 14, 2015 11:17 AM
To: Scott, Robert L. (DCH)
Subject: FW: Medicaid Lead Testing reports

Bob,
Could you estimate when the files will be ready?
Thanks.

From: Scott, Robert L. (DCH) [mailto:ScottR9@michigan.gov]
Sent: Tuesday, May 19, 2015 3:41 PM
To: Paul Diefenbach
Subject: RE: Medicaid Lead Testing reports

Will do!

From: Paul Diefenbach [mailto:pdiefenbach@mlpp.org]
Sent: Tuesday, May 19, 2015 3:18 PM
To: Scott, Robert L. (DCH)
Subject: Medicaid Lead Testing reports

Hi Bob,
Attached are the annual reports you have been sending us. Could you please send the 2014 versions? June 19 would be a good target date.

Thank you.

	A	B	C	D
1	**Children Tested for Lead Poisoning -- Calendar Year 2014**			
2	**Selected Communities**			
3				
4	**Children less than Six Years of Age**			
5				
6				
7	Community	%Pre-1950 Housing	%Pre-1978 Housing	Children less than Six Years of Age
8	Battle Creek	43.0	79.6	4,811
9	Benton Harbor	57.7	84.0	1,294
10	Dearborn	48.1	85.3	9,914
11	Detroit	62.2	93.3	59,755
12	Flint	38.0	89.7	9,639
13	Grand Rapids	48.1	81.5	17,577
14	Hamtramck	78.2	94.6	2,303
15	Highland Park	68.8	87.9	711
16	Jackson	67.6	91.6	3,550
17	Kalamazoo	40.8	78.8	4,966
18	Lansing	35.7	81.9	10,236
19	Muskegon/MuskHts	48.6	84.4	4,392
20	Pontiac	32.6	77.3	5,208
21	Saginaw	55.6	91.4	4,616
22				
23	Subtotal	53.5	88.4	122,953
24				
25	Michigan	24.7	64.8	710,976
26				
27				
28				
29	**Children One and Two Years of Age**			
30				
31				
32	Community	%Pre-1950 Housing	%Pre-1978 Housing	Children One and Two Years of Age
33	Battle Creek	43.0	79.6	1,628

	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
1																
2																
3																
4																
5																
6	Children Tested			Children Tested, by Highest Blood Lead Level (BLL)												
7	Number of Children Tested	% Tested		<5 ug/dL		5 to 9 ug/dL, not confirmed by venous	>= 10 ug/dL, not confirmed by venous		Confirmed 5-9 ug/dL (venous only)	Confirmed 10-14 ug/dL (venous only)	Confirmed 15-44 ug/dL (venous only)	Confirmed ≥45 ug/dL (venous only)		Total confirmed ≥ 5 µg/dL	% with confirmed BLL >= 5 ug/dL	
8	1,172	24.4		1,119		18	0		27	5	3	0		35	3.0	
9	317	24.5		295		7	3		8	2	2	0		12	3.8	
10	2,356	23.8		2,313		9	0		29	5	0	0		34	1.4	
11	22,842	38.2		20,966		279	51		1,183	214	145	4		1,546	6.8	
12	2,343	24.3		2,237		43	5		45	8	5	0		58	2.5	
13	4,379	24.9		4,020		237	7		74	20	21	0		115	2.6	
14	1,008	43.8		929		25	3		42	6	3	0		51	5.1	
15	289	40.6		243		4	1		28	9	4	0		41	14.2	
16	1,069	30.1		976		63	11		15	1	3	0		19	1.8	
17	1,306	26.3		1,240		38	5		17	3	2	1		23	1.8	
18	2,995	29.3		2,892		68	4		17	10	4	0		31	1.0	
19	1,177	26.8		1,054		47	8		53	9	6	0		68	5.8	
20	1,579	30.3		1,551		5	0		14	6	3	0		23	1.5	
21	1,540	33.4		1,452		49	6		22	6	5	0		33	2.1	
22																
23	40,527	33.0		37,560		858	101		1,510	292	201	5		2,003	4.9	
24																
25	143,123	20.1		136,152		2,119	212		2,050	387	277	8		2,722	1.9	
26																
27																
28																
29																
30																
31	Children Tested			Children Tested, by Highest Blood Lead Level (BLL)												
32	Number of Children Tested	% Tested		<5 ug/dL		5 to 9 ug/dL, not confirmed by venous	>= 10 ug/dL, not confirmed by venous		Confirmed 5-9 ug/dL (venous only)	Confirmed 10-14 ug/dL (venous only)	Confirmed 15-44 ug/dL (venous only)	Confirmed ≥45 ug/dL (venous only)		Total confirmed ≥ 5 µg/dL	% with confirmed BLL >= 5 ug/dL	
33	639	39.3		606		8	1		21	3	0	0		24	3.8	

	U	V
1		
2		
3		
4		
5		
6		
7	Total ≥ 5 µg/dL, confirmed & unconfirmed*	% with BLL >= 5 ug/dL, confirmed & unconfirmed*
8	88	7.5
9	34	10.7
10	77	3.3
11	3,422	15.0
12	164	7.0
13	474	10.8
14	130	12.9
15	87	30.1
16	112	10.5
17	89	6.8
18	134	4.5
19	191	16.2
20	51	3.2
21	121	7.9
22		
23	4,970	12.3
24		
25	5,053	3.5
26		
27		
28		
29		
30		
31		
32	Total ≥ 5 µg/dL, confirmed & unconfirmed*	% with BLL >= 5 ug/dL, confirmed & unconfirmed*
33	57	8.9

	A	B	C	D
34	Benton Harbor	57.7	84.0	447
35	Dearborn	48.1	85.3	3,338
36	Detroit	62.2	93.3	20,048
37	Flint	38.0	89.7	3,266
38	Grand Rapids	48.1	81.5	5,962
39	Hamtramck	78.2	94.6	756
40	Highland Park	68.8	87.9	214
41	Jackson	67.6	91.6	1,204
42	Kalamazoo	40.8	78.8	1,626
43	Lansing	35.7	81.9	3,523
44	Muskegon/MuskHts	48.6	84.4	1,497
45	Pontiac	32.6	77.3	1,764
46	Saginaw	55.6	91.4	1,530
47				
48	Subtotal	53.5	88.4	46,803
49				
50	Michigan	24.7	64.8	234,103
51				
52				
53	*These columns are included for comparison with previous years' data			
54	Sources: US Census Bureau, Census 2010 (Pre-1950 Housing & Pre-1978 Housing) and American Community Survey 2013 5-year estimates (Community populations); MDCH Data Warehouse (children tested)			

	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
34	236	52.8		219		6	3		6	1	1	0		8	3.4	
35	1,200	35.9		1,182		5	0		11	2	0	0		13	1.1	
36	9,641	48.1		8,674		160	25		577	115	88	0		780	8.1	
37	1,502	46.0		1,431		31	5		27	5	3	0		35	2.3	
38	3,464	58.1		3,180		195	5		51	16	17	0		84	2.4	
39	455	60.2		409		14	3		23	4	2	0		29	6.4	
40	127	59.3		102		3	0		17	3	2	0		22	17.3	
41	740	61.5		666		53	7		12	0	2	0		14	1.9	
42	723	44.5		684		22	1		12	3	1	0		16	2.2	
43	1,751	49.7		1,689		41	4		9	6	2	0		17	1.0	
44	705	47.1		622		29	5		36	7	6	0		49	7.0	
45	883	50.1		865		2	0		10	3	3	0		16	1.8	
46	1,100	71.9		1,039		34	4		15	4	4	0		23	2.1	
47																
48	23,166	49.5		21,368		603	63		827	172	131	0		1,130	4.9	
49																
50	87,917	37.6		84,776		1,469	139		1,122	230	179	2		1,557	1.8	
51																
52																
53																
54																

	U	V
34	25	10.6
35	31	2.6
36	1,745	18.1
37	106	7.1
38	368	10.6
39	75	16.5
40	47	37.0
41	88	11.9
42	55	7.6
43	79	4.5
44	132	18.7
45	34	3.9
46	84	7.6
47		
48	2,926	12.6
49		
50	3,165	3.6
51		
52		
53		
54		7/20/2015

	A	B	C	D
1	**Children Tested for Lead Poisoning -- Calendar Year 2014**			
2	**All Counties in Michigan**			
3				
4	**Children One to Two Years of Age**			
5				
6				
7	County	%Pre-1950 Housing	%Pre-1978 Housing	Children One to Two Years of Age
8	Alcona	12.4	61.5	130
9	Alger	29.5	64.1	130
10	Allegan	23.2	51.1	2,888
11	Alpena	25.3	71.6	570
12	Antrim	18.8	52.6	450
13	Arenac	19.8	58.2	281
14	Baraga	34.0	71.7	165
15	Barry	27.1	57.3	1,328
16	Bay	33.9	75.6	2,410
17	Benzie	18.6	46.3	338
18	Berrien	28.6	72.2	3,855
19	Branch	30.9	65.3	1,157
20	Calhoun	36.1	75.3	3,366
21	Cass	22.4	59.9	1,120
22	Charlevoix	25.3	54.4	523
23	Cheboygan	20.9	53.5	457
24	Chippewa	25.1	58.6	775
25	Clare	14.5	58.8	700
26	Clinton	22.5	52.8	1,650
27	Crawford	13.7	55.6	237
28	Delta	33.3	68.0	782
29	Dickinson	38.9	71.7	529
30	Eaton	20.4	56.4	2,410

	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
1																	
2																	
3																	
4																	
5																	
6	Children Tested			Children Tested, by Highest Blood Lead Level (BLL)													
7	Number of Children Tested	% Tested		<5 ug/dL		5 to 9 ug/dL, not confirmed by venous	>= 10 ug/dL, not confirmed by venous		Confirmed 5-9 ug/dL (venous only)	Confirmed 10-14 ug/dL (venous only)	Confirmed 15-44 ug/dL (venous only)	Confirmed ≥45 ug/dL (venous only)		Total confirmed ≥ 5 µg/dL	% with confirmed BLL >= 5 ug/dL		Total ≥ 5 µg/dL, confirmed & unconfirmed*
8	43	33.1		41		2	0		0	0	0	0		0	0.0		2
9	76	58.5		74		1	0		0	1	0	0		1	1.3		2
10	872	30.2		848		19	2		3	0	0	0		3	0.3		24
11	218	38.2		210		7	0		1	0	0	0		1	0.5		8
12	191	42.4		189		0	0		2	0	0	0		2	1.0		2
13	136	48.4		135		1	0		0	0	0	0		0	0.0		1
14	91	55.2		91		0	0		0	0	0	0		0	0.0		0
15	387	29.1		371		13	0		2	1	0	0		3	0.8		16
16	1,233	51.2		1,195		24	2		8	3	1	0		12	1.0		38
17	178	52.7		176		2	0		0	0	0	0		0	0.0		2
18	1,602	41.6		1,554		22	5		14	3	4	0		21	1.3		48
19	239	20.7		232		6	0		0	1	0	0		1	0.4		7
20	1,317	39.1		1,257		17	1		35	4	3	0		42	3.2		60
21	364	32.5		353		7	1		2	1	0	0		3	0.8		11
22	213	40.7		212		1	0		0	0	0	0		0	0.0		1
23	214	46.8		209		5	0		0	0	0	0		0	0.0		5
24	268	34.6		265		1	0		2	0	0	0		2	0.7		3
25	359	51.3		355		4	0		0	0	0	0		0	0.0		4
26	342	20.7		338		1	0		3	0	0	0		3	0.9		4
27	67	28.3		66		1	0		0	0	0	0		0	0.0		1
28	351	44.9		335		14	0		1	0	1	0		2	0.6		16
29	288	54.4		287		0	0		1	0	0	0		1	0.3		1
30	772	32.0		753		13	3		3	0	0	0		3	0.4		19

	V
1	
2	
3	
4	
5	
6	
7	% with BLL >= 5 ug/dL, confirmed & unconfirmed*
8	4.7
9	2.6
10	2.8
11	3.7
12	1.0
13	0.7
14	0.0
15	4.1
16	3.1
17	1.1
18	3.0
19	2.9
20	4.6
21	3.0
22	0.5
23	2.3
24	1.1
25	1.1
26	1.2
27	1.5
28	4.6
29	0.3
30	2.5

	A	B	C	D
31	Emmet	23.0	48.3	656
32	Genesee	19.9	68.0	10,583
33	Gladwin	12.4	49.5	486
34	Gogebic	50.0	76.7	285
35	Grand Traverse	14.7	43.5	1,955
36	Gratiot	34.7	69.8	909
37	Hillsdale	36.5	63.2	1,079
38	Houghton	53.4	75.5	828
39	Huron	31.8	68.9	607
40	Ingham	24.9	68.2	6,426
41	Ionia	35.8	63.0	1,590
42	Iosco	12.7	65.6	397
43	Iron	44.1	72.1	193
44	Isabella	16.3	48.2	1,392
45	Jackson	33.0	67.9	3,716
46	Kalamazoo	22.5	62.6	6,166
47	Kalkaska	13.2	49.3	395
48	Kent	24.8	59.2	17,514
49	Keweenaw	46.9	77.6	39
50	Lake	12.5	52.6	192
51	Lapeer	20.4	52.9	1,780
52	Leelanau	17.9	46.5	350
53	Lenawee	33.6	67.2	2,248
54	Livingston	11.4	39.0	3,871
55	Luce	23.8	64.3	121
56	Mackinac	23.4	58.6	193
57	Macomb	9.3	59.1	19,051
58	Manistee	28.8	63.9	411
59	Marquette	27.9	69.4	1,364
60	Mason	32.1	64.6	620
61	Mecosta	18.2	53.4	851
62	Menominee	35.4	73.2	442

	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
31	266	40.5		266		0	0		0	0	0	0		0	0.0		0
32	4,326	40.9		4,207		68	9		34	5	3	0		42	1.0		119
33	193	39.7		193		0	0		0	0	0	0		0	0.0		0
34	117	41.1		115		2	0		0	0	0	0		0	0.0		2
35	893	45.7		887		3	1		2	0	0	0		2	0.2		6
36	359	39.5		356		2	0		1	0	0	0		1	0.3		3
37	395	36.6		384		6	2		3	0	0	0		3	0.8		11
38	505	61.0		493		4	0		4	2	2	0		8	1.6		12
39	229	37.7		220		8	0		1	0	0	0		1	0.4		9
40	2,832	44.1		2,749		56	5		14	6	2	0		22	0.8		83
41	628	39.5		604		18	2		3	0	1	0		4	0.6		24
42	124	31.2		121		3	0		0	0	0	0		0	0.0		3
43	120	62.2		118		2	0		0	0	0	0		0	0.0		2
44	462	33.2		458		3	0		1	0	0	0		1	0.2		4
45	2,021	54.4		1,900		87	8		21	2	3	0		26	1.3		121
46	1,889	30.6		1,838		26	4		16	3	1	1		21	1.1		51
47	138	34.9		137		1	0		0	0	0	0		0	0.0		1
48	8,193	46.8		7,816		267	6		64	19	21	0		104	1.3		377
49	21	53.8		19		2	0		0	0	0	0		0	0.0		2
50	87	45.3		86		1	0		0	0	0	0		0	0.0		1
51	705	39.6		680		21	2		1	0	1	0		2	0.3		25
52	169	48.3		165		3	1		0	0	0	0		0	0.0		4
53	688	30.6		613		51	6		13	2	3	0		18	2.6		75
54	750	19.4		741		4	0		4	1	0	0		5	0.7		9
55	79	65.3		79		0	0		0	0	0	0		0	0.0		0
56	113	58.5		112		1	0		0	0	0	0		0	0.0		1
57	6,156	32.3		6,075		47	5		23	2	3	1		29	0.5		81
58	247	60.1		235		9	0		1	0	2	0		3	1.2		12
59	414	30.4		402		3	2		7	0	0	0		7	1.7		12
60	111	17.9		106		4	0		1	0	0	0		1	0.9		5
61	279	32.8		277		0	0		0	1	1	0		2	0.7		2
62	219	49.5		203		11	1		3	0	1	0		4	1.8		16

	V
31	0.0
32	2.8
33	0.0
34	1.7
35	0.7
36	0.8
37	2.8
38	2.4
39	3.9
40	2.9
41	3.8
42	2.4
43	1.7
44	0.9
45	6.0
46	2.7
47	0.7
48	4.6
49	9.5
50	1.1
51	3.5
52	2.4
53	10.9
54	1.2
55	0.0
56	0.9
57	1.3
58	4.9
59	2.9
60	4.5
61	0.7
62	7.3

	A	B	C	D
63	Midland	15.2	58.7	1,842
64	Missaukee	21.2	56.2	359
65	Monroe	23.0	59.0	3,378
66	Montcalm	27.3	57.7	1,493
67	Montmorency	18.1	58.6	131
68	Muskegon	25.8	66.2	4,384
69	Newaygo	19.3	53.6	1,172
70	Oakland	14.7	60.5	27,292
71	Oceana	25.8	57.8	685
72	Ogemaw	12.8	61.6	413
73	Ontonagon	39.1	73.2	82
74	Osceola	22.6	56.6	564
75	Oscoda	17.8	62.1	168
76	Otsego	12.2	50.3	540
77	Ottawa	15.7	45.3	7,046
78	Presque Isle	21.1	66.3	193
79	Roscommon	13.1	58.7	379
80	Saginaw	28.1	73.1	4,623
81	Saint Clair	25.8	59.4	3,574
82	Saint Joseph	27.5	65.1	1,684
83	Sanilac	30.7	64.6	949
84	Schoolcraft	25.5	63.3	151
85	Shiawassee	33.9	68.2	1,503
86	Tuscola	30.2	67.4	1,174
87	Van Buren	23.3	58.1	1,924
88	Washtenaw	17.2	56.5	7,560
89	Wayne ex Det	22.6	74.5	26,966
90	Wexford	23.0	53.7	865
91	Detroit, City of	62.2	93.2	20,048
92	MICHIGAN	24.7	64.8	234,103
93				
94	*These columns are included for comparison with previous years' data			

	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
63	297	16.1		295		1	0		1	0	0	0		1	0.3		2
64	113	31.5		112		0	0		0	1	0	0		1	0.9		1
65	1,158	34.3		1,143		12	1		1	1	0	0		2	0.2		15
66	494	33.1		484		4	0		4	1	1	0		6	1.2		10
67	64	48.9		63		1	0		0	0	0	0		0	0.0		1
68	1,652	37.7		1,546		44	9		40	7	6	0		53	3.2		106
69	395	33.7		388		6	1		0	0	0	0		0	0.0		7
70	7,882	28.9		7,759		61	7		38	9	8	0		55	0.7		123
71	276	40.3		271		3	0		1	1	0	0		2	0.7		5
72	81	19.6		80		0	0		1	0	0	0		1	1.2		1
73	31	37.8		29		2	0		0	0	0	0		0	0.0		2
74	260	46.1		251		3	0		2	3	1	0		6	2.3		9
75	18	10.7		16		2	0		0	0	0	0		0	0.0		2
76	197	36.5		197		0	0		0	0	0	0		0	0.0		0
77	2,576	36.6		2,507		51	5		12	1	0	0		13	0.5		69
78	89	46.1		87		2	0		0	0	0	0		0	0.0		2
79	172	45.4		172		0	0		0	0	0	0		0	0.0		0
80	2,756	59.6		2,670		54	5		17	5	5	0		27	1.0		86
81	1,333	37.3		1,296		24	3		5	3	2	0		10	0.8		37
82	691	41.0		665		18	3		2	2	1	0		5	0.7		26
83	291	30.7		286		4	0		0	1	0	0		1	0.3		5
84	80	53.0		80		0	0		0	0	0	0		0	0.0		0
85	749	49.8		718		16	2		11	2	0	0		13	1.7		31
86	650	55.4		639		10	0		0	1	0	0		1	0.2		11
87	507	26.4		490		6	1		8	0	2	0		10	2.0		17
88	1,834	24.3		1,809		10	2		8	2	3	0		13	0.7		25
89	9,769	36.2		9,539		100	7		100	18	7	0		125	1.3		232
90	312	36.1		309		1	0		0	0	2	0		2	0.6		3
91	9,641	48.1		8,674		160	25		577	115	88	0		780	8.1		965
92	87,917	37.6		84,776		1,469	139		1,122	230	179	2		1,533	1.7		3,141
93																	
94																	

	V
63	0.7
64	0.9
65	1.3
66	2.0
67	1.6
68	6.4
69	1.8
70	1.6
71	1.8
72	1.2
73	6.5
74	3.5
75	11.1
76	0.0
77	2.7
78	2.2
79	0.0
80	3.1
81	2.8
82	3.8
83	1.7
84	0.0
85	4.1
86	1.7
87	3.4
88	1.4
89	2.4
90	1.0
91	10.0
92	3.6
93	
94	

	A	B	C	D
95				
96	July 20, 2015			
97	Sources: US Census Bureau, Census 2010 (Pre-1950 Housing and Pre-1978 Housing) and American Community Survey 2013 5-year estimates (Detroit and county populations);			
98	MDCH Data Warehouse (children tested)			

	A	B	C	D	E	F	G	H
1	**Children Tested for Lead Poisoning -- Calendar Year 2014**							
2	**All Counties in Michigan**							
3								
4	**Blood Lead Testing Among Children who are Insured by Medicaid**							
5								
6		Children age 1 & 2 years, Insured by Medicaid						
7	County	Children, age 1-2 yrs	Children Tested	% Tested	Confirmed ≥ 5 µg/dL (venous only)	% with confirmed BLL >= 5 ug/dL		Total ≥ 5 µg/dL, confirmed & unconfirmed*
8	Alcona	109	34	31.2	0	0.0		2
9	Alger	83	64	77.1	1	1.6		2
10	Allegan	1,336	629	47.1	3	0.5		17
11	Alpena	339	204	60.2	1	0.5		7
12	Antrim	273	171	62.6	2	1.2		2
13	Arenac	157	111	70.7	0	0.0		1
14	Baraga	113	65	57.5	0	0.0		0
15	Barry	589	319	54.2	3	0.9		16
16	Bay	1,159	888	76.6	11	1.2		34
17	Benzie	151	126	83.4	0	0.0		2
18	Berrien	2,392	1,424	59.5	19	1.3		42
19	Branch	642	207	32.2	1	0.5		7
20	Calhoun	2,156	883	41.0	39	4.4		54
21	Cass	663	321	48.4	2	0.6		9
22	Charlevoix	287	206	71.8	0	0.0		1
23	Cheboygan	273	194	71.1	0	0.0		5
24	Chippewa	400	204	51.0	1	0.5		2
25	Clare	429	335	78.1	0	0.0		4
26	Clinton	547	254	46.4	2	0.8		3
27	Crawford	149	62	41.6	0	0.0		1
28	Delta	450	329	73.1	2	0.6		16
29	Dickinson	309	246	79.6	1	0.4		1
30	Eaton	1,054	634	60.2	1	0.2		17
31	Emmet	350	240	68.6	0	0.0		0
32	Genesee	6,528	3,420	52.4	42	1.2		109
33	Gladwin	242	176	72.7	0	0.0		0
34	Gogebic	157	107	68.2	0	0.0		2
35	Grand Traverse	918	437	47.6	1	0.2		2
36	Gratiot	561	325	57.9	1	0.3		3

	I	J	K	L	M	N	O	P
1								
2								
3								
4								
5								
6			Children age 3 through 5 years, Insured by Medicaid					
7	% with BLL >= 5 ug/dL, confirmed & unconfirmed*		Children Tested	Confirmed ≥ 5 µg/dL (venous only)	% with confirmed BLL >= 5 ug/dL		Total ≥ 5 µg/dL, confirmed & unconfirmed*	% with BLL >= 5 ug/dL, confirmed & unconfirmed*
8	5.9		8	0	0.0		0	0.0
9	3.1		8	0	0.0		0	0.0
10	2.7		234	0	0.0		6	2.6
11	3.4		30	0	0.0		1	3.3
12	1.2		28	0	0.0		0	0.0
13	0.9		44	0	0.0		0	0.0
14	0.0		32	0	0.0		1	3.1
15	5.0		48	1	2.1		5	10.4
16	3.8		126	4	3.2		8	6.3
17	1.6		28	0	0.0		0	0.0
18	2.9		248	7	2.8		8	3.2
19	3.4		240	3	1.3		15	6.3
20	6.1		368	10	2.7		17	4.6
21	2.8		46	1	2.2		1	2.2
22	0.5		54	0	0.0		0	0.0
23	2.6		55	1	1.8		1	1.8
24	1.0		82	1	1.2		1	1.2
25	1.2		66	0	0.0		0	0.0
26	1.2		135	0	0.0		1	0.7
27	1.6		8	0	0.0		0	0.0
28	4.9		53	1	1.9		1	1.9
29	0.4		8	0	0.0		0	0.0
30	2.7		242	0	0.0		5	2.1
31	0.0		47	0	0.0		0	0.0
32	3.2		1,444	23	1.6		39	2.7
33	0.0		81	0	0.0		0	0.0
34	1.9		23	0	0.0		0	0.0
35	0.5		117	1	0.9		3	2.6
36	0.9		84	0	0.0		1	1.2

	A	B	C	D	E	F	G	H
37	Hillsdale	615	333	54.1	3	0.9		11
38	Houghton	372	287	77.2	6	2.1		9
39	Huron	310	183	59.0	1	0.5		9
40	Ingham	3,560	2,290	64.3	17	0.7		66
41	Ionia	779	495	63.5	4	0.8		20
42	Iosco	332	120	36.1	0	0.0		3
43	Iron	132	109	82.6	0	0.0		2
44	Isabella	636	315	49.5	1	0.3		3
45	Jackson	2,001	1,328	66.4	22	1.7		98
46	Kalamazoo	2,989	1,329	44.5	15	1.1		42
47	Kalkaska	238	107	45.0	0	0.0		0
48	Kent	8,708	6,050	69.5	89	1.5		327
49	Keweenaw	18	14	77.8	0	0.0		2
50	Lake	178	82	46.1	0	0.0		1
51	Lapeer	953	514	53.9	2	0.4		20
52	Leelanau	139	91	65.5	0	0.0		3
53	Lenawee	1,238	418	33.8	17	4.1		54
54	Livingston	1,064	532	50.0	3	0.6		6
55	Luce	81	68	84.0	0	0.0		0
56	Mackinac	101	90	89.1	0	0.0		1
57	Macomb	8,689	3,585	41.3	23	0.6		60
58	Manistee	224	174	77.7	2	1.1		8
59	Marquette	628	349	55.6	6	1.7		11
60	Mason	361	95	26.3	1	1.1		5
61	Mecosta	486	234	48.1	2	0.9		2
62	Menominee	211	175	82.9	3	1.7		13
63	Midland	750	198	26.4	1	0.5		2
64	Missaukee	242	102	42.1	1	1.0		1
65	Monroe	1,464	740	50.5	1	0.1		11
66	Montcalm	881	432	49.0	4	0.9		8
67	Montmorency	92	59	64.1	0	0.0		1
68	Muskegon	2,799	1,219	43.6	50	4.1		98
69	Newaygo	681	310	45.5	0	0.0		7
70	Oakland	9,214	3,774	41.0	33	0.9		63
71	Oceana	465	239	51.4	1	0.4		4
72	Ogemaw	277	64	23.1	1	1.6		1
73	Ontonagon	34	21	61.8	0	0.0		2
74	Osceola	347	243	70.0	6	2.5		9
75	Oscoda	95	17	17.9	0	0.0		2
76	Otsego	339	187	55.2	0	0.0		0

	I	J	K	L	M	N	O	P
37	3.3		193	0	0.0		5	2.6
38	3.1		67	0	0.0		2	3.0
39	4.9		122	2	1.6		3	2.5
40	2.9		1448	17	1.2		47	3.2
41	4.0		153	0	0.0		2	1.3
42	2.5		22	1	4.5		1	4.5
43	1.8		14	0	0.0		1	7.1
44	1.0		94	0	0.0		0	0.0
45	7.4		444	5	1.1		27	6.1
46	3.2		438	4	0.9		21	4.8
47	0.0		15	0	0.0		0	0.0
48	5.4		971	30	3.1		76	7.8
49	14.3		3	0	0.0		0	0.0
50	1.2		20	0	0.0		1	5.0
51	3.9		123	1	0.8		3	2.4
52	3.3		17	0	0.0		0	0.0
53	12.9		174	7	4.0		22	12.6
54	1.1		113	0	0.0		0	0.0
55	0.0		8	0	0.0		0	0.0
56	1.1		9	0	0.0		0	0.0
57	1.7		1626	13	0.8		23	1.4
58	4.6		25	0	0.0		0	0.0
59	3.2		44	1	2.3		1	2.3
60	5.3		91	1	1.1		5	5.5
61	0.9		22	0	0.0		0	0.0
62	7.4		28	0	0.0		0	0.0
63	1.0		104	0	0.0		1	1.0
64	1.0		11	0	0.0		0	0.0
65	1.5		187	0	0.0		0	0.0
66	1.9		158	1	0.6		2	1.3
67	1.7		13	0	0.0		0	0.0
68	8.0		589	19	3.2		37	6.3
69	2.3		28	0	0.0		0	0.0
70	1.7		2067	21	1.0		27	1.3
71	1.7		159	3	1.9		4	2.5
72	1.6		16	0	0.0		0	0.0
73	9.5		11	0	0.0		0	0.0
74	3.7		60	1	1.7		2	3.3
75	11.8		13	0	0.0		1	7.7
76	0.0		106	0	0.0		1	0.9

	A	B	C	D	E	F	G	H
77	Ottawa	2,560	1,420	55.5	6	0.4		37
78	Presque Isle	113	81	71.7	0	0.0		2
79	Roscommon	290	167	57.6	0	0.0		0
80	Saginaw	2,800	1,993	71.2	26	1.3		82
81	St Clair	1,772	1,141	64.4	10	0.9		33
82	St Joseph	1,088	591	54.3	5	0.8		24
83	Sanilac	508	254	50.0	1	0.4		4
84	Schoolcraft	92	71	77.2	0	0.0		0
85	Shiawassee	848	583	68.8	12	2.1		29
86	Tuscola	699	513	73.4	1	0.2		11
87	Van Buren	1,214	394	32.5	9	2.3		14
88	Washtenaw	2,658	943	35.5	7	0.7		12
89	Wayne	30,825	15,097	49.0	825	5.5		1,070
90	Wexford	562	292	52.0	2	0.7		3
91	MICHIGAN	121,568	63,127	51.9	1,352	2.1		2,667
92								
93								
94	*These columns are included for comparison with previous years' data							
95	Source: MDCH Data Warehouse							

	I	J	K	L	M	N	O	P
77	2.6		240	3	1.3		7	2.9
78	2.5		14	0	0.0		0	0.0
79	0.0		41	0	0.0		0	0.0
80	4.1		586	10	1.7		24	4.1
81	2.9		809	10	1.2		23	2.8
82	4.1		250	4	1.6		13	5.2
83	1.6		142	1	0.7		1	0.7
84	0.0		4	1	25.0		1	25.0
85	5.0		205	2	1.0		4	2.0
86	2.1		175	1	0.6		2	1.1
87	3.6		147	4	2.7		6	4.1
88	1.3		501	1	0.2		5	1.0
89	7.1		15,204	774	5.1		923	6.1
90	1.0		26	0	0.0		0	0.0
91	4.2		32,137	991	3.1		1,438	4.5
92								
93								
94								
95								7/20/2015

From: Scott, Robert L. (DCH)
Sent: Tuesday, July 21, 2015 9:47 AM
To: Alanna M. Woolley
Subject: RE: 2014 EBL Numbers
Attachments: 2014 Lead Testing and EBLL 0-5 072015.pdf; 2014 Lead Testing and EBLL 1-2 072015.pdf; 2014 Medicaid 072015.pdf

Alanna,

Please see three attached files. I've been working on some of the pieces and parts for 2014. Communities and ZIPs to follow later today.

We are trying to put together a snazzy, user-friendly Annual Data Report, but it may be a while yet.

Please note that despite my assurance that the spreadsheet I sent before GHHI was "final," the attached spreadsheet for kids age 0-5 is in fact slightly different. We discussed "confirmed" the other day, and decided we should stick to our long-standing policy that only a venous test can "confirm" an elevated blood lead level. In the version I sent you earlier, I was including (for the first time) two elevated capillary tests as "confirmed," which boosted the numbers just slightly.

Bob

-----Original Message-----
From: Alanna M. Woolley [mailto:du3374@wayne.edu]
Sent: Monday, July 20, 2015 11:36 AM
To: Scott, Robert L. (DCH)
Cc: Angie Sarb; Katelyn Mary Burkart; Lykethompson
Subject: Re: 2014 EBL Numbers

Hi Bob,

I hope that you had a wonderful weekend. Any word on when the final report for 2014 EBLs will be out?

Thanks!

Best,

Alanna
--
Alanna Woolley, MPA
Research Assistant
Center for Urban Studies
Wayne State University
E: du3374@wayne.edu
P: (313) 577-2207

----- Original Message -----
From: "Robert L. Scott (DCH)" <ScottR9@michigan.gov>

To: "Alanna M. Woolley" <du3374@wayne.edu>
Cc: "Katelyn Mary Burkart" <dv2491@wayne.edu>, "Lyke Thompson" <lykethompson@gmail.com>, "Angie Sarb" <angela.sarb@wayne.edu>
Sent: Thursday, June 25, 2015 10:57:52 AM
Subject: RE: 2014 EBL Numbers

Please see attached.

-----Original Message-----
From: Alanna M. Woolley [mailto:du3374@wayne.edu]
Sent: Thursday, June 25, 2015 10:22 AM
To: Scott, Robert L. (DCH)
Cc: Katelyn Mary Burkart; Lyke Thompson; Angie Sarb
Subject: Re: 2014 EBL Numbers

Hi again Bob,

Do you have the numbers for children under six with 5-9 EBLs from 1998-2003? If so, could you please send them to me?

Thank you!

Best,

Alanna

----- Original Message -----
From: "Robert L. Scott (DCH)" <ScottR9@michigan.gov>
To: "Alanna M. Woolley" <du3374@wayne.edu>
Cc: "Katelyn Mary Burkart" <dv2491@wayne.edu>, "Lyke Thompson" <lykethompson@gmail.com>, "Angie Sarb" <angela.sarb@wayne.edu>
Sent: Thursday, June 25, 2015 8:17:32 AM
Subject: RE: 2014 EBL Numbers

Alanna,

Sorry, didn't hear your phone message until this morning. Please see attached.

Bob

-----Original Message-----
From: Scott, Robert L. (DCH)
Sent: Tuesday, June 23, 2015 4:20 PM
To: 'Alanna M. Woolley'
Cc: Katelyn Mary Burkart; Lyke Thompson; Angie Sarb
Subject: RE: 2014 EBL Numbers

Please see attached. Let me know if you have questions.

-----Original Message-----
From: Alanna M. Woolley [mailto:du3374@wayne.edu]
Sent: Wednesday, June 17, 2015 2:13 PM

To: Scott, Robert L. (DCH)
Cc: Katelyn Mary Burkart; Lyke Thompson; Angie Sarb
Subject: Fwd: 2014 EBL Numbers

Hi Bob,

We were hoping to do an update on 2014 EBL numbers at the next GHHI meeting on 6/25. Is there any chance that you'll have them ready before then?

Thank you!

Best,

Alanna

--
Alanna Woolley, MPA
Research Assistant
Center for Urban Studies
Wayne State University
E: du3374@wayne.edu
P: (313) 577-2207

----- Original Message -----
From: "Robert L. Scott (DCH)" <ScottR9@michigan.gov>
To: "Alanna M. Woolley" <du3374@wayne.edu>
Sent: Monday, June 1, 2015 10:26:43 AM
Subject: RE: 2014 EBL Numbers

Alanna,

I hope to work on that this week. Will send them ASAP.

Bob

-----Original Message-----
From: Alanna M. Woolley [mailto:du3374@wayne.edu]
Sent: Thursday, May 28, 2015 4:44 PM
To: Scott, Robert L. (DCH)
Subject: 2014 EBL Numbers

Hi Bob!

If you have the 2014 EBL numbers could you please send them to me?

Thank you!

Best,

Alanna

--
Alanna Woolley, MPA
Research Assistant
Center for Urban Studies
Wayne State University
E: du3374@wayne.edu
P: (313) 577-2207

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Children Tested for Lead Poisoning -- Calendar Year 2014
All Counties in Michigan

Children less than Six Years of Age

				Children Tested		Children Tested, by Highest Blood Lead Level (BLL)										
County	%Pre-1950 Housing	%Pre-1978 Housing	Children less than Six Years of Age	Number of Children Tested	% Tested	<5 ug/dL	5 to 9 ug/dL, not confirmed by venous	>= 10 ug/dL, not confirmed by venous	Confirmed 5-9 ug/dL (venous only)	Confirmed 10-14 ug/dL (venous only)	Confirmed 15-44 ug/dL (venous only)	Confirmed ≥45 ug/dL (venous only)	Total confirmed ≥ 5 µg/dL	% with confirmed BLL >= 5 ug/dL	Total ≥ 5 µg/dL, confirmed & unconfirmed*	% with BLL >= 5 ug/dL, confirmed & unconfirmed*
Alcona	12.4	61.5	398	53	13.3	51	2	0	0	0	0	0	0	0.0	2	3.8
Alger	29.5	64.1	427	92	21.5	90	1	0	0	1	0	0	1	1.1	2	2.2
Allegan	23.2	51.1	8,806	1,208	13.7	1,177	26	2	3	0	0	0	3	0.2	31	2.6
Alpena	25.3	71.6	1,758	257	14.6	248	7	1	1	0	0	0	1	0.4	9	3.5
Antrim	18.8	52.6	1,370	260	19.0	258	0	0	2	0	0	0	2	0.8	2	0.8
Arenac	19.8	58.2	870	186	21.4	185	1	0	0	0	0	0	0	0.0	1	0.5
Baraga	34.0	71.7	477	135	28.3	134	1	0	0	0	0	0	0	0.0	1	0.7
Barry	27.1	57.3	4,143	491	11.9	468	19	0	3	1	0	0	4	0.8	23	4.7
Bay	33.9	75.6	7,322	1,408	19.2	1,358	31	2	10	3	3	1	17	1.2	50	3.6
Benzie	18.6	46.3	1,041	268	25.7	266	2	0	0	0	0	0	0	0.0	2	0.7
Berrien	28.6	72.2	11,681	1,943	16.6	1,884	24	5	21	4	5	0	30	1.5	59	3.0
Branch	30.9	65.3	3,506	668	19.1	645	18	1	1	3	0	0	4	0.6	23	3.4
Calhoun	36.1	75.3	10,149	2,390	23.5	2,290	36	0	51	7	6	0	64	2.7	100	4.2
Cass	22.4	59.9	3,444	426	12.4	414	7	1	3	1	0	0	4	0.9	12	2.8
Charlevoix	25.3	54.4	1,624	295	18.2	294	1	0	0	0	0	0	0	0.0	1	0.3
Cheboygan	20.9	53.5	1,414	286	20.2	279	6	0	1	0	0	0	1	0.3	7	2.4
Chippewa	25.1	58.6	2,345	440	18.8	436	1	0	3	0	0	0	3	0.7	4	0.9
Clare	14.5	58.8	2,083	446	21.4	442	4	0	0	0	0	0	0	0.0	4	0.9
Clinton	22.5	52.8	5,140	585	11.4	579	1	0	5	0	0	0	5	0.9	6	1.0
Crawford	13.7	55.6	727	85	11.7	84	1	0	0	0	0	0	0	0.0	1	1.2
Delta	33.3	68.0	2,388	413	17.3	397	14	0	1	0	1	0	2	0.5	16	3.9
Dickinson	38.9	71.7	1,575	318	20.2	317	0	0	1	0	0	0	1	0.3	1	0.3
Eaton	20.4	56.4	7,356	1,140	15.5	1,113	20	3	4	0	0	0	4	0.4	27	2.4
Emmet	23.0	48.3	2,042	362	17.7	362	0	0	0	0	0	0	0	0.0	0	0.0
Genesee	19.9	68.0	31,997	6,824	21.3	6,646	97	11	56	9	5	0	70	1.0	178	2.6
Gladwin	12.4	49.5	1,495	291	19.5	291	0	0	0	0	0	0	0	0.0	0	0.0
Gogebic	50.0	76.7	855	154	18.0	152	2	0	0	0	0	0	0	0.0	2	1.3
Grand Traverse	14.7	43.5	6,000	1,371	22.9	1,359	6	3	3	0	0	0	3	0.2	12	0.9
Gratiot	34.7	69.8	2,754	496	18.0	491	4	0	1	0	0	0	1	0.2	5	1.0
Hillsdale	36.5	63.2	3,283	814	24.8	795	14	2	3	0	0	0	3	0.4	19	2.3
Houghton	53.4	75.5	2,477	599	24.2	585	6	0	4	2	2	0	8	1.3	14	2.3
Huron	31.8	68.9	1,873	393	21.0	381	9	0	2	1	0	0	3	0.8	12	3.1
Ingham	24.9	68.2	19,248	4,747	24.7	4,606	94	5	25	11	6	0	42	0.9	141	3.0
Ionia	35.8	63.0	4,878	843	17.3	816	20	2	4	0	1	0	5	0.6	27	3.2
Iosco	12.7	65.6	1,233	150	12.2	146	3	0	1	0	0	0	1	0.7	4	2.7
Iron	44.1	72.1	573	138	24.1	135	3	0	0	0	0	0	0	0.0	3	2.2
Isabella	16.3	48.2	4,208	640	15.2	632	7	0	1	0	0	0	1	0.2	8	1.3
Jackson	33.0	67.9	11,296	2,757	24.4	2,602	107	14	27	3	4	0	34	1.2	155	5.6
Kalamazoo	22.5	62.6	18,588	3,257	17.5	3,172	48	7	23	4	2	1	30	0.9	85	2.6
Kalkaska	13.2	49.3	1,180	217	18.4	216	1	0	0	0	0	0	0	0.0	1	0.5
Kent	24.8	59.2	52,655	10,115	19.2	9,645	325	8	89	22	26	0	137	1.4	470	4.6
Keweenaw	46.9	77.6	115	25	21.7	23	2	0	0	0	0	0	0	0.0	2	8.0
Lake	12.5	52.6	585	120	20.5	118	2	0	0	0	0	0	0	0.0	2	1.7
Lapeer	20.4	52.9	5,687	919	16.2	890	22	3	3	0	1	0	4	0.4	29	3.2
Leelanau	17.9	46.5	1,111	239	21.5	234	4	1	0	0	0	0	0	0.0	5	2.1
Lenawee	33.6	67.2	6,911	1,196	17.3	1,074	78	16	21	3	4	0	28	2.3	122	10.2

Children Tested for Lead Poisoning -- Calendar Year 2014
All Counties in Michigan

Children less than Six Years of Age

				Children Tested		Children Tested, by Highest Blood Lead Level (BLL)										
County	%Pre-1950 Housing	%Pre-1978 Housing	Children less than Six Years of Age	Number of Children Tested	% Tested	<5 ug/dL	5 to 9 ug/dL, not confirmed by venous	>= 10 ug/dL, not confirmed by venous	Confirmed 5-9 ug/dL (venous only)	Confirmed 10-14 ug/dL (venous only)	Confirmed 15-44 ug/dL (venous only)	Confirmed ≥45 ug/dL (venous only)	Total confirmed ≥ 5 µg/dL	% with confirmed BLL >= 5 ug/dL	Total ≥ 5 µg/dL, confirmed & unconfirmed*	% with BLL >= 5 ug/dL, confirmed & unconfirmed*
Livingston	11.4	39.0	12,104	1,026	8.5	1,017	4	0	4	1	0	0	5	0.5	9	0.9
Luce	23.8	64.3	370	88	23.8	88	0	0	0	0	0	0	0	0.0	0	0.0
Mackinac	23.4	58.6	587	130	22.1	129	1	0	0	0	0	0	0	0.0	1	0.8
Macomb	9.3	59.1	57,878	9,525	16.5	9,397	73	6	38	2	7	2	49	0.5	128	1.3
Manistee	28.8	63.9	1,307	284	21.7	271	10	0	1	0	2	0	3	1.1	13	4.6
Marquette	27.9	69.4	4,029	471	11.7	458	3	2	8	0	0	0	8	1.7	13	2.8
Mason	32.1	64.6	1,864	414	22.2	387	25	0	2	0	0	0	2	0.5	27	6.5
Mecosta	18.2	53.4	2,520	316	12.5	314	0	0	0	0	2	0	2	0.6	2	0.6
Menominee	35.4	73.2	1,375	261	19.0	245	11	1	3	0	1	0	4	1.5	16	6.1
Midland	15.2	58.7	5,685	477	8.4	472	2	0	2	1	0	0	3	0.6	5	1.0
Missaukee	21.2	56.2	1,111	133	12.0	132	0	0	0	1	0	0	1	0.8	1	0.8
Monroe	23.0	59.0	10,355	1,571	15.2	1,553	15	1	1	1	0	0	2	0.1	18	1.1
Montcalm	27.3	57.7	4,527	748	16.5	735	6	0	5	1	1	0	7	0.9	13	1.7
Montmorency	18.1	58.6	404	83	20.5	82	1	0	0	0	0	0	0	0.0	1	1.2
Muskegon	25.8	66.2	13,224	2,572	19.4	2,415	66	13	62	10	6	0	78	3.0	157	6.1
Newaygo	19.3	53.6	3,581	447	12.5	440	6	1	0	0	0	0	0	0.0	7	1.6
Oakland	14.7	60.5	83,501	14,308	17.1	14,102	94	8	71	20	13	0	104	0.7	206	1.4
Oceana	25.8	57.8	2,091	516	24.7	506	5	0	2	3	0	0	5	1.0	10	1.9
Ogemaw	12.8	61.6	1,289	102	7.9	101	0	0	1	0	0	0	1	1.0	1	1.0
Ontonagon	39.1	73.2	251	48	19.1	46	2	0	0	0	0	0	0	0.0	2	4.2
Osceola	22.6	56.6	1,723	334	19.4	324	4	0	2	2	2	0	6	1.8	10	3.0
Oscoda	17.8	62.1	521	35	6.7	32	2	1	0	0	0	0	0	0.0	3	8.6
Otsego	12.2	50.3	1,641	325	19.8	324	1	0	0	0	0	0	0	0.0	1	0.3
Ottawa	15.7	45.3	21,390	3,012	14.1	2,931	59	5	16	1	0	0	17	0.6	81	2.7
Presque Isle	21.1	66.3	597	111	18.6	109	2	0	0	0	0	0	0	0.0	2	1.8
Roscommon	13.1	58.7	1,156	218	18.9	218	0	0	0	0	0	0	0	0.0	0	0.0
Saginaw	28.1	73.1	14,029	3,670	26.2	3,548	76	8	25	7	6	0	38	1.0	122	3.3
Saint Clair	25.8	59.4	11,046	2,731	24.7	2,655	46	7	15	5	3	0	23	0.8	76	2.8
Saint Joseph	27.5	65.1	5,125	1,012	19.7	971	27	4	7	2	1	0	10	1.0	41	4.1
Sanilac	30.7	64.6	2,879	523	18.2	517	4	0	1	1	0	0	2	0.4	6	1.1
Schoolcraft	25.5	63.3	471	99	21.0	98	0	0	1	0	0	0	1	1.0	1	1.0
Shiawassee	33.9	68.2	4,622	1,169	25.3	1,131	19	2	15	2	0	0	17	1.5	38	3.3
Tuscola	30.2	67.4	3,579	886	24.8	874	10	0	0	2	0	0	2	0.2	12	1.4
Van Buren	23.3	58.1	5,884	862	14.6	832	9	1	17	1	2	0	20	2.3	30	3.5
Washtenaw	17.2	56.5	22,833	2,604	11.4	2,572	15	2	10	2	3	0	15	0.6	32	1.2
Wayne ex Det	22.6	74.5	82,002	18,348	22.4	16,021	164	12	185	33	15	0	233	1.3	409	2.2
Wexford	23.0	53.7	2,582	362	14.0	359	1	0	0	0	2	0	2	0.6	3	0.8
Detroit, City of	62.2	93.2	59,755	22,842	38.2	20,966	279	51	1,183	214	145	4	1,546	6.8	1,876	8.2
MICHIGAN	24.7	64.8	710,976	143,123	20.1	136,152	2,119	212	2,050	387	277	8	2,722	1.9	5,053	3.5

*These columns are included for comparison with previous years' data

July 20, 2015

Sources: US Census Bureau, Census 2010 (Pre-1950 Housing and Pre-1978 Housing) and American Community Survey 2013 5-year estimates (Detroit and county populations);
MDCH Data Warehouse (children tested)

Children Tested for Lead Poisoning -- Calendar Year 2014
All Counties in Michigan

Children One to Two Years of Age

				Children Tested		Children Tested, by Highest Blood Lead Level (BLL)										
County	%Pre-1950 Housing	%Pre-1978 Housing	Children One to Two Years of Age	Number of Children Tested	% Tested	<5 ug/dL	5 to 9 ug/dL, not confirmed by venous	>= 10 ug/dL, not confirmed by venous	Confirmed 5-9 ug/dL (venous only)	Confirmed 10-14 ug/dL (venous only)	Confirmed 15-44 ug/dL (venous only)	Confirmed ≥45 ug/dL (venous only)	Total confirmed ≥ 5 µg/dL	% with confirmed BLL >= 5 ug/dL	Total ≥ 5 µg/dL, confirmed & unconfirmed*	% with BLL >= 5 ug/dL, confirmed & unconfirmed*
Alcona	12.4	61.5	130	43	33.1	41	2	0	0	0	0	0	0	0.0	2	4.7
Alger	29.5	64.1	130	76	58.5	74	1	0	0	1	0	0	1	1.3	2	2.6
Allegan	23.2	51.1	2,888	872	30.2	848	19	2	3	0	0	0	3	0.3	24	2.8
Alpena	25.3	71.6	570	218	38.2	210	7	0	1	0	0	0	1	0.5	8	3.7
Antrim	18.8	52.6	450	191	42.4	189	0	0	2	0	0	0	2	1.0	2	1.0
Arenac	19.8	58.2	281	136	48.4	135	1	0	0	0	0	0	0	0.0	1	0.7
Baraga	34.0	71.7	165	91	55.2	91	0	0	0	0	0	0	0	0.0	0	0.0
Barry	27.1	57.3	1,328	387	29.1	371	13	0	2	1	0	0	3	0.8	16	4.1
Bay	33.9	75.6	2,410	1,233	51.2	1,195	24	2	8	3	1	0	12	1.0	38	3.1
Benzie	18.6	46.3	338	178	52.7	176	2	0	0	0	0	0	0	0.0	2	1.1
Berrien	28.6	72.2	3,855	1,602	41.6	1,554	22	5	14	3	4	0	21	1.3	48	3.0
Branch	30.9	65.3	1,157	239	20.7	232	6	0	0	1	0	0	1	0.4	7	2.9
Calhoun	36.1	75.3	3,366	1,317	39.1	1,257	17	1	35	4	3	0	42	3.2	60	4.6
Cass	22.4	59.9	1,120	364	32.5	353	7	1	2	1	0	0	3	0.8	11	3.0
Charlevoix	25.3	54.4	523	213	40.7	212	1	0	0	0	0	0	0	0.0	1	0.5
Cheboygan	20.9	53.5	457	214	46.8	209	5	0	0	0	0	0	0	0.0	5	2.3
Chippewa	25.1	58.6	775	268	34.6	265	1	0	2	0	0	0	2	0.7	3	1.1
Clare	14.5	58.8	700	359	51.3	355	4	0	0	0	0	0	0	0.0	4	1.1
Clinton	22.5	52.8	1,650	342	20.7	338	1	0	3	0	0	0	3	0.9	4	1.2
Crawford	13.7	55.6	237	67	28.3	66	1	0	0	0	0	0	0	0.0	1	1.5
Delta	33.3	68.0	782	351	44.9	335	14	0	1	0	1	0	2	0.6	16	4.6
Dickinson	38.9	71.7	529	288	54.4	287	0	0	1	0	0	0	1	0.3	1	0.3
Eaton	20.4	56.4	2,410	772	32.0	753	13	3	3	0	0	0	3	0.4	19	2.5
Emmet	23.0	48.3	656	266	40.5	266	0	0	0	0	0	0	0	0.0	0	0.0
Genesee	19.9	68.0	10,583	4,326	40.9	4,207	68	9	34	5	3	0	42	1.0	119	2.8
Gladwin	12.4	49.5	486	193	39.7	193	0	0	0	0	0	0	0	0.0	0	0.0
Gogebic	50.0	76.7	285	117	41.1	115	2	0	0	0	0	0	0	0.0	2	1.7
Grand Traverse	14.7	43.5	1,955	893	45.7	887	3	1	2	0	0	0	2	0.2	6	0.7
Gratiot	34.7	69.8	909	359	39.5	356	2	0	1	0	0	0	1	0.3	3	0.8
Hillsdale	36.5	63.2	1,079	395	36.6	384	6	2	3	0	0	0	3	0.8	11	2.8
Houghton	53.4	75.5	828	505	61.0	493	4	0	4	2	2	0	8	1.6	12	2.4
Huron	31.8	68.9	607	229	37.7	220	8	0	1	0	0	0	1	0.4	9	3.9
Ingham	24.9	68.2	6,426	2,832	44.1	2,749	56	5	14	6	2	0	22	0.8	83	2.9
Ionia	35.8	63.0	1,590	628	39.5	604	18	2	3	0	1	0	4	0.6	24	3.8
Iosco	12.7	65.6	397	124	31.2	121	3	0	0	0	0	0	0	0.0	3	2.4
Iron	44.1	72.1	193	120	62.2	118	2	0	0	0	0	0	0	0.0	2	1.7
Isabella	16.3	48.2	1,392	462	33.2	458	3	0	1	0	0	0	1	0.2	4	0.9
Jackson	33.0	67.9	3,716	2,021	54.4	1,900	87	8	21	2	3	0	26	1.3	121	6.0
Kalamazoo	22.5	62.6	6,166	1,889	30.6	1,838	26	4	16	3	1	1	21	1.1	51	2.7
Kalkaska	13.2	49.3	395	138	34.9	137	1	0	0	0	0	0	0	0.0	1	0.7
Kent	24.8	59.2	17,514	8,193	46.8	7,816	267	6	64	19	21	0	104	1.3	377	4.6
Keweenaw	46.9	77.6	39	21	53.8	19	2	0	0	0	0	0	0	0.0	2	9.5
Lake	12.5	52.6	192	87	45.3	86	1	0	0	0	0	0	0	0.0	1	1.1
Lapeer	20.4	52.9	1,780	705	39.6	680	21	2	1	0	1	0	2	0.3	25	3.5
Leelanau	17.9	46.5	350	169	48.3	165	3	1	0	0	0	0	0	0.0	4	2.4
Lenawee	33.6	67.2	2,248	688	30.6	613	51	6	13	2	3	0	18	2.6	75	10.9

Children Tested for Lead Poisoning -- Calendar Year 2014
All Counties in Michigan

Children One to Two Years of Age

				Children Tested		Children Tested, by Highest Blood Lead Level (BLL)										
County	%Pre-1950 Housing	%Pre-1978 Housing	Children One to Two Years of Age	Number of Children Tested	% Tested	<5 ug/dL	5 to 9 ug/dL, not confirmed by venous	>= 10 ug/dL, not confirmed by venous	Confirmed 5-9 ug/dL (venous only)	Confirmed 10-14 ug/dL (venous only)	Confirmed 15-44 ug/dL (venous only)	Confirmed ≥45 ug/dL (venous only)	Total confirmed ≥ 5 µg/dL	% with confirmed BLL >= 5 ug/dL	Total ≥ 5 µg/dL, confirmed & unconfirmed*	% with BLL >= 5 ug/dL, confirmed & unconfirmed*
Livingston	11.4	39.0	3,871	750	19.4	741	4	0	4	1	0	0	5	0.7	9	1.2
Luce	23.8	64.3	121	79	65.3	79	0	0	0	0	0	0	0	0.0	0	0.0
Mackinac	23.4	58.6	193	113	58.5	112	1	0	0	0	0	0	0	0.0	1	0.9
Macomb	9.3	59.1	19,051	6,156	32.3	6,075	47	5	23	2	3	1	29	0.5	81	1.3
Manistee	28.8	63.9	411	247	60.1	235	9	0	1	0	2	0	3	1.2	12	4.9
Marquette	27.9	69.4	1,364	414	30.4	402	3	2	7	0	0	0	7	1.7	12	2.9
Mason	32.1	64.6	620	111	17.9	106	4	0	1	0	0	0	1	0.9	5	4.5
Mecosta	18.2	53.4	851	279	32.8	277	0	0	0	1	1	0	2	0.7	2	0.7
Menominee	35.4	73.2	442	219	49.5	203	11	1	3	0	1	0	4	1.8	16	7.3
Midland	15.2	58.7	1,842	297	16.1	295	1	0	1	0	0	0	1	0.3	2	0.7
Missaukee	21.2	56.2	359	113	31.5	112	0	0	0	1	0	0	1	0.9	1	0.9
Monroe	23.0	59.0	3,378	1,158	34.3	1,143	12	1	1	1	0	0	2	0.2	15	1.3
Montcalm	27.3	57.7	1,493	494	33.1	484	4	0	4	1	1	0	6	1.2	10	2.0
Montmorency	18.1	58.6	131	64	48.9	63	1	0	0	0	0	0	0	0.0	1	1.6
Muskegon	25.8	66.2	4,384	1,652	37.7	1,546	44	9	40	7	6	0	53	3.2	106	6.4
Newaygo	19.3	53.6	1,172	395	33.7	388	6	1	0	0	0	0	0	0.0	7	1.8
Oakland	14.7	60.5	27,292	7,882	28.9	7,759	61	7	38	9	8	0	55	0.7	123	1.6
Oceana	25.8	57.8	685	276	40.3	271	3	0	1	1	0	0	2	0.7	5	1.8
Ogemaw	12.8	61.6	413	81	19.6	80	0	0	1	0	0	0	1	1.2	1	1.2
Ontonagon	39.1	73.2	82	31	37.8	29	2	0	0	0	0	0	0	0.0	2	6.5
Osceola	22.6	56.6	564	260	46.1	251	3	0	2	3	1	0	6	2.3	9	3.5
Oscoda	17.8	62.1	168	18	10.7	16	2	0	0	0	0	0	0	0.0	2	11.1
Otsego	12.2	50.3	540	197	36.5	197	0	0	0	0	0	0	0	0.0	0	0.0
Ottawa	15.7	45.3	7,046	2,576	36.6	2,507	51	5	12	1	0	0	13	0.5	69	2.7
Presque Isle	21.1	66.3	193	89	46.1	87	2	0	0	0	0	0	0	0.0	2	2.2
Roscommon	13.1	58.7	379	172	45.4	172	0	0	0	0	0	0	0	0.0	0	0.0
Saginaw	28.1	73.1	4,623	2,756	59.6	2,670	54	5	17	5	5	0	27	1.0	86	3.1
Saint Clair	25.8	59.4	3,574	1,333	37.3	1,296	24	3	5	3	2	0	10	0.8	37	2.8
Saint Joseph	27.5	65.1	1,684	691	41.0	665	18	3	2	2	1	0	5	0.7	26	3.8
Sanilac	30.7	64.6	949	291	30.7	286	4	0	0	1	0	0	1	0.3	5	1.7
Schoolcraft	25.5	63.3	151	80	53.0	80	0	0	0	0	0	0	0	0.0	0	0.0
Shiawassee	33.9	68.2	1,503	749	49.8	718	16	2	11	2	0	0	13	1.7	31	4.1
Tuscola	30.2	67.4	1,174	650	55.4	639	10	0	0	1	0	0	1	0.2	11	1.7
Van Buren	23.3	58.1	1,924	507	26.4	490	6	1	8	0	2	0	10	2.0	17	3.4
Washtenaw	17.2	56.5	7,560	1,834	24.3	1,809	10	2	8	2	3	0	13	0.7	25	1.4
Wayne ex Det	22.6	74.5	26,966	9,769	36.2	9,539	100	7	100	18	7	0	125	1.3	232	2.4
Wexford	23.0	53.7	865	312	36.1	309	1	0	0	0	2	0	2	0.6	3	1.0
Detroit, City of	62.2	93.2	20,048	9,641	48.1	8,674	160	25	577	115	88	0	780	8.1	965	10.0
MICHIGAN	24.7	64.8	234,103	87,917	37.6	84,776	1,469	139	1,122	230	179	2	1,533	1.7	3,141	3.6

*These columns are included for comparison with previous years' data

July 20, 2015

Sources: US Census Bureau, Census 2010 (Pre-1950 Housing and Pre-1978 Housing) and American Community Survey 2013 5-year estimates (Detroit and county populations);
MDCH Data Warehouse (children tested)

Children Tested for Lead Poisoning -- Calendar Year 2014
All Counties in Michigan

Blood Lead Testing Among Children who are Insured by Medicaid

	Children age 1 & 2 years, Insured by Medicaid							Children age 3 through 5 years, Insured by Medicaid				
County	Children, age 1-2 yrs	Children Tested	% Tested	Confirmed ≥ 5 µg/dL (venous only)	% with confirmed BLL >= 5 ug/dL	Total ≥ 5 µg/dL, confirmed & unconfirmed*	% with BLL >= 5 ug/dL, confirmed & unconfirmed*	Children Tested	Confirmed ≥ 5 µg/dL (venous only)	% with confirmed BLL >= 5 ug/dL	Total ≥ 5 µg/dL, confirmed & unconfirmed*	% with BLL >= 5 ug/dL, confirmed & unconfirmed*
Alcona	109	34	31.2	0	0.0	2	5.9	8	0	0.0	0	0.0
Alger	83	64	77.1	1	1.6	2	3.1	8	0	0.0	0	0.0
Allegan	1,336	629	47.1	3	0.5	17	2.7	234	0	0.0	6	2.6
Alpena	339	204	60.2	1	0.5	7	3.4	30	0	0.0	1	3.3
Antrim	273	171	62.6	2	1.2	2	1.2	28	0	0.0	0	0.0
Arenac	157	111	70.7	0	0.0	1	0.9	44	0	0.0	0	0.0
Baraga	113	65	57.5	0	0.0	0	0.0	32	0	0.0	1	3.1
Barry	589	319	54.2	3	0.9	16	5.0	48	1	2.1	5	10.4
Bay	1,159	888	76.6	11	1.2	34	3.8	126	4	3.2	8	6.3
Benzie	151	126	83.4	0	0.0	2	1.6	28	0	0.0	0	0.0
Berrien	2,392	1,424	59.5	19	1.3	42	2.9	248	7	2.8	8	3.2
Branch	642	207	32.2	1	0.5	7	3.4	240	3	1.3	15	6.3
Calhoun	2,156	883	41.0	39	4.4	54	6.1	368	10	2.7	17	4.6
Cass	663	321	48.4	2	0.6	9	2.8	46	1	2.2	1	2.2
Charlevoix	287	206	71.8	0	0.0	1	0.5	54	0	0.0	0	0.0
Cheboygan	273	194	71.1	0	0.0	5	2.6	55	1	1.8	1	1.8
Chippewa	400	204	51.0	1	0.5	2	1.0	82	1	1.2	1	1.2
Clare	429	335	78.1	0	0.0	4	1.2	66	0	0.0	0	0.0
Clinton	547	254	46.4	2	0.8	3	1.2	135	0	0.0	1	0.7
Crawford	149	62	41.6	0	0.0	1	1.6	8	0	0.0	0	0.0
Delta	450	329	73.1	2	0.6	16	4.9	53	1	1.9	1	1.9
Dickinson	309	246	79.6	1	0.4	1	0.4	8	0	0.0	0	0.0
Eaton	1,054	634	60.2	1	0.2	17	2.7	242	0	0.0	5	2.1
Emmet	350	240	68.6	0	0.0	0	0.0	47	0	0.0	0	0.0
Genesee	6,528	3,420	52.4	42	1.2	109	3.2	1,444	23	1.6	39	2.7
Gladwin	242	176	72.7	0	0.0	0	0.0	81	0	0.0	0	0.0
Gogebic	157	107	68.2	0	0.0	2	1.9	23	0	0.0	0	0.0
Grand Traverse	918	437	47.6	1	0.2	2	0.5	117	1	0.9	3	2.6
Gratiot	561	325	57.9	1	0.3	3	0.9	84	0	0.0	1	1.2
Hillsdale	615	333	54.1	3	0.9	11	3.3	193	0	0.0	5	2.6
Houghton	372	287	77.2	6	2.1	9	3.1	67	0	0.0	2	3.0
Huron	310	183	59.0	1	0.5	9	4.9	122	2	1.6	3	2.5
Ingham	3,560	2,290	64.3	17	0.7	66	2.9	1448	17	1.2	47	3.2
Ionia	779	495	63.5	4	0.8	20	4.0	153	0	0.0	2	1.3
Iosco	332	120	36.1	0	0.0	3	2.5	22	1	4.5	1	4.5
Iron	132	109	82.6	0	0.0	2	1.8	14	0	0.0	1	7.1
Isabella	636	315	49.5	1	0.3	3	1.0	94	0	0.0	0	0.0
Jackson	2,001	1,328	66.4	22	1.7	98	7.4	444	5	1.1	27	6.1
Kalamazoo	2,989	1,329	44.5	15	1.1	42	3.2	438	4	0.9	21	4.8
Kalkaska	238	107	45.0	0	0.0	0	0.0	15	0	0.0	0	0.0
Kent	8,708	6,050	69.5	89	1.5	327	5.4	971	30	3.1	76	7.8
Keweenaw	18	14	77.8	0	0.0	2	14.3	3	0	0.0	0	0.0
Lake	178	82	46.1	0	0.0	1	1.2	20	0	0.0	1	5.0
Lapeer	953	514	53.9	2	0.4	20	3.9	123	1	0.8	3	2.4
Leelanau	139	91	65.5	0	0.0	3	3.3	17	0	0.0	0	0.0

Children Tested for Lead Poisoning -- Calendar Year 2014
All Counties in Michigan

Blood Lead Testing Among Children who are Insured by Medicaid

	Children age 1 & 2 years, Insured by Medicaid							Children age 3 through 5 years, Insured by Medicaid				
County	Children, age 1-2 yrs	Children Tested	% Tested	Confirmed ≥ 5 µg/dL (venous only)	% with confirmed BLL >= 5 ug/dL	Total ≥ 5 µg/dL, confirmed & unconfirmed*	% with BLL >= 5 ug/dL, confirmed & unconfirmed*	Children Tested	Confirmed ≥ 5 µg/dL (venous only)	% with confirmed BLL >= 5 ug/dL	Total ≥ 5 µg/dL, confirmed & unconfirmed*	% with BLL >= 5 ug/dL, confirmed & unconfirmed*
Lenawee	1,238	418	33.8	17	4.1	54	12.9	174	7	4.0	22	12.6
Livingston	1,064	532	50.0	3	0.6	6	1.1	113	0	0.0	0	0.0
Luce	81	68	84.0	0	0.0	0	0.0	8	0	0.0	0	0.0
Mackinac	101	90	89.1	0	0.0	1	1.1	9	0	0.0	0	0.0
Macomb	8,689	3,585	41.3	23	0.6	60	1.7	1626	13	0.8	23	1.4
Manistee	224	174	77.7	2	1.1	8	4.6	25	0	0.0	0	0.0
Marquette	628	349	55.6	6	1.7	11	3.2	44	1	2.3	1	2.3
Mason	361	95	26.3	1	1.1	5	5.3	91	1	1.1	5	5.5
Mecosta	486	234	48.1	2	0.9	2	0.9	22	0	0.0	0	0.0
Menominee	211	175	82.9	3	1.7	13	7.4	28	0	0.0	0	0.0
Midland	750	198	26.4	1	0.5	2	1.0	104	0	0.0	1	1.0
Missaukee	242	102	42.1	1	1.0	1	1.0	11	0	0.0	0	0.0
Monroe	1,464	740	50.5	1	0.1	11	1.5	187	0	0.0	0	0.0
Montcalm	881	432	49.0	4	0.9	8	1.9	158	1	0.6	2	1.3
Montmorency	92	59	64.1	0	0.0	1	1.7	13	0	0.0	0	0.0
Muskegon	2,799	1,219	43.6	50	4.1	98	8.0	589	19	3.2	37	6.3
Newaygo	681	310	45.5	0	0.0	7	2.3	28	0	0.0	0	0.0
Oakland	9,214	3,774	41.0	33	0.9	63	1.7	2067	21	1.0	27	1.3
Oceana	465	239	51.4	1	0.4	4	1.7	159	3	1.9	4	2.5
Ogemaw	277	64	23.1	1	1.6	1	1.6	16	0	0.0	0	0.0
Ontonagon	34	21	61.8	0	0.0	2	9.5	11	0	0.0	0	0.0
Osceola	347	243	70.0	6	2.5	9	3.7	60	1	1.7	2	3.3
Oscoda	95	17	17.9	0	0.0	2	11.8	13	0	0.0	1	7.7
Otsego	339	187	55.2	0	0.0	0	0.0	106	0	0.0	1	0.9
Ottawa	2,560	1,420	55.5	6	0.4	37	2.6	240	3	1.3	7	2.9
Presque Isle	113	81	71.7	0	0.0	2	2.5	14	0	0.0	0	0.0
Roscommon	290	167	57.6	0	0.0	0	0.0	41	0	0.0	0	0.0
Saginaw	2,800	1,993	71.2	26	1.3	82	4.1	586	10	1.7	24	4.1
St Clair	1,772	1,141	64.4	10	0.9	33	2.9	809	10	1.2	23	2.8
St Joseph	1,088	591	54.3	5	0.8	24	4.1	250	4	1.6	13	5.2
Sanilac	508	254	50.0	1	0.4	4	1.6	142	1	0.7	1	0.7
Schoolcraft	92	71	77.2	0	0.0	0	0.0	4	1	25.0	1	25.0
Shiawassee	848	583	68.8	12	2.1	29	5.0	205	2	1.0	4	2.0
Tuscola	699	513	73.4	1	0.2	11	2.1	175	1	0.6	2	1.1
Van Buren	1,214	394	32.5	9	2.3	14	3.6	147	4	2.7	6	4.1
Washtenaw	2,658	943	35.5	7	0.7	12	1.3	501	1	0.2	5	1.0
Wayne	30,825	15,097	49.0	825	5.5	1,070	7.1	15,204	774	5.1	923	6.1
Wexford	562	292	52.0	2	0.7	3	1.0	26	0	0.0	0	0.0
MICHIGAN	121,568	63,127	51.9	1,352	2.1	2,667	4.2	32,137	991	3.1	1,438	4.5

*These columns are included for comparison with previous years' data

Source: MDCH Data Warehouse

7/20/2015

From: Scott, Robert L. (DCH)
Sent: Tuesday, July 21, 2015 3:52 PM
To: Alanna M. Woolley
Subject: RE: 2014 EBL Numbers
Attachments: 2014 FundedCommunities 072115.pdf

Alanna,

Here is Communities (attached). ZIP Codes will have to wait a bit, sorry.

Bob

-----Original Message-----
From: Alanna M. Woolley [mailto:du3374@wayne.edu]
Sent: Monday, July 20, 2015 11:36 AM
To: Scott, Robert L. (DCH)
Cc: Angie Sarb; Katelyn Mary Burkart; Lykethompson
Subject: Re: 2014 EBL Numbers

Hi Bob,

I hope that you had a wonderful weekend. Any word on when the final report for 2014 EBLs will be out?

Thanks!

Best,

Alanna
--
Alanna Woolley, MPA
Research Assistant
Center for Urban Studies
Wayne State University
E: du3374@wayne.edu
P: (313) 577-2207

----- Original Message -----
From: "Robert L. Scott (DCH)" <ScottR9@michigan.gov>
To: "Alanna M. Woolley" <du3374@wayne.edu>
Cc: "Katelyn Mary Burkart" <dv2491@wayne.edu>, "Lyke Thompson" <lykethompson@gmail.com>, "Angie Sarb" <angela.sarb@wayne.edu>
Sent: Thursday, June 25, 2015 10:57:52 AM
Subject: RE: 2014 EBL Numbers

Please see attached.

-----Original Message-----
From: Alanna M. Woolley [mailto:du3374@wayne.edu]

Sent: Thursday, June 25, 2015 10:22 AM
To: Scott, Robert L. (DCH)
Cc: Katelyn Mary Burkart; Lyke Thompson; Angie Sarb
Subject: Re: 2014 EBL Numbers

Hi again Bob,

Do you have the numbers for children under six with 5-9 EBLs from 1998-2003? If so, could you please send them to me?

Thank you!

Best,

Alanna

----- Original Message -----
From: "Robert L. Scott (DCH)" <ScottR9@michigan.gov>
To: "Alanna M. Woolley" <du3374@wayne.edu>
Cc: "Katelyn Mary Burkart" <dv2491@wayne.edu>, "Lyke Thompson" <lykethompson@gmail.com>, "Angie Sarb" <angela.sarb@wayne.edu>
Sent: Thursday, June 25, 2015 8:17:32 AM
Subject: RE: 2014 EBL Numbers

Alanna,

Sorry, didn't hear your phone message until this morning. Please see attached.

Bob

-----Original Message-----
From: Scott, Robert L. (DCH)
Sent: Tuesday, June 23, 2015 4:20 PM
To: 'Alanna M. Woolley'
Cc: Katelyn Mary Burkart; Lyke Thompson; Angie Sarb
Subject: RE: 2014 EBL Numbers

Please see attached. Let me know if you have questions.

-----Original Message-----
From: Alanna M. Woolley [mailto:du3374@wayne.edu]
Sent: Wednesday, June 17, 2015 2:13 PM
To: Scott, Robert L. (DCH)
Cc: Katelyn Mary Burkart; Lyke Thompson; Angie Sarb
Subject: Fwd: 2014 EBL Numbers

Hi Bob,

We were hoping to do an update on 2014 EBL numbers at the next GHHI meeting on 6/25. Is there any chance that you'll have them ready before then?

Thank you!

Best,

Alanna

--
Alanna Woolley, MPA
Research Assistant
Center for Urban Studies
Wayne State University
E: du3374@wayne.edu
P: (313) 577-2207

----- Original Message -----
From: "Robert L. Scott (DCH)" <ScottR9@michigan.gov>
To: "Alanna M. Woolley" <du3374@wayne.edu>
Sent: Monday, June 1, 2015 10:26:43 AM
Subject: RE: 2014 EBL Numbers

Alanna,

I hope to work on that this week. Will send them ASAP.

Bob

-----Original Message-----
From: Alanna M. Woolley [mailto:du3374@wayne.edu]
Sent: Thursday, May 28, 2015 4:44 PM
To: Scott, Robert L. (DCH)
Subject: 2014 EBL Numbers

Hi Bob!

If you have the 2014 EBL numbers could you please send them to me?

Thank you!

Best,

Alanna

--
Alanna Woolley, MPA
Research Assistant
Center for Urban Studies
Wayne State University
E: du3374@wayne.edu
P: (313) 577-2207

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Children Tested for Lead Poisoning -- Calendar Year 2014
Communities Receiving Funding for Lead Poisoning Prevention in FY15

Children less than Six Years of Age

				Children Tested		Children Tested, by Highest Blood Lead Level (BLL)										
Community	%Pre-1950 Housing	%Pre-1978 Housing	Children less than Six Years of Age	Number of Children Tested	% Tested	<5 ug/dL	5 to 9 ug/dL, not confirmed by venous	>= 10 ug/dL, not confirmed by venous	Confirmed 5-9 ug/dL (venous only)	Confirmed 10-14 ug/dL (venous only)	Confirmed 15-44 ug/dL (venous only)	Confirmed ≥45 ug/dL (venous only)	Total confirmed ≥ 5 µg/dL	% with confirmed BLL >= 5 ug/dL	Total ≥ 5 µg/dL, confirmed & unconfirmed *	% with BLL >= 5 ug/dL, confirmed & unconfirmed *
Detroit	62.2	93.3	59,755	22,842	38.2	20,966	279	51	1,183	214	145	4	1,546	6.8	3,422	15.0
Flint	38.0	89.7	9,639	2,343	24.3	2,237	43	5	45	8	5	0	58	2.5	164	7.0
Grand Rapids	48.1	81.5	17,577	4,379	24.9	4,020	237	7	74	20	21	0	115	2.6	474	10.8
Hamtramck	78.2	94.6	2,303	1,008	43.8	929	25	3	42	6	3	0	51	5.1	130	12.9
Highland Park	68.8	87.9	711	289	40.6	243	4	1	28	9	4	0	41	14.2	87	30.1
Jackson	67.6	91.6	3,550	1,069	30.1	976	63	11	15	1	3	0	19	1.8	112	10.5
Lansing	35.7	81.9	10,236	2,995	29.3	2,892	68	4	17	10	4	0	31	1.0	134	4.5
Muskegon/MuskHts	48.6	84.4	4,392	1,177	26.8	1,054	47	8	53	9	6	0	68	5.8	191	16.2
Subtotal	53.5	88.4	108,163	36,102	33.4	33,317	766	90	1,457	277	191	4	1,925	5.3	4,710	13.0
Michigan	24.7	64.8	710,976	143,123	20.1	136,152	2,119	212	2,050	387	277	8	2,722	1.9	5,053	3.5

Children One and Two Years of Age

				Children Tested		Children Tested, by Highest Blood Lead Level (BLL)										
Community	%Pre-1950 Housing	%Pre-1978 Housing	Children One and Two Years of Age	Number of Children Tested	% Tested	<5 ug/dL	5 to 9 ug/dL, not confirmed by venous	>= 10 ug/dL, not confirmed by venous	Confirmed 5-9 ug/dL (venous only)	Confirmed 10-14 ug/dL (venous only)	Confirmed 15-44 ug/dL (venous only)	Confirmed ≥45 ug/dL (venous only)	Total confirmed ≥ 5 µg/dL	% with confirmed BLL >= 5 ug/dL	Total ≥ 5 µg/dL, confirmed & unconfirmed *	% with BLL >= 5 ug/dL, confirmed & unconfirmed *
Detroit	62.2	93.3	20,048	9,641	48.1	8,674	160	25	577	115	88	0	780	8.1	1,745	18.1
Flint	38.0	89.7	3,266	1,502	46.0	1,431	31	5	27	5	3	0	35	2.3	106	7.1
Grand Rapids	48.1	81.5	5,962	3,464	58.1	3,180	195	5	51	16	17	0	84	2.4	368	10.6
Hamtramck	78.2	94.6	756	455	60.2	409	14	3	23	4	2	0	29	6.4	75	16.5
Highland Park	68.8	87.9	214	127	59.3	102	3	0	17	3	2	0	22	17.3	47	37.0
Jackson	67.6	91.6	1,204	740	61.5	666	53	7	12	0	2	0	14	1.9	88	11.9
Lansing	35.7	81.9	3,523	1,751	49.7	1,689	41	4	9	6	2	0	17	1.0	79	4.5
Muskegon/MuskHts	48.6	84.4	1,497	705	47.1	622	29	5	36	7	6	0	49	7.0	132	18.7
Subtotal	53.5	88.4	36,470	18,385	50.4	16,773	526	54	752	156	122	0	1,030	5.6	2,640	14.4
Michigan	24.7	64.8	234,103	87,917	37.6	84,776	1,469	139	1,122	230	179	2	1,557	1.8	3,165	3.6

*These columns are included for comparison with previous years' data

Sources: US Census Bureau, Census 2010 (Pre-1950 Housing & Pre-1978 Housing) and American Community Survey 2013 5-year estimates (Community populations); MDCH Data Warehouse (children tested)

7/21/2015

From: Scott, Robert L. (DCH)
Sent: Wednesday, July 22, 2015 12:45 PM
To: Paul Diefenbach
Subject: RE: Medicaid Lead Testing reports

☺ I'm glad to hear we (Lead) are not the first.

From: Paul Diefenbach [mailto:pdiefenbach@mlpp.org]
Sent: Wednesday, July 22, 2015 12:43 PM
To: Scott, Robert L. (DCH)
Subject: RE: Medicaid Lead Testing reports

Thanks for the explanation. That's what I was afraid of, since we use both the single year results and have a trend file on the national Data Center.
At least we're used to it; seems like most of our indicators have explanatory notes.

From: Scott, Robert L. (DCH) [mailto:ScottR9@michigan.gov]
Sent: Wednesday, July 22, 2015 10:43 AM
To: Paul Diefenbach
Subject: RE: Medicaid Lead Testing reports

It's a sticky one. We felt we needed to make the change to "confirmed" after we took a closer look at our data--even at the 5-9 levels so many capillary tests are followed by a lower venous test, so including all 5-9s (cap and venous) is misleading. On the other hand, that creates a precipitous drop in the number of kids with BLL >=5, so I provided the old version (confirmed and unconfirmed) for comparison with previous years.

So, my suggestion is this: when displaying 2014 numbers only, use the "confirmed" columns. When comparing against previous years, use the "confirmed & unconfirmed" columns. Of course this creates potential for lots of confusion, so some explanatory notes might be appropriate.

From: Paul Diefenbach [mailto:pdiefenbach@mlpp.org]
Sent: Wednesday, July 22, 2015 9:51 AM
To: Scott, Robert L. (DCH)
Subject: RE: Medicaid Lead Testing reports

I do have a question, now that I am processing the data.

There are now confirmed and unconfirmed counts of >5 ug/dL. Which one should I use?

From: Scott, Robert L. (DCH) [mailto:ScottR9@michigan.gov]
Sent: Monday, July 20, 2015 12:59 PM
To: Paul Diefenbach
Subject: RE: Medicaid Lead Testing reports

Paul,

Please see three attached files. Let me know if you have questions.

Bob

From: Paul Diefenbach [mailto:pdiefenbach@mlpp.org]
Sent: Wednesday, July 15, 2015 9:12 AM
To: Scott, Robert L. (DCH)
Subject: RE: Medicaid Lead Testing reports

I didn't get an attachment. We use the data for 12 cities – all but Benton Harbor and Hamtramck.

From: Scott, Robert L. (DCH) [mailto:ScottR9@michigan.gov]
Sent: Tuesday, July 14, 2015 4:28 PM
To: Paul Diefenbach
Subject: RE: Medicaid Lead Testing reports

Paul,

I apologize for letting the target date slip by. I think I can work on them now, will try to have them to you by the end of this week. Please see attached—do you need all of those cities, or are you looking for specific ones?

Thanks,
Bob

From: Paul Diefenbach [mailto:pdiefenbach@mlpp.org]
Sent: Tuesday, July 14, 2015 11:17 AM
To: Scott, Robert L. (DCH)
Subject: FW: Medicaid Lead Testing reports

Bob,
Could you estimate when the files will be ready?
Thanks.

From: Scott, Robert L. (DCH) [mailto:ScottR9@michigan.gov]
Sent: Tuesday, May 19, 2015 3:41 PM
To: Paul Diefenbach
Subject: RE: Medicaid Lead Testing reports

Will do!

From: Paul Diefenbach [mailto:pdiefenbach@mlpp.org]
Sent: Tuesday, May 19, 2015 3:18 PM
To: Scott, Robert L. (DCH)
Subject: Medicaid Lead Testing reports

Hi Bob,
Attached are the annual reports you have been sending us. Could you please send the 2014 versions? June 19 would be a good target date.

Thank you.

From: Scott, Robert L. (DCH)
Sent: Thursday, July 23, 2015 11:11 AM
To: Paul Diefenbach
Subject: RE: Medicaid Lead Testing reports

Ouch, you're correct, thanks for catching that. I'll send a corrected file.

From: Paul Diefenbach [mailto:pdiefenbach@mlpp.org]
Sent: Thursday, July 23, 2015 11:02 AM
To: Scott, Robert L. (DCH)
Subject: RE: Medicaid Lead Testing reports

On the county file, column U is the sum of col. J-P, but on the city file it is the sum of col. J-R.
I think the confirmed cases got double counted on the city file.

From: Scott, Robert L. (DCH) [mailto:ScottR9@michigan.gov]
Sent: Wednesday, July 22, 2015 10:43 AM
To: Paul Diefenbach
Subject: RE: Medicaid Lead Testing reports

It's a sticky one. We felt we needed to make the change to "confirmed" after we took a closer look at our data--even at the 5-9 levels so many capillary tests are followed by a lower venous test, so including all 5-9s (cap and venous) is misleading. On the other hand, that creates a precipitous drop in the number of kids with BLL >=5, so I provided the old version (confirmed and unconfirmed) for comparison with previous years.

So, my suggestion is this: when displaying 2014 numbers only, use the "confirmed" columns. When comparing against previous years, use the "confirmed & unconfirmed" columns. Of course this creates potential for lots of confusion, so some explanatory notes might be appropriate.

From: Paul Diefenbach [mailto:pdiefenbach@mlpp.org]
Sent: Wednesday, July 22, 2015 9:51 AM
To: Scott, Robert L. (DCH)
Subject: RE: Medicaid Lead Testing reports

I do have a question, now that I am processing the data.

There are now confirmed and unconfirmed counts of >5 ug/dL. Which one should I use?

From: Scott, Robert L. (DCH) [mailto:ScottR9@michigan.gov]
Sent: Monday, July 20, 2015 12:59 PM
To: Paul Diefenbach
Subject: RE: Medicaid Lead Testing reports

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Please see three attached files. Let me know if you have questions.

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From: Paul Diefenbach [mailto:pdiefenbach@mlpp.org]
Sent: Wednesday, July 15, 2015 9:12 AM
To: Scott, Robert L. (DCH)
Subject: RE: Medicaid Lead Testing reports

I didn't get an attachment. We use the data for 12 cities -- all but Benton Harbor and Hamtramck.

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Sent: Tuesday, July 14, 2015 4:28 PM
To: Paul Diefenbach
Subject: RE: Medicaid Lead Testing reports

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Thanks,
Bob

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Thanks.

From: Scott, Robert L. (DCH) [mailto:ScottR9@michigan.gov]
Sent: Tuesday, May 19, 2015 3:41 PM
To: Paul Diefenbach
Subject: RE: Medicaid Lead Testing reports

Will do!

From: Paul Diefenbach [mailto:pdiefenbach@mlpp.org]
Sent: Tuesday, May 19, 2015 3:18 PM
To: Scott, Robert L. (DCH)
Subject: Medicaid Lead Testing reports

Hi Bob,
Attached are the annual reports you have been sending us. Could you please send the 2014 versions? June 19 would be a good target date.

Thank you.

From: Scott, Robert L. (DCH)
Sent: Thursday, July 23, 2015 11:25 AM
To: Alanna M. Woolley
Subject: RE: 2014 EBL Numbers
Attachments: 2014 FundedCommunities 072315.pdf

Alanna,

Please delete the "Funded Communities" PDF that I sent earlier, and replace it with this one. The previous version had errors.

Thanks,
Bob

Children Tested for Lead Poisoning -- Calendar Year 2014
Communities Receiving Funding for Lead Poisoning Prevention in FY15

Children less than Six Years of Age

				Children Tested		Children Tested, by Highest Blood Lead Level (BLL)										
Community	%Pre-1950 Housing	%Pre-1978 Housing	Children less than Six Years of Age	Number of Children Tested	% Tested	<5 ug/dL	5 to 9 ug/dL, not confirmed by venous	>= 10 ug/dL, not confirmed by venous	Confirmed 5-9 ug/dL (venous only)	Confirmed 10-14 ug/dL (venous only)	Confirmed 15-44 ug/dL (venous only)	Confirmed ≥45 ug/dL (venous only)	Total confirmed ≥ 5 µg/dL	% with confirmed BLL >= 5 ug/dL	Total ≥ 5 µg/dL, confirmed & unconfirmed *	% with BLL >= 5 ug/dL, confirmed & unconfirmed *
Detroit	62.2	93.3	59,755	22,842	38.2	20,966	279	51	1,183	214	145	4	1,546	6.8	1,876	8.2
Flint	38.0	89.7	9,639	2,343	24.3	2,237	43	5	45	8	5	0	58	2.5	106	4.5
Grand Rapids	48.1	81.5	17,577	4,379	24.9	4,020	237	7	74	20	21	0	115	2.6	359	8.2
Hamtramck	78.2	94.6	2,303	1,008	43.8	929	25	3	42	6	3	0	51	5.1	79	7.8
Highland Park	68.8	87.9	711	289	40.6	243	4	1	28	9	4	0	41	14.2	46	15.9
Jackson	67.6	91.6	3,550	1,069	30.1	976	63	11	15	1	3	0	19	1.8	93	8.7
Lansing	35.7	81.9	10,236	2,995	29.3	2,892	68	4	17	10	4	0	31	1.0	103	3.4
Muskegon/MuskHts	48.6	84.4	4,392	1,177	26.8	1,054	47	8	53	9	6	0	68	5.8	123	10.5
Subtotal	53.5	88.4	108,163	36,102	33.4	33,317	766	90	1,457	277	191	4	1,925	5.3	2,785	7.7
Michigan	24.7	64.8	710,976	143,123	20.1	136,152	2,119	212	2,050	387	277	8	2,722	1.9	5,053	3.5

Children One and Two Years of Age

				Children Tested		Children Tested, by Highest Blood Lead Level (BLL)										
Community	%Pre-1950 Housing	%Pre-1978 Housing	Children One and Two Years of Age	Number of Children Tested	% Tested	<5 ug/dL	5 to 9 ug/dL, not confirmed by venous	>= 10 ug/dL, not confirmed by venous	Confirmed 5-9 ug/dL (venous only)	Confirmed 10-14 ug/dL (venous only)	Confirmed 15-44 ug/dL (venous only)	Confirmed ≥45 ug/dL (venous only)	Total confirmed ≥ 5 µg/dL	% with confirmed BLL >= 5 ug/dL	Total ≥ 5 µg/dL, confirmed & unconfirmed *	% with BLL >= 5 ug/dL, confirmed & unconfirmed *
Detroit	62.2	93.3	20,048	9,641	48.1	8,674	160	25	577	115	88	0	780	8.1	965	10.0
Flint	38.0	89.7	3,266	1,502	46.0	1,431	31	5	27	5	3	0	35	2.3	71	4.7
Grand Rapids	48.1	81.5	5,962	3,464	58.1	3,180	195	5	51	16	17	0	84	2.4	284	8.2
Hamtramck	78.2	94.6	756	455	60.2	409	14	3	23	4	2	0	29	6.4	46	10.1
Highland Park	68.8	87.9	214	127	59.3	102	3	0	17	3	2	0	22	17.3	25	19.7
Jackson	67.6	91.6	1,204	740	61.5	666	53	7	12	0	2	0	14	1.9	74	10.0
Lansing	35.7	81.9	3,523	1,751	49.7	1,689	41	4	9	6	2	0	17	1.0	62	3.5
Muskegon/MuskHts	48.6	84.4	1,497	705	47.1	622	29	5	36	7	6	0	49	7.0	83	11.8
Subtotal	53.5	88.4	36,470	18,385	50.4	16,773	526	54	752	156	122	0	1,030	5.6	1,610	8.8
Michigan	24.7	64.8	234,103	87,917	37.6	84,776	1,469	139	1,122	230	179	2	1,533	1.8	3,141	3.6

*These columns are included for comparison with previous years' data

Sources: US Census Bureau, Census 2010 (Pre-1950 Housing & Pre-1978 Housing) and American Community Survey 2013 5-year estimates (Community populations); MDCH Data Warehouse (children tested)

7/23/2015

From: Scott, Robert L. (DCH)
Sent: Thursday, July 23, 2015 11:35 AM
To: Paul Diefenbach
Subject: RE: Medicaid Lead Testing reports
Attachments: 2014 Cities 072315.xlsx

There was also a problem with the sub-totals in the top table. Please see attached. Thanks again for catching the problem. My sincere apologies for sending incorrect data.

From: Paul Diefenbach [mailto:pdiefenbach@mlpp.org]
Sent: Thursday, July 23, 2015 11:02 AM
To: Scott, Robert L. (DCH)
Subject: RE: Medicaid Lead Testing reports

On the county file, column U is the sum of col. J-P, but on the city file it is the sum of col. J-R.
I think the confirmed cases got double counted on the city file.

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There are now confirmed and unconfirmed counts of >5 ug/dL. Which one should I use?

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Subject: FW: Medicaid Lead Testing reports

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From: Scott, Robert L. (DCH) [mailto:ScottR9@michigan.gov]
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To: Paul Diefenbach
Subject: RE: Medicaid Lead Testing reports

Will do!

From: Paul Diefenbach [mailto:pdiefenbach@mlpp.org]
Sent: Tuesday, May 19, 2015 3:18 PM
To: Scott, Robert L. (DCH)
Subject: Medicaid Lead Testing reports

Hi Bob,
Attached are the annual reports you have been sending us. Could you please send the 2014 versions? June 19 would be a good target date.

Thank you.

	A	B	C	D
1	**Children Tested for Lead Poisoning -- Calendar Year 2014**			
2	**Selected Communities**			
3				
4	**Children less than Six Years of Age**			
5				
6				
7	Community	%Pre-1950 Housing	%Pre-1978 Housing	Children less than Six Years of Age
8	Battle Creek	43.0	79.6	4,811
9	Benton Harbor	57.7	84.0	1,294
10	Dearborn	48.1	85.3	9,914
11	Detroit	62.2	93.3	59,755
12	Flint	38.0	89.7	9,639
13	Grand Rapids	48.1	81.5	17,577
14	Hamtramck	78.2	94.6	2,303
15	Highland Park	68.8	87.9	711
16	Jackson	67.6	91.6	3,550
17	Kalamazoo	40.8	78.8	4,966
18	Lansing	35.7	81.9	10,236
19	Muskegon/MuskHts	48.6	84.4	4,392
20	Pontiac	32.6	77.3	5,208
21	Saginaw	55.6	91.4	4,616
22				
23	Subtotal	53.5	88.4	138,972
24				
25	Michigan	24.7	64.8	710,976
26				
27				
28				
29	**Children One and Two Years of Age**			
30				
31				
32	Community	%Pre-1950 Housing	%Pre-1978 Housing	Children One and Two Years of Age
33	Battle Creek	43.0	79.6	1,628

	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
1																
2																
3																
4																
5																
6	Children Tested			Children Tested, by Highest Blood Lead Level (BLL)												
7	Number of Children Tested	% Tested		<5 ug/dL		5 to 9 ug/dL, not confirmed by venous	>= 10 ug/dL, not confirmed by venous		Confirmed 5-9 ug/dL (venous only)	Confirmed 10-14 ug/dL (venous only)	Confirmed 15-44 ug/dL (venous only)	Confirmed ≥45 ug/dL (venous only)		Total confirmed ≥ 5 µg/dL	% with confirmed BLL >= 5 ug/dL	
8	1,172	24.4		1,119		18	0		27	5	3	0		35	3.0	
9	317	24.5		295		7	3		8	2	2	0		12	3.8	
10	2,356	23.8		2,313		9	0		29	5	0	0		34	1.4	
11	22,842	38.2		20,966		279	51		1,183	214	145	4		1,546	6.8	
12	2,343	24.3		2,237		43	5		45	8	5	0		58	2.5	
13	4,379	24.9		4,020		237	7		74	20	21	0		115	2.6	
14	1,008	43.8		929		25	3		42	6	3	0		51	5.1	
15	289	40.6		243		4	1		28	9	4	0		41	14.2	
16	1,069	30.1		976		63	11		15	1	3	0		19	1.8	
17	1,306	26.3		1,240		38	5		17	3	2	1		23	1.8	
18	2,995	29.3		2,892		68	4		17	10	4	0		31	1.0	
19	1,177	26.8		1,054		47	8		53	9	6	0		68	5.8	
20	1,579	30.3		1,551		5	0		14	6	3	0		23	1.5	
21	1,540	33.4		1,452		49	6		22	6	5	0		33	2.1	
22																
23	44,372	31.9		41,287		892	104		1,574	304	206	5		2,089	4.7	
24																
25	143,123	20.1		136,152		2,119	212		2,050	387	277	8		2,722	1.9	
26																
27																
28																
29																
30																
31	Children Tested			Children Tested, by Highest Blood Lead Level (BLL)												
32	Number of Children Tested	% Tested		<5 ug/dL		5 to 9 ug/dL, not confirmed by venous	>= 10 ug/dL, not confirmed by venous		Confirmed 5-9 ug/dL (venous only)	Confirmed 10-14 ug/dL (venous only)	Confirmed 15-44 ug/dL (venous only)	Confirmed ≥45 ug/dL (venous only)		Total confirmed ≥ 5 µg/dL	% with confirmed BLL >= 5 ug/dL	
33	639	39.3		606		8	1		21	3	0	0		24	3.8	

	U	V
1		
2		
3		
4		
5		
6		
7	Total ≥ 5 µg/dL, confirmed & unconfirmed*	% with BLL >= 5 ug/dL, confirmed & unconfirmed*
8	53	4.5
9	22	6.9
10	43	1.8
11	1,876	8.2
12	106	4.5
13	359	8.2
14	79	7.8
15	46	15.9
16	93	8.7
17	66	5.1
18	103	3.4
19	123	10.5
20	28	1.8
21	88	5.7
22		
23	3,085	7.0
24		
25	5,053	3.5
26		
27		
28		
29		
30		
31		
32	Total ≥ 5 µg/dL, confirmed & unconfirmed*	% with BLL >= 5 ug/dL, confirmed & unconfirmed*
33	33	5.2

	A	B	C	D
34	Benton Harbor	57.7	84.0	447
35	Dearborn	48.1	85.3	3,338
36	Detroit	62.2	93.3	20,048
37	Flint	38.0	89.7	3,266
38	Grand Rapids	48.1	81.5	5,962
39	Hamtramck	78.2	94.6	756
40	Highland Park	68.8	87.9	214
41	Jackson	67.6	91.6	1,204
42	Kalamazoo	40.8	78.8	1,626
43	Lansing	35.7	81.9	3,523
44	Muskegon/MuskHts	48.6	84.4	1,497
45	Pontiac	32.6	77.3	1,764
46	Saginaw	55.6	91.4	1,530
47				
48	Subtotal	53.5	88.4	46,803
49				
50	Michigan	24.7	64.8	234,103
51				
52				
53	*These columns are included for comparison with previous years' data			
54	Sources: US Census Bureau, Census 2010 (Pre-1950 Housing & Pre-1978 Housing) and American Community Survey 2013 5-year estimates (Community populations); MDCH Data Warehouse (children tested)			

	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
34	236	52.8		219		6	3		6	1	1	0		8	3.4	
35	1,200	35.9		1,182		5	0		11	2	0	0		13	1.1	
36	9,641	48.1		8,674		160	25		577	115	88	0		780	8.1	
37	1,502	46.0		1,431		31	5		27	5	3	0		35	2.3	
38	3,464	58.1		3,180		195	5		51	16	17	0		84	2.4	
39	455	60.2		409		14	3		23	4	2	0		29	6.4	
40	127	59.3		102		3	0		17	3	2	0		22	17.3	
41	740	61.5		666		53	7		12	0	2	0		14	1.9	
42	723	44.5		684		22	1		12	3	1	0		16	2.2	
43	1,751	49.7		1,689		41	4		9	6	2	0		17	1.0	
44	705	47.1		622		29	5		36	7	6	0		49	7.0	
45	883	50.1		865		2	0		10	3	3	0		16	1.8	
46	1,100	71.9		1,039		34	4		15	4	4	0		23	2.1	
47																
48	23,166	49.5		21,368		603	63		827	172	131	0		1,130	4.9	
49																
50	87,917	37.6		84,776		1,469	139		1,122	230	179	2		1,533	1.8	
51																
52																
53																
54																

	U	V
34	17	7.2
35	18	1.5
36	965	10.0
37	71	4.7
38	284	8.2
39	46	10.1
40	25	19.7
41	74	10.0
42	39	5.4
43	62	3.5
44	83	11.8
45	18	2.0
46	61	5.5
47		
48	1,796	7.8
49		
50	3,141	3.6
51		
52		
53		
54		7/23/2015

From: Scott, Robert L. (DCH)
Sent: Tuesday, July 28, 2015 1:48 PM
To: Peeler, Nancy (DCH)
Subject: FW: Flint Testing and EBLLs.xlsx

Nancy,

I said this morning I'd look to see if the distribution of EBLLs in the July-September 2014 "spike" was any different from the typical distribution of EBLLs in Flint. I compared totals by zip code vs totals by zip code from 2010 (BLLs >=5). The pattern is very similar and is further evidence, I think, that the water was not a major factor here.

July-September 2010			
zip	# of EBLL		
48503	11	16	% of total
48504	17	24	% of total
48505	19	27	% of total
48506	11	16	% of total
48507	8	11	% of total
48532	4	6	% of total
Total	70	100	% of total
CY 2010			
zip	# of EBLL		
48503	68	21	% of total
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48505	79	24	% of total
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48507	30	9	% of total
48532	11	3	% of total
Total	326	100	% of total

Cristin is redoing her analysis with the extra two years of data. I assume it's OK to let her go ahead with that.

Bob

From: Larder, Cristin (DCH)
Sent: Tuesday, July 28, 2015 11:00 AM
To: Scott, Robert L. (DCH); Peeler, Nancy (DCH); McKane, Patricia (DCH)
Subject: RE: Flint Testing and EBLLs.xlsx

Okay, thanks, Bob. I'll incorporate the previous years and put the new results into a publisher document with some description of what's going on in the chart.

We'll find out if this changes the results!

From: Scott, Robert L. (DCH)
Sent: Tuesday, July 28, 2015 10:15 AM
To: Larder, Cristin (DCH); Peeler, Nancy (DCH); McKane, Patricia (DCH)
Subject: RE: Flint Testing and EBLLs.xlsx

Cristin,

I can safely say I don't understand it without some explanation.

However, late yesterday Nancy and I decided to take a look two years farther back to see how they fit with the recent years. Please see attached, which I just finished this morning. Sorry I didn't have this for you yesterday before you did the analysis. Would this new information change the analysis?

Thanks,
Bob

From: Larder, Cristin (DCH)
Sent: Tuesday, July 28, 2015 10:07 AM
To: Peeler, Nancy (DCH); McKane, Patricia (DCH)
Cc: Scott, Robert L. (DCH)
Subject: RE: Flint Testing and EBLLs.xlsx

Nancy and Bob,

Is the control chart clear enough, do you think? I could whip up a fact sheet with a description of what it shows, if you think it would help make it more digestible for our audience.

Cristin

From: Larder, Cristin (DCH)
Sent: Tuesday, July 28, 2015 9:25 AM
To: Peeler, Nancy (DCH); McKane, Patricia (DCH)
Cc: Scott, Robert L. (DCH)
Subject: RE: Flint Testing and EBLLs.xlsx

Hi Nancy,

I made a p-chart, which Shewhart's version of a control chart for proportions, for the data you sent. Basically, I used the monthly data from 2013-14 to create upper and lower control limits, then plotted the 2014-15 data in a run chart. It shows that the three months in question are the only ones that lie outside the control limit: in fact, they are the only points that lie well above the mean at all. This doesn't say anything about causality, but it does warrant further investigation.

There are several next steps we can employ if the folks upstairs ask us to look deeper into the data. Also, I'm not sure if you talked at all with the Environmental Health folks, but their toxicologists could probably help give us some context to the issue.

Cristin

From: Peeler, Nancy (DCH)
Sent: Monday, July 27, 2015 3:37 PM
To: McKane, Patricia (DCH)
Cc: Larder, Cristin (DCH); Scott, Robert L. (DCH)
Subject: Re: Flint Testing and EBLLs.xlsx

Thanks, Patti. I'm looking forward to hearing about your CoIIN meeting, I'm sure you will be bringing great information back.

Sent from my iPhone

On Jul 27, 2015, at 3:11 PM, "McKane, Patricia (DCH)" <McKaneP@michigan.gov> wrote:

> Thanks Nancy.
> I was in a session on Shewart charts for QI. I think this might be a good approach for the needs assessment We can talk more. Hopefully the slides will be available, because I can't type that much with my thumbs
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> >
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> >
> > Nancy
> >
> > <Flint Testing and EBLLs.xlsx>

	A	B	C	D
	July-September 2010			
	zip	# of EBLL		
	48503	11	16	% of total
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	48532	11	3	% of total
	Total	326	100	% of total

From: Scott, Robert L. (DCH)
Sent: Tuesday, July 28, 2015 2:28 PM
To: Peeler, Nancy (DCH)
Subject: RE: Flint Testing and EBLLs.xlsx

No, sorry, I mislabeled the top one. Should say "July-September 2014."

From: Peeler, Nancy (DCH)
Sent: Tuesday, July 28, 2015 2:26 PM
To: Scott, Robert L. (DCH)
Subject: RE: Flint Testing and EBLLs.xlsx

So this is 2010 data, rather than 2014 data?

From: Scott, Robert L. (DCH)
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To: Peeler, Nancy (DCH)
Subject: FW: Flint Testing and EBLLs.xlsx

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Cristin

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Sent from my iPhone

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	zip	# of EBLL		
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	48507	8	11	% of total
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	48506	50	15	% of total
	48507	30	9	% of total
	48532	11	3	% of total
	Total	326	100	% of total

From: Scott, Robert L. (DCH)
Sent: Monday, August 24, 2015 4:16 PM
To: Reed, Amanda
Subject: RE: Michigan Healthy Homes & Lead Poisoning Prevention Data
Attachments: CLPPP 2013 Data Report.pdf; 2014 FundedCommunities 072315.pdf; 2014 Lead Testing and EBLL 0-5 072015.pdf; 2014 Lead Testing and EBLL 1-2 072015.pdf

Amanda,

Please see four attached files. We've had ongoing website issues, so the 2013 data report has never been posted. The other three files are for 2014, but we don't have a comprehensive data report yet for 2014.

Let me know if you have questions.

Bob

Robert L. Scott
Childhood Lead Poisoning Prevention Program
Michigan Department of Health & Human Services
(517) 335-8178
fax (517) 335-8509

From: Reed, Amanda [mailto:Amanda.Reed@liveunitedsem.org]
Sent: Monday, August 24, 2015 11:31 AM
To: Scott, Robert L. (DCH) <ScottR9@michigan.gov>
Cc: Miles, Jeff <Jeff.Miles@liveunitedsem.org>
Subject: Michigan Healthy Homes & Lead Poisoning Prevention Data

Hi Robert,

My name is Amanda Reed and I work at United Way for Southeastern Michigan in Early Childhood Education. I was reading about the work the Healthy Homes & Lead Poisoning Prevention program has done, and I noticed the most recent data on the MDCH website is from 2012. **Is there updated information that is available on lead poisoning statistics in Michigan for children? Also, do these reports have different age segments for children (0-1 years, 1-2 years, etc.)?**

Any information you can provide would be much appreciated. We are looking to create a snapshot of how lead poisoning may be correlated with developmental outcomes of children in our region.

Thank you, and I look forward to hearing from you,

Amanda Reed
Social Innovation Fund Knowledge Sharing Specialist

United Way for Southeastern Michigan
660 Woodward Ave | Suite 300 | Detroit, MI 48226
Mobile: 734.474.9574

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Children Tested for Lead Poisoning -- Calendar Year 2014
Communities Receiving Funding for Lead Poisoning Prevention in FY15

Children less than Six Years of Age

				Children Tested		Children Tested, by Highest Blood Lead Level (BLL)										
Community	%Pre-1950 Housing	%Pre-1978 Housing	Children less than Six Years of Age	Number of Children Tested	% Tested	<5 ug/dL	5 to 9 ug/dL, not confirmed by venous	>= 10 ug/dL, not confirmed by venous	Confirmed 5-9 ug/dL (venous only)	Confirmed 10-14 ug/dL (venous only)	Confirmed 15-44 ug/dL (venous only)	Confirmed ≥45 ug/dL (venous only)	Total confirmed ≥ 5 µg/dL	% with confirmed BLL >= 5 ug/dL	Total ≥ 5 µg/dL, confirmed & unconfirmed *	% with BLL >= 5 ug/dL, confirmed & unconfirmed *
Detroit	62.2	93.3	59,755	22,842	38.2	20,966	279	51	1,183	214	145	4	1,546	6.8	1,876	8.2
Flint	38.0	89.7	9,639	2,343	24.3	2,237	43	5	45	8	5	0	58	2.5	106	4.5
Grand Rapids	48.1	81.5	17,577	4,379	24.9	4,020	237	7	74	20	21	0	115	2.6	359	8.2
Hamtramck	78.2	94.6	2,303	1,008	43.8	929	25	3	42	6	3	0	51	5.1	79	7.8
Highland Park	68.8	87.9	711	289	40.6	243	4	1	28	9	4	0	41	14.2	46	15.9
Jackson	67.6	91.6	3,550	1,069	30.1	976	63	11	15	1	3	0	19	1.8	93	8.7
Lansing	35.7	81.9	10,236	2,995	29.3	2,892	68	4	17	10	4	0	31	1.0	103	3.4
Muskegon/MuskHts	48.6	84.4	4,392	1,177	26.8	1,054	47	8	53	9	6	0	68	5.8	123	10.5
Subtotal	53.5	88.4	108,163	36,102	33.4	33,317	766	90	1,457	277	191	4	1,925	5.3	2,785	7.7
Michigan	24.7	64.8	710,976	143,123	20.1	136,152	2,119	212	2,050	387	277	8	2,722	1.9	5,053	3.5

Children One and Two Years of Age

				Children Tested		Children Tested, by Highest Blood Lead Level (BLL)										
Community	%Pre-1950 Housing	%Pre-1978 Housing	Children One and Two Years of Age	Number of Children Tested	% Tested	<5 ug/dL	5 to 9 ug/dL, not confirmed by venous	>= 10 ug/dL, not confirmed by venous	Confirmed 5-9 ug/dL (venous only)	Confirmed 10-14 ug/dL (venous only)	Confirmed 15-44 ug/dL (venous only)	Confirmed ≥45 ug/dL (venous only)	Total confirmed ≥ 5 µg/dL	% with confirmed BLL >= 5 ug/dL	Total ≥ 5 µg/dL, confirmed & unconfirmed *	% with BLL >= 5 ug/dL, confirmed & unconfirmed *
Detroit	62.2	93.3	20,048	9,641	48.1	8,674	160	25	577	115	88	0	780	8.1	965	10.0
Flint	38.0	89.7	3,266	1,502	46.0	1,431	31	5	27	5	3	0	35	2.3	71	4.7
Grand Rapids	48.1	81.5	5,962	3,464	58.1	3,180	195	5	51	16	17	0	84	2.4	284	8.2
Hamtramck	78.2	94.6	756	455	60.2	409	14	3	23	4	2	0	29	6.4	46	10.1
Highland Park	68.8	87.9	214	127	59.3	102	3	0	17	3	2	0	22	17.3	25	19.7
Jackson	67.6	91.6	1,204	740	61.5	666	53	7	12	0	2	0	14	1.9	74	10.0
Lansing	35.7	81.9	3,523	1,751	49.7	1,689	41	4	9	6	2	0	17	1.0	62	3.5
Muskegon/MuskHts	48.6	84.4	1,497	705	47.1	622	29	5	36	7	6	0	49	7.0	83	11.8
Subtotal	53.5	88.4	36,470	18,385	50.4	16,773	526	54	752	156	122	0	1,030	5.6	1,610	8.8
Michigan	24.7	64.8	234,103	87,917	37.6	84,776	1,469	139	1,122	230	179	2	1,533	1.8	3,141	3.6

*These columns are included for comparison with previous years' data

Sources: US Census Bureau, Census 2010 (Pre-1950 Housing & Pre-1978 Housing) and American Community Survey 2013 5-year estimates (Community populations); MDCH Data Warehouse (children tested)

7/23/2015

Children Tested for Lead Poisoning -- Calendar Year 2014
All Counties in Michigan

Children less than Six Years of Age

				Children Tested		Children Tested, by Highest Blood Lead Level (BLL)										
County	%Pre-1950 Housing	%Pre-1978 Housing	Children less than Six Years of Age	Number of Children Tested	% Tested	<5 ug/dL	5 to 9 ug/dL, not confirmed by venous	>= 10 ug/dL, not confirmed by venous	Confirmed 5-9 ug/dL (venous only)	Confirmed 10-14 ug/dL (venous only)	Confirmed 15-44 ug/dL (venous only)	Confirmed ≥45 ug/dL (venous only)	Total confirmed ≥ 5 µg/dL	% with confirmed BLL >= 5 ug/dL	Total ≥ 5 µg/dL, confirmed & unconfirmed*	% with BLL >= 5 ug/dL, confirmed & unconfirmed*
Alcona	12.4	61.5	398	53	13.3	51	2	0	0	0	0	0	0	0.0	2	3.8
Alger	29.5	64.1	427	92	21.5	90	1	0	0	1	0	0	1	1.1	2	2.2
Allegan	23.2	51.1	8,806	1,208	13.7	1,177	26	2	3	0	0	0	3	0.2	31	2.6
Alpena	25.3	71.6	1,758	257	14.6	248	7	1	1	0	0	0	1	0.4	9	3.5
Antrim	18.8	52.6	1,370	260	19.0	258	0	0	2	0	0	0	2	0.8	2	0.8
Arenac	19.8	58.2	870	186	21.4	185	1	0	0	0	0	0	0	0.0	1	0.5
Baraga	34.0	71.7	477	135	28.3	134	1	0	0	0	0	0	0	0.0	1	0.7
Barry	27.1	57.3	4,143	491	11.9	468	19	0	3	1	0	0	4	0.8	23	4.7
Bay	33.9	75.6	7,322	1,408	19.2	1,358	31	2	10	3	3	1	17	1.2	50	3.6
Benzie	18.6	46.3	1,041	268	25.7	266	2	0	0	0	0	0	0	0.0	2	0.7
Berrien	28.6	72.2	11,681	1,943	16.6	1,884	24	5	21	4	5	0	30	1.5	59	3.0
Branch	30.9	65.3	3,506	668	19.1	645	18	1	1	3	0	0	4	0.6	23	3.4
Calhoun	36.1	75.3	10,149	2,390	23.5	2,290	36	0	51	7	6	0	64	2.7	100	4.2
Cass	22.4	59.9	3,444	426	12.4	414	7	1	3	1	0	0	4	0.9	12	2.8
Charlevoix	25.3	54.4	1,624	295	18.2	294	1	0	0	0	0	0	0	0.0	1	0.3
Cheboygan	20.9	53.5	1,414	286	20.2	279	6	0	1	0	0	0	1	0.3	7	2.4
Chippewa	25.1	58.6	2,345	440	18.8	436	1	0	3	0	0	0	3	0.7	4	0.9
Clare	14.5	58.8	2,083	446	21.4	442	4	0	0	0	0	0	0	0.0	4	0.9
Clinton	22.5	52.8	5,140	585	11.4	579	1	0	5	0	0	0	5	0.9	6	1.0
Crawford	13.7	55.6	727	85	11.7	84	1	0	0	0	0	0	0	0.0	1	1.2
Delta	33.3	68.0	2,388	413	17.3	397	14	0	1	0	1	0	2	0.5	16	3.9
Dickinson	38.9	71.7	1,575	318	20.2	317	0	0	1	0	0	0	1	0.3	1	0.3
Eaton	20.4	56.4	7,356	1,140	15.5	1,113	20	3	4	0	0	0	4	0.4	27	2.4
Emmet	23.0	48.3	2,042	362	17.7	362	0	0	0	0	0	0	0	0.0	0	0.0
Genesee	19.9	68.0	31,997	6,824	21.3	6,646	97	11	56	9	5	0	70	1.0	178	2.6
Gladwin	12.4	49.5	1,495	291	19.5	291	0	0	0	0	0	0	0	0.0	0	0.0
Gogebic	50.0	76.7	855	154	18.0	152	2	0	0	0	0	0	0	0.0	2	1.3
Grand Traverse	14.7	43.5	6,000	1,371	22.9	1,359	6	3	3	0	0	0	3	0.2	12	0.9
Gratiot	34.7	69.8	2,754	496	18.0	491	4	0	1	0	0	0	1	0.2	5	1.0
Hillsdale	36.5	63.2	3,283	814	24.8	795	14	2	3	0	0	0	3	0.4	19	2.3
Houghton	53.4	75.5	2,477	599	24.2	585	6	0	4	2	2	0	8	1.3	14	2.3
Huron	31.8	68.9	1,873	393	21.0	381	9	0	2	1	0	0	3	0.8	12	3.1
Ingham	24.9	68.2	19,248	4,747	24.7	4,606	94	5	25	11	6	0	42	0.9	141	3.0
Ionia	35.8	63.0	4,878	843	17.3	816	20	2	4	0	1	0	5	0.6	27	3.2
Iosco	12.7	65.6	1,233	150	12.2	146	3	0	1	0	0	0	1	0.7	4	2.7
Iron	44.1	72.1	573	138	24.1	135	3	0	0	0	0	0	0	0.0	3	2.2
Isabella	16.3	48.2	4,208	640	15.2	632	7	0	1	0	0	0	1	0.2	8	1.3
Jackson	33.0	67.9	11,296	2,757	24.4	2,602	107	14	27	3	4	0	34	1.2	155	5.6
Kalamazoo	22.5	62.6	18,588	3,257	17.5	3,172	48	7	23	4	2	1	30	0.9	85	2.6
Kalkaska	13.2	49.3	1,180	217	18.4	216	1	0	0	0	0	0	0	0.0	1	0.5
Kent	24.8	59.2	52,655	10,115	19.2	9,645	325	8	89	22	26	0	137	1.4	470	4.6
Keweenaw	46.9	77.6	115	25	21.7	23	2	0	0	0	0	0	0	0.0	2	8.0
Lake	12.5	52.6	585	120	20.5	118	2	0	0	0	0	0	0	0.0	2	1.7
Lapeer	20.4	52.9	5,687	919	16.2	890	22	3	3	0	1	0	4	0.4	29	3.2
Leelanau	17.9	46.5	1,111	239	21.5	234	4	1	0	0	0	0	0	0.0	5	2.1
Lenawee	33.6	67.2	6,911	1,196	17.3	1,074	78	16	21	3	4	0	28	2.3	122	10.2

Children Tested for Lead Poisoning -- Calendar Year 2014
All Counties in Michigan

Children less than Six Years of Age

				Children Tested		Children Tested, by Highest Blood Lead Level (BLL)										
County	%Pre-1950 Housing	%Pre-1978 Housing	Children less than Six Years of Age	Number of Children Tested	% Tested	<5 ug/dL	5 to 9 ug/dL, not confirmed by venous	>= 10 ug/dL, not confirmed by venous	Confirmed 5-9 ug/dL (venous only)	Confirmed 10-14 ug/dL (venous only)	Confirmed 15-44 ug/dL (venous only)	Confirmed ≥45 ug/dL (venous only)	Total confirmed ≥ 5 µg/dL	% with confirmed BLL >= 5 ug/dL	Total ≥ 5 µg/dL, confirmed & unconfirmed*	% with BLL >= 5 ug/dL, confirmed & unconfirmed*
Livingston	11.4	39.0	12,104	1,026	8.5	1,017	4	0	4	1	0	0	5	0.5	9	0.9
Luce	23.8	64.3	370	88	23.8	88	0	0	0	0	0	0	0	0.0	0	0.0
Mackinac	23.4	58.6	587	130	22.1	129	1	0	0	0	0	0	0	0.0	1	0.8
Macomb	9.3	59.1	57,878	9,525	16.5	9,397	73	6	38	2	7	2	49	0.5	128	1.3
Manistee	28.8	63.9	1,307	284	21.7	271	10	0	1	0	2	0	3	1.1	13	4.6
Marquette	27.9	69.4	4,029	471	11.7	458	3	2	8	0	0	0	8	1.7	13	2.8
Mason	32.1	64.6	1,864	414	22.2	387	25	0	2	0	0	0	2	0.5	27	6.5
Mecosta	18.2	53.4	2,520	316	12.5	314	0	0	0	0	2	0	2	0.6	2	0.6
Menominee	35.4	73.2	1,375	261	19.0	245	11	1	3	0	1	0	4	1.5	16	6.1
Midland	15.2	58.7	5,685	477	8.4	472	2	0	2	1	0	0	3	0.6	5	1.0
Missaukee	21.2	56.2	1,111	133	12.0	132	0	0	0	1	0	0	1	0.8	1	0.8
Monroe	23.0	59.0	10,355	1,571	15.2	1,553	15	1	1	1	0	0	2	0.1	18	1.1
Montcalm	27.3	57.7	4,527	748	16.5	735	6	0	5	1	1	0	7	0.9	13	1.7
Montmorency	18.1	58.6	404	83	20.5	82	1	0	0	0	0	0	0	0.0	1	1.2
Muskegon	25.8	66.2	13,224	2,572	19.4	2,415	66	13	62	10	6	0	78	3.0	157	6.1
Newaygo	19.3	53.6	3,581	447	12.5	440	6	1	0	0	0	0	0	0.0	7	1.6
Oakland	14.7	60.5	83,501	14,308	17.1	14,102	94	8	71	20	13	0	104	0.7	206	1.4
Oceana	25.8	57.8	2,091	516	24.7	506	5	0	2	3	0	0	5	1.0	10	1.9
Ogemaw	12.8	61.6	1,289	102	7.9	101	0	0	1	0	0	0	1	1.0	1	1.0
Ontonagon	39.1	73.2	251	48	19.1	46	2	0	0	0	0	0	0	0.0	2	4.2
Osceola	22.6	56.6	1,723	334	19.4	324	4	0	2	2	2	0	6	1.8	10	3.0
Oscoda	17.8	62.1	521	35	6.7	32	2	1	0	0	0	0	0	0.0	3	8.6
Otsego	12.2	50.3	1,641	325	19.8	324	1	0	0	0	0	0	0	0.0	1	0.3
Ottawa	15.7	45.3	21,390	3,012	14.1	2,931	59	5	16	1	0	0	17	0.6	81	2.7
Presque Isle	21.1	66.3	597	111	18.6	109	2	0	0	0	0	0	0	0.0	2	1.8
Roscommon	13.1	58.7	1,156	218	18.9	218	0	0	0	0	0	0	0	0.0	0	0.0
Saginaw	28.1	73.1	14,029	3,670	26.2	3,548	76	8	25	7	6	0	38	1.0	122	3.3
Saint Clair	25.8	59.4	11,046	2,731	24.7	2,655	46	7	15	5	3	0	23	0.8	76	2.8
Saint Joseph	27.5	65.1	5,125	1,012	19.7	971	27	4	7	2	1	0	10	1.0	41	4.1
Sanilac	30.7	64.6	2,879	523	18.2	517	4	0	1	1	0	0	2	0.4	6	1.1
Schoolcraft	25.5	63.3	471	99	21.0	98	0	0	1	0	0	0	1	1.0	1	1.0
Shiawassee	33.9	68.2	4,622	1,169	25.3	1,131	19	2	15	2	0	0	17	1.5	38	3.3
Tuscola	30.2	67.4	3,579	886	24.8	874	10	0	0	2	0	0	2	0.2	12	1.4
Van Buren	23.3	58.1	5,884	862	14.6	832	9	1	17	1	2	0	20	2.3	30	3.5
Washtenaw	17.2	56.5	22,833	2,604	11.4	2,572	15	2	10	2	3	0	15	0.6	32	1.2
Wayne ex Det	22.6	74.5	82,002	18,348	22.4	16,021	164	12	185	33	15	0	233	1.3	409	2.2
Wexford	23.0	53.7	2,582	362	14.0	359	1	0	0	0	2	0	2	0.6	3	0.8
Detroit, City of	62.2	93.2	59,755	22,842	38.2	20,966	279	51	1,183	214	145	4	1,546	6.8	1,876	8.2
MICHIGAN	24.7	64.8	710,976	143,123	20.1	136,152	2,119	212	2,050	387	277	8	2,722	1.9	5,053	3.5

*These columns are included for comparison with previous years' data

July 20, 2015

Sources: US Census Bureau, Census 2010 (Pre-1950 Housing and Pre-1978 Housing) and American Community Survey 2013 5-year estimates (Detroit and county populations);
MDCH Data Warehouse (children tested)

Children Tested for Lead Poisoning -- Calendar Year 2014
All Counties in Michigan

Children One to Two Years of Age

				Children Tested		Children Tested, by Highest Blood Lead Level (BLL)										
County	%Pre-1950 Housing	%Pre-1978 Housing	Children One to Two Years of Age	Number of Children Tested	% Tested	<5 ug/dL	5 to 9 ug/dL, not confirmed by venous	>= 10 ug/dL, not confirmed by venous	Confirmed 5-9 ug/dL (venous only)	Confirmed 10-14 ug/dL (venous only)	Confirmed 15-44 ug/dL (venous only)	Confirmed ≥45 ug/dL (venous only)	Total confirmed ≥ 5 µg/dL	% with confirmed BLL >= 5 ug/dL	Total ≥ 5 µg/dL, confirmed & unconfirmed*	% with BLL >= 5 ug/dL, confirmed & unconfirmed*
Alcona	12.4	61.5	130	43	33.1	41	2	0	0	0	0	0	0	0.0	2	4.7
Alger	29.5	64.1	130	76	58.5	74	1	0	0	1	0	0	1	1.3	2	2.6
Allegan	23.2	51.1	2,888	872	30.2	848	19	2	3	0	0	0	3	0.3	24	2.8
Alpena	25.3	71.6	570	218	38.2	210	7	0	1	0	0	0	1	0.5	8	3.7
Antrim	18.8	52.6	450	191	42.4	189	0	0	2	0	0	0	2	1.0	2	1.0
Arenac	19.8	58.2	281	136	48.4	135	1	0	0	0	0	0	0	0.0	1	0.7
Baraga	34.0	71.7	165	91	55.2	91	0	0	0	0	0	0	0	0.0	0	0.0
Barry	27.1	57.3	1,328	387	29.1	371	13	0	2	1	0	0	3	0.8	16	4.1
Bay	33.9	75.6	2,410	1,233	51.2	1,195	24	2	8	3	1	0	12	1.0	38	3.1
Benzie	18.6	46.3	338	178	52.7	176	2	0	0	0	0	0	0	0.0	2	1.1
Berrien	28.6	72.2	3,855	1,602	41.6	1,554	22	5	14	3	4	0	21	1.3	48	3.0
Branch	30.9	65.3	1,157	239	20.7	232	6	0	0	1	0	0	1	0.4	7	2.9
Calhoun	36.1	75.3	3,366	1,317	39.1	1,257	17	1	35	4	3	0	42	3.2	60	4.6
Cass	22.4	59.9	1,120	364	32.5	353	7	1	2	1	0	0	3	0.8	11	3.0
Charlevoix	25.3	54.4	523	213	40.7	212	1	0	0	0	0	0	0	0.0	1	0.5
Cheboygan	20.9	53.5	457	214	46.8	209	5	0	0	0	0	0	0	0.0	5	2.3
Chippewa	25.1	58.6	775	268	34.6	265	1	0	2	0	0	0	2	0.7	3	1.1
Clare	14.5	58.8	700	359	51.3	355	4	0	0	0	0	0	0	0.0	4	1.1
Clinton	22.5	52.8	1,650	342	20.7	338	1	0	3	0	0	0	3	0.9	4	1.2
Crawford	13.7	55.6	237	67	28.3	66	1	0	0	0	0	0	0	0.0	1	1.5
Delta	33.3	68.0	782	351	44.9	335	14	0	1	0	1	0	2	0.6	16	4.6
Dickinson	38.9	71.7	529	288	54.4	287	0	0	1	0	0	0	1	0.3	1	0.3
Eaton	20.4	56.4	2,410	772	32.0	753	13	3	3	0	0	0	3	0.4	19	2.5
Emmet	23.0	48.3	656	266	40.5	266	0	0	0	0	0	0	0	0.0	0	0.0
Genesee	19.9	68.0	10,583	4,326	40.9	4,207	68	9	34	5	3	0	42	1.0	119	2.8
Gladwin	12.4	49.5	486	193	39.7	193	0	0	0	0	0	0	0	0.0	0	0.0
Gogebic	50.0	76.7	285	117	41.1	115	2	0	0	0	0	0	0	0.0	2	1.7
Grand Traverse	14.7	43.5	1,955	893	45.7	887	3	1	2	0	0	0	2	0.2	6	0.7
Gratiot	34.7	69.8	909	359	39.5	356	2	0	1	0	0	0	1	0.3	3	0.8
Hillsdale	36.5	63.2	1,079	395	36.6	384	6	2	3	0	0	0	3	0.8	11	2.8
Houghton	53.4	75.5	828	505	61.0	493	4	0	4	2	2	0	8	1.6	12	2.4
Huron	31.8	68.9	607	229	37.7	220	8	0	1	0	0	0	1	0.4	9	3.9
Ingham	24.9	68.2	6,426	2,832	44.1	2,749	56	5	14	6	2	0	22	0.8	83	2.9
Ionia	35.8	63.0	1,590	628	39.5	604	18	2	3	0	1	0	4	0.6	24	3.8
Iosco	12.7	65.6	397	124	31.2	121	3	0	0	0	0	0	0	0.0	3	2.4
Iron	44.1	72.1	193	120	62.2	118	2	0	0	0	0	0	0	0.0	2	1.7
Isabella	16.3	48.2	1,392	462	33.2	458	3	0	1	0	0	0	1	0.2	4	0.9
Jackson	33.0	67.9	3,716	2,021	54.4	1,900	87	8	21	2	3	0	26	1.3	121	6.0
Kalamazoo	22.5	62.6	6,166	1,889	30.6	1,838	26	4	16	3	1	1	21	1.1	51	2.7
Kalkaska	13.2	49.3	395	138	34.9	137	1	0	0	0	0	0	0	0.0	1	0.7
Kent	24.8	59.2	17,514	8,193	46.8	7,816	267	6	64	19	21	0	104	1.3	377	4.6
Keweenaw	46.9	77.6	39	21	53.8	19	2	0	0	0	0	0	0	0.0	2	9.5
Lake	12.5	52.6	192	87	45.3	86	1	0	0	0	0	0	0	0.0	1	1.1
Lapeer	20.4	52.9	1,780	705	39.6	680	21	2	1	0	1	0	2	0.3	25	3.5
Leelanau	17.9	46.5	350	169	48.3	165	3	1	0	0	0	0	0	0.0	4	2.4
Lenawee	33.6	67.2	2,248	688	30.6	613	51	6	13	2	3	0	18	2.6	75	10.9

Children Tested for Lead Poisoning -- Calendar Year 2014
All Counties in Michigan

Children One to Two Years of Age

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County	%Pre-1950 Housing	%Pre-1978 Housing	Children One to Two Years of Age	Number of Children Tested	% Tested	<5 ug/dL	5 to 9 ug/dL, not confirmed by venous	>= 10 ug/dL, not confirmed by venous	Confirmed 5-9 ug/dL (venous only)	Confirmed 10-14 ug/dL (venous only)	Confirmed 15-44 ug/dL (venous only)	Confirmed ≥45 ug/dL (venous only)	Total confirmed ≥ 5 µg/dL	% with confirmed BLL >= 5 ug/dL	Total ≥ 5 µg/dL, confirmed & unconfirmed*	% with BLL >= 5 ug/dL, confirmed & unconfirmed*
Livingston	11.4	39.0	3,871	750	19.4	741	4	0	4	1	0	0	5	0.7	9	1.2
Luce	23.8	64.3	121	79	65.3	79	0	0	0	0	0	0	0	0.0	0	0.0
Mackinac	23.4	58.6	193	113	58.5	112	1	0	0	0	0	0	0	0.0	1	0.9
Macomb	9.3	59.1	19,051	6,156	32.3	6,075	47	5	23	2	3	1	29	0.5	81	1.3
Manistee	28.8	63.9	411	247	60.1	235	9	0	1	0	2	0	3	1.2	12	4.9
Marquette	27.9	69.4	1,364	414	30.4	402	3	2	7	0	0	0	7	1.7	12	2.9
Mason	32.1	64.6	620	111	17.9	106	4	0	1	0	0	0	1	0.9	5	4.5
Mecosta	18.2	53.4	851	279	32.8	277	0	0	0	1	1	0	2	0.7	2	0.7
Menominee	35.4	73.2	442	219	49.5	203	11	1	3	0	1	0	4	1.8	16	7.3
Midland	15.2	58.7	1,842	297	16.1	295	1	0	1	0	0	0	1	0.3	2	0.7
Missaukee	21.2	56.2	359	113	31.5	112	0	0	0	1	0	0	1	0.9	1	0.9
Monroe	23.0	59.0	3,378	1,158	34.3	1,143	12	1	1	1	0	0	2	0.2	15	1.3
Montcalm	27.3	57.7	1,493	494	33.1	484	4	0	4	1	1	0	6	1.2	10	2.0
Montmorency	18.1	58.6	131	64	48.9	63	1	0	0	0	0	0	0	0.0	1	1.6
Muskegon	25.8	66.2	4,384	1,652	37.7	1,546	44	9	40	7	6	0	53	3.2	106	6.4
Newaygo	19.3	53.6	1,172	395	33.7	388	6	1	0	0	0	0	0	0.0	7	1.8
Oakland	14.7	60.5	27,292	7,882	28.9	7,759	61	7	38	9	8	0	55	0.7	123	1.6
Oceana	25.8	57.8	685	276	40.3	271	3	0	1	1	0	0	2	0.7	5	1.8
Ogemaw	12.8	61.6	413	81	19.6	80	0	0	1	0	0	0	1	1.2	1	1.2
Ontonagon	39.1	73.2	82	31	37.8	29	2	0	0	0	0	0	0	0.0	2	6.5
Osceola	22.6	56.6	564	260	46.1	251	3	0	2	3	1	0	6	2.3	9	3.5
Oscoda	17.8	62.1	168	18	10.7	16	2	0	0	0	0	0	0	0.0	2	11.1
Otsego	12.2	50.3	540	197	36.5	197	0	0	0	0	0	0	0	0.0	0	0.0
Ottawa	15.7	45.3	7,046	2,576	36.6	2,507	51	5	12	1	0	0	13	0.5	69	2.7
Presque Isle	21.1	66.3	193	89	46.1	87	2	0	0	0	0	0	0	0.0	2	2.2
Roscommon	13.1	58.7	379	172	45.4	172	0	0	0	0	0	0	0	0.0	0	0.0
Saginaw	28.1	73.1	4,623	2,756	59.6	2,670	54	5	17	5	5	0	27	1.0	86	3.1
Saint Clair	25.8	59.4	3,574	1,333	37.3	1,296	24	3	5	3	2	0	10	0.8	37	2.8
Saint Joseph	27.5	65.1	1,684	691	41.0	665	18	3	2	2	1	0	5	0.7	26	3.8
Sanilac	30.7	64.6	949	291	30.7	286	4	0	0	1	0	0	1	0.3	5	1.7
Schoolcraft	25.5	63.3	151	80	53.0	80	0	0	0	0	0	0	0	0.0	0	0.0
Shiawassee	33.9	68.2	1,503	749	49.8	718	16	2	11	2	0	0	13	1.7	31	4.1
Tuscola	30.2	67.4	1,174	650	55.4	639	10	0	0	1	0	0	1	0.2	11	1.7
Van Buren	23.3	58.1	1,924	507	26.4	490	6	1	8	0	2	0	10	2.0	17	3.4
Washtenaw	17.2	56.5	7,560	1,834	24.3	1,809	10	2	8	2	3	0	13	0.7	25	1.4
Wayne ex Det	22.6	74.5	26,966	9,769	36.2	9,539	100	7	100	18	7	0	125	1.3	232	2.4
Wexford	23.0	53.7	865	312	36.1	309	1	0	0	0	2	0	2	0.6	3	1.0
Detroit, City of	62.2	93.2	20,048	9,641	48.1	8,674	160	25	577	115	88	0	780	8.1	965	10.0
MICHIGAN	24.7	64.8	234,103	87,917	37.6	84,776	1,469	139	1,122	230	179	2	1,533	1.7	3,141	3.6

*These columns are included for comparison with previous years' data

July 20, 2015

Sources: US Census Bureau, Census 2010 (Pre-1950 Housing and Pre-1978 Housing) and American Community Survey 2013 5-year estimates (Detroit and county populations);
MDCH Data Warehouse (children tested)

From: Scott, Robert L. (DCH)
Sent: Friday, September 11, 2015 12:00 PM
To: 'Lishinski Karen (LishinskiK@michigan.gov)';Emily Houk (emily@r2pconsultants.com)
Subject: FW: MIHP, NFP and EBLL
Attachments: BLLs_MIHP_NFP_matched_091115.pdf

Whoops, I forgot to CC. Please see attached.

From: Scott, Robert L. (DCH)
Sent: Friday, September 11, 2015 12:00 PM
To: Peeler, Nancy (DCH) <PeelerN@michigan.gov>
Subject: MIHP, NFP and EBLL

Nancy, please see attached.

Robert L. Scott
Childhood Lead Poisoning Prevention Program
Michigan Department of Health & Human Services
(517) 335-8178
fax (517) 335-8509

Children Insured by Medicaid, less than 72 months of age, with confirmed BLL >= 5, 2013-2014
Visited or Not Visited by MIHP

Year Child was Born	Year of Highest BLL	Children with Elevated BLL	Received MIHP Visit	Pct of EBLL w/MIHP
2007	2013	47	0	0
	2014	0	0	---
	Total	47	0	0
2008	2013	273	0	0
	2014	43	0	0
	Total	316	0	0
2009	2013	385	0	0
	2014	188	0	0
	Total	573	0	0
2010	2013	518	1	0.2
	2014	322	0	0
	Total	840	1	0.1
2011	2013	600	13	2.2
	2014	414	9	2.2
	Total	1014	22	2.2
2012	2013	461	62	13.4
	2014	597	125	20.9
	Total	1058	187	17.7
2013	2013	11	4	36.4
	2014	496	135	27.2
	Total	507	139	27.4
2014	2013	0	0	0
	2014	9	3	33.3
	Total	9	3	33.3

Children Insured by Medicaid, born in 2013 or 2014, with confirmed BLL >= 5
Enrolled or Not Enrolled in NFP

Of 845 children with BLL >= 5--from Berrien, Calhoun, Genesee, Ingham, Kalamazoo, Kent, Oakland, Saginaw and Wayne Counties--five children were enrolled in NFP.

September 11, 2015

Source: MDHHS Data Warehouse

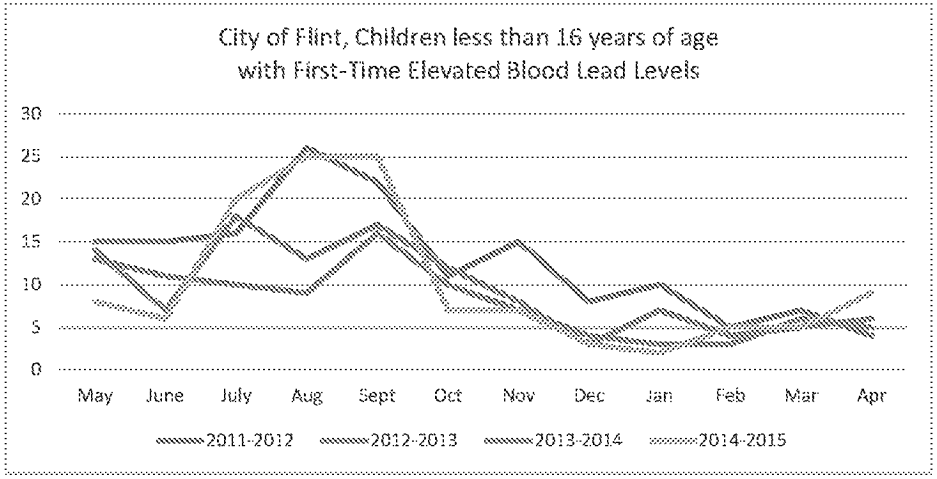
From: Scott, Robert L. (DCH)
Sent: Tuesday, September 15, 2015 1:17 PM
To: reynolds@mottchc.org
Cc: Peeler, Nancy (DCH);'Lishinski Karen (LishinskiK@michigan.gov)'
Subject: Lead graphs
Attachments: Flint Testing and EBLLs.pdf

Dr. Reynolds,

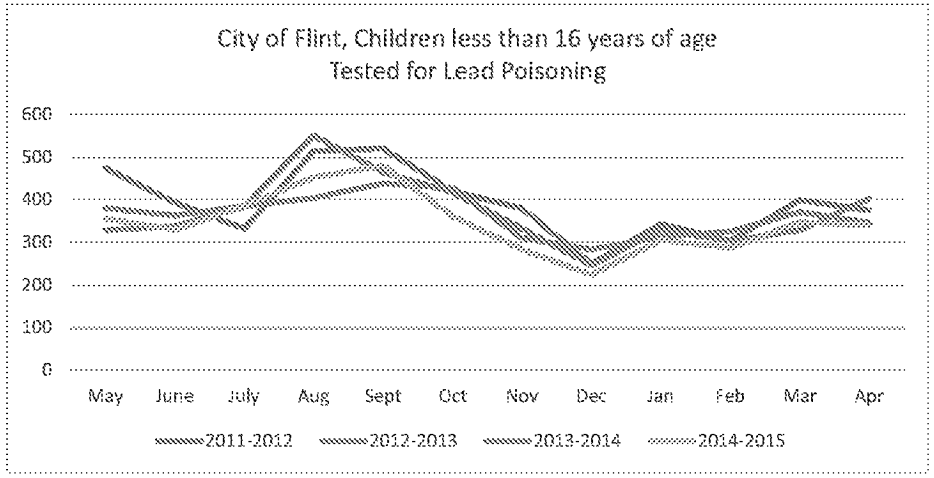
Per your conversation with Nancy Peeler, please see attached. Let me know if you have any questions about the data.

Thanks,
Bob Scott

Robert L. Scott
Childhood Lead Poisoning Prevention Program
Michigan Department of Health & Human Services
(517) 335-8178
fax (517) 335-8509



	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr
2011-2012	15	15	16	26	22	11	15	8	10	5	7	4
2012-2013	14	7	18	13	17	12	8	3	7	4	5	6
2013-2014	13	11	10	9	16	10	7	4	3	3	6	5
2014-2015	8	6	20	25	25	7	7	3	2	5	5	9



	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr
2011-2012	474	393	332	513	520	420	379	249	343	303	399	375
2012-2013	328	338	383	550	464	417	332	246	328	303	328	402
2013-2014	380	363	385	404	438	427	310	283	313	325	371	346
2014-2015	356	329	386	452	480	361	283	224	305	287	348	339

From: Scott, Robert L. (DCH)
Sent: Wednesday, September 16, 2015 11:11 AM
To: Peeler, Nancy (DCH)
Subject: RE: Lead level data

Will do!

From: Peeler, Nancy (DCH)
Sent: Wednesday, September 16, 2015 11:05 AM
To: Scott, Robert L. (DCH) <ScottR9@michigan.gov>
Subject: RE: Lead level data

I like to see the revised charts before they go out, please and thank you!

From: Scott, Robert L. (DCH)
Sent: Wednesday, September 16, 2015 10:50 AM
To: Lawrence Reynolds; Mona Hanna-Attisha; Laura Carravallah; Dr. Lawrence Reynolds, M.D.
Cc: Peeler, Nancy (DCH)
Subject: RE: Lead level data

The CDC's and Michigan's "reference level" for blood lead is 5 ug/dL—with the understanding that there is no safe level of lead.

From: Lawrence Reynolds [mailto:lrey52@gmail.com]
Sent: Wednesday, September 16, 2015 10:35 AM
To: Scott, Robert L. (DCH) <ScottR9@michigan.gov>; Mona Hanna-Attisha <MHanna1@hurleymc.com>; Laura Carravallah <lcarrav1@yahoo.com>; Dr. Lawrence Reynolds, M.D. <reynolds@mottchc.org>
Subject: Re: Lead level data

Ps- Is 5 or 10 the cut off lead ?

On Wed, Sep 16, 2015 at 10:30 AM, Lawrence Reynolds <lrey52@gmail.com> wrote:

> Good morning Mr. Scott .
> Thank you for your timely response.I have reviewed the graphs with our GCHD and Dr. Mona Hanna-Attisha of Hurley.Is it possible to stratify the data by age -under 15 months, 16 months to under 6 years of age , over 6 years.Also can we get the most recent data for 2015.
> At this point we will work with our patients to educate them.
> Breast feeding is first choice .
> I understand different filters do different things for lead , and not all get lead clumps from leaching pipes so we will not emphasize them.
> We will try to get WIC to cover bottled water and encourage using water from outside the city system
> Our goal is to give the most consistent correct information.
> Are there any plans for public service announcements from the state ?
> I am asking you to cc my reynolds@mottchc.org email along with lrey52@ gmail so I can access from anywhere.

--
Lawrence Reynolds

--
Lawrence Reynolds

From: Scott, Robert L. (DCH)
Sent: Wednesday, September 23, 2015 10:57 AM
To: Mona Hanna-Attisha
Cc: Lawrence Reynolds;Peeler, Nancy (DCH)
Subject: RE: IRBNet Board Action

I will ASAP, but still trying to get caught up after being away.

-----Original Message-----
From: Mona Hanna-Attisha [mailto:MHanna1@hurleymc.com]
Sent: Wednesday, September 23, 2015 10:55 AM
To: Scott, Robert L. (DCH) <ScottR9@michigan.gov>
Cc: Lawrence Reynolds <lrey52@gmail.com>; Peeler, Nancy (DCH) <PeelerN@michigan.gov>
Subject: RE: IRBNet Board Action

Thanks. Will do today.

Are you able to look at EBL % as was previously done for the more recent months and for kids less than 5yr?

Mona Hanna-Attisha MD MPH

Director, Pediatric Residency Program

Hurley Children's Hospital at Hurley Medical Center

Assistant Professor, Department of Pediatrics and Human Development

Michigan State University College of Human Medicine

Office: 810-262-7257

mhanna1@hurleymc.com

From: Scott, Robert L. (DCH) [ScottR9@michigan.gov]
Sent: Wednesday, September 23, 2015 10:53 AM
To: Mona Hanna-Attisha
Cc: Lawrence Reynolds; Peeler, Nancy (DCH)
Subject: RE: IRBNet Board Action

Mona,

I'll be happy to help with this. We'll need you to submit a DCH-1294 Data Use Agreement (attached) and an IRB Initial Review Application - Abbreviated for review by the MDHHS IRB. The latter is available at Michigan.gov/irb under "Information for New Applications." (The "Abbreviated" application is used whenever another IRB has already approved

the project.) Please complete each of the two documents as far as you can, and send to me unsigned, as Word documents. I'll fill in the rest, and will send the DUA to our Legal department and the IRB app to our IRB contact. I'll ask each of them for as quick a review as possible.

Please let me know if you have questions.

Bob

Robert L. Scott
Childhood Lead Poisoning Prevention Program Michigan Department of Health & Human Services
(517) 335-8178
fax (517) 335-8509

-----Original Message-----
From: Mona Hanna-Attisha [mailto:MHanna1@hurleymc.com]
Sent: Wednesday, September 16, 2015 3:10 PM
To: Scott, Robert L. (DCH) <ScottR9@michigan.gov>
Cc: Lawrence Reynolds <lrey52@gmail.com>
Subject: FW: IRBNet Board Action

Bob, I just received IRB approval to look at the City of Flint blood lead levels. I would love to get the raw data if that is possible. Attached is my study proposal and the IRB approval.

Specific fields that we are looking for include:
MCIR ID or some sort of identifier to ensure first time lead level only Zip code Date of Birth Date of Blood lead level Lead level

Would greatly appreciate your assistance! Thanks!

Mona Hanna-Attisha MD MPH FAAP
Program Director Pediatric Residency
Hurley Children's Hospital at Hurley Medical Center Michigan State University College of Human Medicine Department of Pediatrics and Human Development Mhanna1@hurleymc.com

-----Original Message-----
From: Nicolas Lecea [mailto:no-reply@irbnet.org]
Sent: Wednesday, September 16, 2015 2:09 PM
To: Jenny LaChance; Mona Hanna-Attisha
Subject: IRBNet Board Action

Please note that Hurley Medical Center Institutional Review Board has taken the following action on IRBNet:

Project Title: [807433-1] Analysis of Pediatric Blood Lead Levels Principal Investigator: Mona Hanna-Attisha, MD MPH

Submission Type: New Project
Date Submitted: September 15, 2015

Action: APPROVED
Effective Date: September 16, 2015
Review Type: Expedited Review

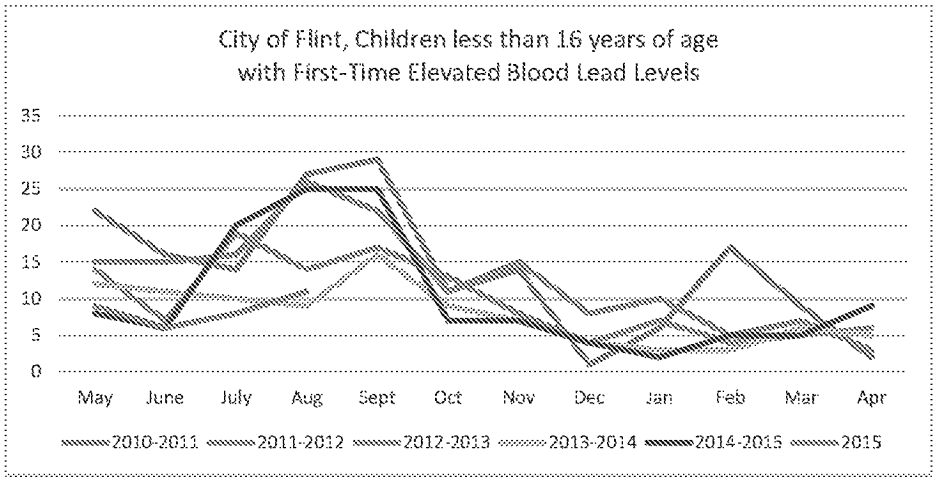
Should you have any questions you may contact Nicolas Lecea at nlecea1@hurleymc.com.

Thank you,
The IRBNet Support Team

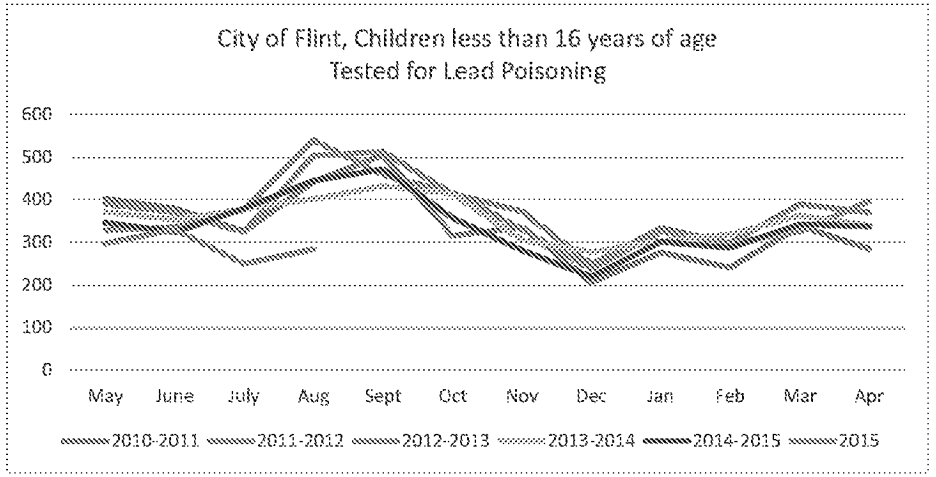
www.irbnet.org

From: Scott, Robert L. (DCH)
Sent: Wednesday, September 23, 2015 4:41 PM
To: Peeler, Nancy (DCH)
Subject: pdf version
Attachments: Flint Testing and EBLLs_updated 092315.pdf

Robert L. Scott
Childhood Lead Poisoning Prevention Program
Michigan Department of Health & Human Services
(517) 335-8178
fax (517) 335-8509



	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr
2010-2011	22	16	14	27	29	11	14	1	6	17	9	2
2011-2012	15	15	16	26	22	11	15	8	10	5	7	3
2012-2013	14	7	19	14	17	13	8	4	7	4	5	6
2013-2014	12	11	10	9	16	9	7	4	3	3	6	5
2014-2015	8	6	20	25	25	7	7	4	2	5	5	9
2015	9	6	8	11								

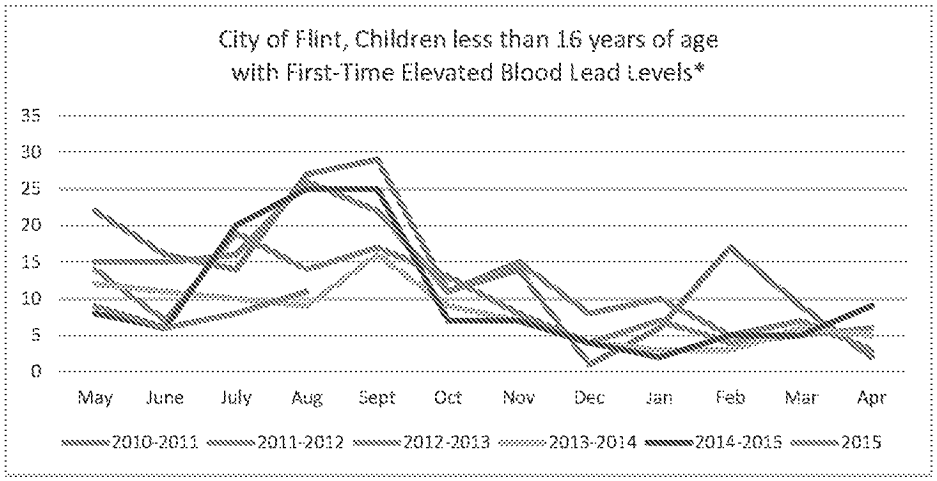


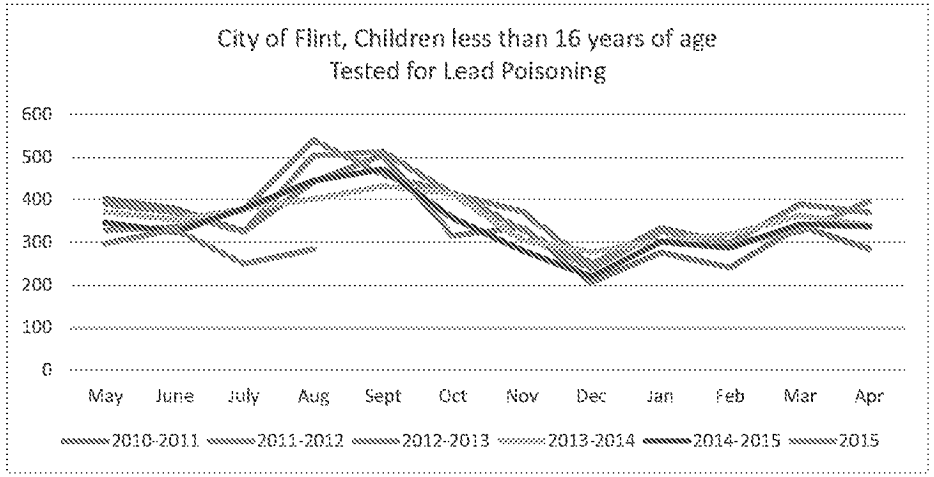
	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr
2010-2011	402	379	325	442	504	315	335	206	276	240	338	285
2011-2012	390	370	324	503	512	413	372	248	333	298	389	370
2012-2013	328	335	376	540	458	416	331	237	325	298	325	397
2013-2014	371	353	378	401	432	414	305	277	304	319	363	339
2014-2015	346	324	379	445	471	357	281	219	301	287	342	337
2015	297	330	249	284								

From: Scott, Robert L. (DCH)
Sent: Wednesday, September 23, 2015 4:48 PM
To: Peeler, Nancy (DCH)
Subject: pdf with notes
Attachments: Flint Testing and EBLLs_updated 092315_with notes.pdf

We can easily modify those notes if you want them to read differently.

Robert L. Scott
Childhood Lead Poisoning Prevention Program
Michigan Department of Health & Human Services
(517) 335-8178
fax (517) 335-8509





	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr
2010-2011	22	16	14	27	29	11	14	1	6	17	9	2
2011-2012	15	15	16	26	22	11	15	8	10	5	7	3
2012-2013	14	7	19	14	17	13	8	4	7	4	5	6
2013-2014	12	11	10	9	16	9	7	4	3	3	6	5
2014-2015	8	6	20	25	25	7	7	4	2	5	5	9
2015	9	6	8	11								

	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr
2010-2011	402	379	325	442	504	315	335	206	276	240	338	285
2011-2012	390	370	324	503	512	413	372	248	333	298	389	370
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2013-2014	371	353	378	401	432	414	305	277	304	319	363	339
2014-2015	346	324	379	445	471	357	281	219	301	287	342	337
2015	297	330	249	284								

*Children whose address is listed as "Flint"--may not conform exactly to Flint city limits
Less than 16 years of age at time of test
Includes only first-time blood lead levels >= 5 ug/dL
Includes sample type of venous, capillary or unknown

September 23, 2015
Source: MDHHS Data Warehouse, Lead Specimen table

From: Scott, Robert L. (DCH)
Sent: Thursday, September 24, 2015 8:09 AM
To: Peeler, Nancy (DCH)
Subject: RE: Flint

Nancy,

Dr. Hanna-Attisha poked me again this morning about getting the updated charts. Can I send her what I gave you late yesterday, or do you want me to hold off?

Bob

-----Original Message-----
From: Peeler, Nancy (DCH)
Sent: Wednesday, September 23, 2015 9:48 PM
To: Scott, Robert L. (DCH) <ScottR9@michigan.gov>
Subject: Flint

Based on questions coming through, I do think we need to run our Flint charts for the same population group that the Flint docs ran (as close as we can approximate the sample) but I'd look at it across the 5 years again.

Depending on what our charts show, we may want to consider having Epi help us run an analysis more like the docs ran - but let's look at the revised charts as a starting point.

Sent from my iPad

From: Scott, Robert L. (DCH)
Sent: Thursday, September 24, 2015 2:50 PM
To: Peeler, Nancy (DCH)
Subject: flint lead powerpoint
Attachments: BLLs in Flint.pptx

Nancy,

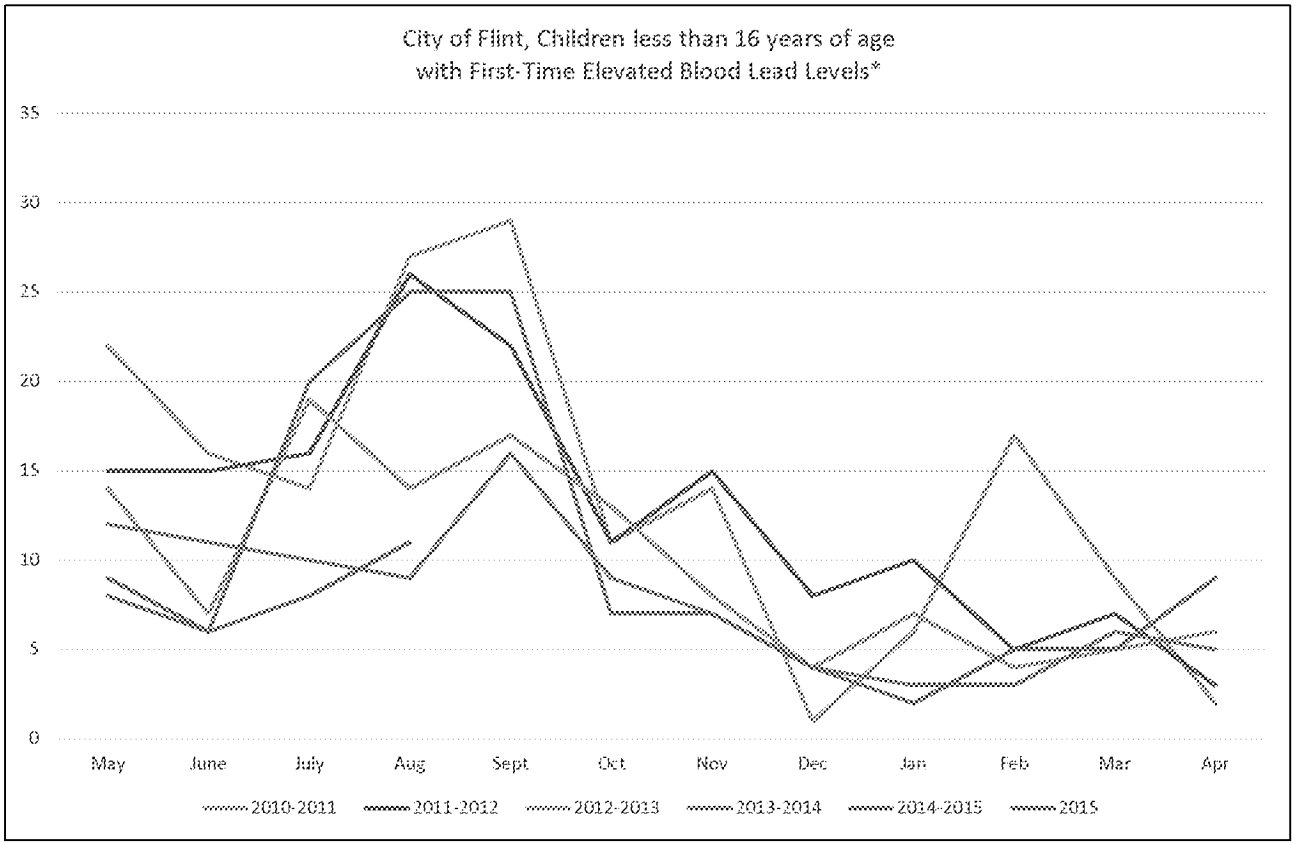
Please see attached. If for some reason you can't read/open it, let me know and I'll try it as a PDF.

Bob

Robert L. Scott
Childhood Lead Poisoning Prevention Program
Michigan Department of Health & Human Services
(517) 335-8178
fax (517) 335-8509

Blood Lead Testing of Children in Flint, Before and After the Change in Flint's Water

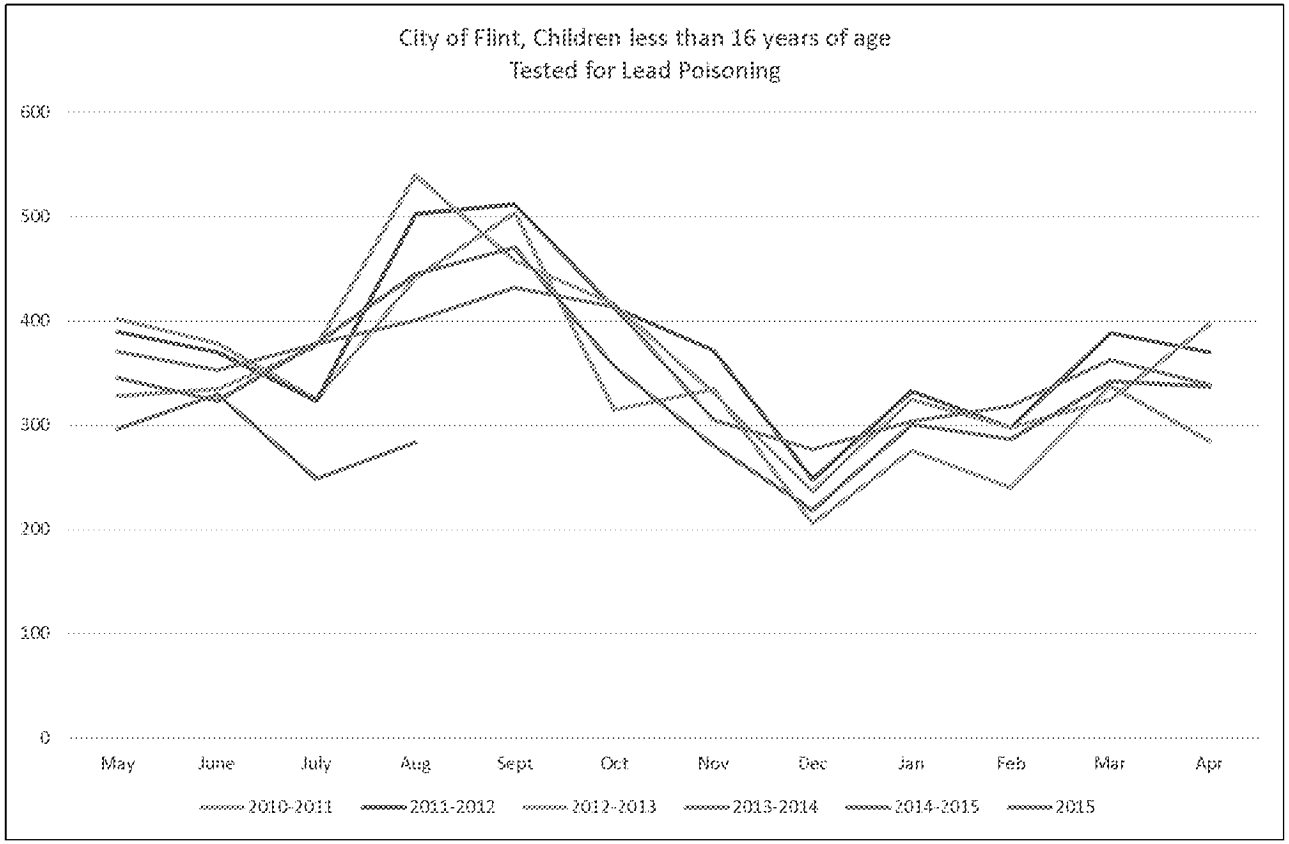
- The change in Flint's water source occurred in April 2014. MDHHS looked at children's blood lead levels (BLL) before and after this event.
- The dark blue line (May 2014 – April 2015) and the green line (May-August 2015) reflect children's blood lead tests after the change. All other lines reflect tests before the change.
- An increase in childhood lead poisoning in summer (July, August, September) is typical throughout Michigan every year.
- While there is a dramatic difference between the numbers of elevated BLL in the summer before and after the event, a wider look that includes data back to 2010 shows that the year BEFORE the event (the yellow line) was more of an anomaly than the year after (the dark blue line).



*This graph includes:
Children whose address is listed as "Flint"--may not conform exactly to Flint city limits
Children less than 16 years of age at time of test
Only first-time blood lead levels >= 5 ug/dL
All first-time elevated levels, regardless of sample type (venous, capillary or unknown)

Blood Lead Testing of Children in Flint, Before and After the Change in Flint's Water

- Blood lead testing (regardless of elevated levels) also tends to rise during late summer (August, September, October).
- This graph shows that testing in Flint has remained fairly steady over the last five years, except for a recent decline(May – August 2015).



*This graph includes:
Children whose address is listed as "Flint"--may not conform exactly to Flint city limits
Children less than 16 years of age at time of test
The number of children tested within each month.
Some children are tested more than once, and may be included in more than one month or year.

From: Scott, Robert L. (DCH)
Sent: Thursday, September 24, 2015 3:15 PM
To: Peeler, Nancy (DCH)
Subject: RE: flint lead powerpoint

Yes to both, will do & copy you, thanks.

From: Peeler, Nancy (DCH)
Sent: Thursday, September 24, 2015 3:14 PM
To: Scott, Robert L. (DCH) <ScottR9@michigan.gov>
Subject: Re: flint lead powerpoint

Only thought - should we way that if results were being driven by the water supply, we would expect the rate to remain at a higher rate?

Also, I forgot this earlier, probably too in the weeds - Larry Reynolds kept mentioning MCIR data - I don't think they know what our data source is that we use. Should we add any kind of a talking point that says all data included in this analysis is reported directly from labs to MDHHS, in accordance with state law?

If you think it worth adding those, go ahead, and send on to Jennifer. Thanks!

Sent from my iPad

On Sep 24, 2015, at 2:49 PM, Scott, Robert L. (DCH) <ScottR9@michigan.gov> wrote:

> Nancy,
>
> Please see attached. If for some reason you can't read/open it, let me know and I'll try it as a PDF.
>
> Bob
>
> Robert L. Scott
> Childhood Lead Poisoning Prevention Program
> Michigan Department of Health & Human Services
> (517) 335-8178
> fax (517) 335-8509
>
> <BLLs in Flint.pptx>

From: Scott, Robert L. (DCH)
Sent: Thursday, September 24, 2015 3:45 PM
To: Peeler, Nancy (DCH)
Subject: one more document, attempt to recreate Hurley
Attachments: Attempt to replicate Hurley.xlsx

Nancy,

Thought I'd pester you one more time. I'm sure this one is not for the public. It's my attempt to recreate Hurley #s. I included EBLL @ 5 & 6 just for comparison, but also looked at Venous-only vs. All types. I used children 0-5 and zip codes 48501–48507 just as Hurley did. I found a difference between the two years, but not as much difference as they did. For some reason I found more children tested than they did.

Let me know if you think it's worth pursuing any farther.

Thanks,
Bob

Robert L. Scott
Childhood Lead Poisoning Prevention Program
Michigan Department of Health & Human Services
(517) 335-8178
fax (517) 335-8509

	A	B	C	D	E
1	**Children Tested for Blood Lead Before and After the Change in Flint's Water Supply**				
2					
3					
4	Hurley tests only				
5	(Provider ID = 00000252)				
6		Children Tested			Children with elevated blood lead levels
7			(Hurley analysis)		Venous only
8			Children Tested	Pct >= 6	BLL >= 5
9	January 1 - September 15, 2013	1177	906	2.1	24
10					
11	January 1 - September 15, 2015*	966	840	4.0	29
12					
13					
14					
15	All Providers				
16		Children Tested			Children with elevated blood lead levels
17					Venous only
18					BLL >= 5
19	January 1 - September 15, 2013	2380			33
20					
21	January 1 - September 15, 2015*	1928			40
22					
23	Notes:				
24	Children 0 - 5 years of age				
25	Children living in zip codes 48501 -48507				
26					
27	Source: MDHHS Data Warehouse				
28	September 24, 2015				

	F	G	H	I	J	K	L	M	N	O
1										
2										
3										
4										
5										
6										
7						All (V, C, unknown)				
8	Pct >= 5		BLL >= 6	Pct >= 6		BLL >= 5	Pct >= 5		BLL >= 6	Pct >= 6
9	2.0		8	0.7		41	3.5		19	1.6
10										
11	3.0		21	2.2		39	4		28	2.9
12										
13										
14										
15										
16										
17						All (V, C, unknown)				
18	Pct >= 5		BLL >= 6	Pct >= 6		BLL >= 5	Pct >= 5		BLL >= 6	Pct >= 6
19	2.8		16	1.4		86	7.3		44	3.7
20										
21	4.1		28	2.9		80	8.3		54	5.6
22										
23										
24										
25										
26										
27										
28										

From: Scott, Robert L. (DCH)
Sent: Friday, September 25, 2015 3:45 PM
To: Mona Hanna-Attisha
Subject: RE: Automatic reply: New DCH-1294, time-sensitive

No, I didn't run the data for kids 0-5. We normally would use that age range, and I don't completely recall the conversation that led to using 0-15—possibly trying to cast as wide a net as possible? Of tests for kids 0-15, approximately 10% are for the 6-15 age range.

From: Mona Hanna-Attisha [mailto:MHanna1@hurleymc.com]
Sent: Friday, September 25, 2015 3:12 PM
To: Scott, Robert L. (DCH) <ScottR9@michigan.gov>
Subject: RE: Automatic reply: New DCH-1294, time-sensitive

Bob, did you ever look at your data that was released for kids less than 5, rather than 16? 16 seems so strange – we rarely do lead levels in kids over the age of 5. Is that what other states do?

Thanks!

From: Scott, Robert L. (DCH) [mailto:ScottR9@michigan.gov]
Sent: Friday, September 25, 2015 1:02 PM
To: Mona Hanna-Attisha; Marc Edwards; Jenny LaChance
Subject: RE: Automatic reply: New DCH-1294, time-sensitive

Mona,

There's generally a lag of about two weeks from the date of the test to its being fully processed in our system. A few results take longer, for a variety of reasons. 99% of all results through August should be reflected in those numbers. Not sure why the last few months were so low.

Thanks,
Bob

From: Mona Hanna-Attisha [mailto:MHanna1@hurleymc.com]
Sent: Friday, September 25, 2015 12:51 PM
To: Scott, Robert L. (DCH) <ScottR9@michigan.gov>; Marc Edwards <edwardsm@vt.edu>; Jenny LaChance <JLachan1@hurleymc.com>
Subject: RE: Automatic reply: New DCH-1294, time-sensitive

Thanks Bob. We greatly appreciate all your assistance and your hard work!

It's interesting to note that the number of children tested in July and August of 2015 is so small as compared to the same months in previous years? Do you think those numbers capture all the tests that were done – is there a lag time in reporting to your system?

Thanks! Mona

From: Scott, Robert L. (DCH) [mailto:ScottR9@michigan.gov]
Sent: Friday, September 25, 2015 12:44 PM
To: Marc Edwards
Cc: Mona Hanna-Attisha; Peeler, Nancy (DCH); Minicuci, Angela (DCH)
Subject: RE: Automatic reply: New DCH-1294, time-sensitive

Marc,

As you well know, the data you and Dr. Hanna-Attisha have requested are derived from personal health data, which of course is confidential. There are state and federal laws governing what can be shared, and how, with researchers or the public.

I worked with you earlier this month to get data to you relatively quickly, but we did not manage to complete the process before I went on annual leave for several days. I neglected to inform you that I'd be away. I returned on Wednesday and corresponded that day with Dr. Hanna-Attisha, providing her with the forms she'll need for her request.

Regarding your email from Monday, I think you'll be able to get approval for data with zip code identified. I'll edit your data use agreement accordingly, will adjust it to say "limited data set" instead of "de-identified," and will re-submit it to our Legal office. You will need to submit an MDHHS IRB review application (attached) because this is considered research. You should also submit a "HIPAA Waiver Request" (attached). (I wasn't aware of the Waiver Request when we talked earlier this month.) Send those documents to me, and I'll pass them on to our IRB contact. I don't know whether you'll need to go through an IRB review with your institution.

In short, both your request and Dr. Hanna-Attisha's are in process in accordance with departmental policies.

I've attached a PDF that includes the numbers behind the graphs you referred to, and I'm CC'ing Dr. Hanna-Attisha so that she has it as well.

Please keep in mind that I work for a very small program responsible for processing several thousand blood lead results every week--in order to get them out to the professionals working directly with children and families, which is the primary purpose and highest priority of our program.

Bob

Robert L. Scott
Childhood Lead Poisoning Prevention Program
Michigan Department of Health & Human Services
(517) 335-8178
fax (517) 335-8509

From: Marc Edwards [mailto:edwardsm@vt.edu]
Sent: Thursday, September 24, 2015 8:14 PM
To: Scott, Robert L. (DCH) <ScottR9@michigan.gov>
Subject: RE: Automatic reply: New DCH-1294, time-sensitive

Dear Robert,

I just spoke to this young researcher at Hurley, and apparently, she has been unable to get access to the state blood lead records.
I have to say, it is very disturbing that the state keeps issuing these blood lead reports and statements in their press releases, and refuses to share the data backing them up with outside researchers.
Even worse, state reps are running around claiming that these reports are proof that Flint water is safe to drink.

Can you tell me why it is so difficult to get this data, and why your agency is raising so many obstacles to sharing it with everyone who asks? I note that I have been asking to see your data since MDEQ first sent it to reporters back in August, and I count 10 e-mails that I sent responding to all your questions. As of yet, you have given me nothing in response. Yet you have been sending reporters one report after another. It seems your agency is more interested in public relations than sound science.

In the meantime, can I at least be given the numbers of EBL cases and number of tests each month, that are the basis for the latest graph your agency is sending to the press...or is that top secret as well?

Marc

From: Scott, Robert L. (DCH) [mailto:Scott89@michigan.gov]
Sent: Monday, September 21, 2015 1:21 PM
To: Marc Edwards
Subject: Automatic reply: New DCH-1294, time-sensitive

I'll be out of the office until Wednesday, Sept 23. I'll respond to your message when I return.

From: Scott, Robert L. (DCH)
Sent: Monday, September 28, 2015 10:58 AM
To: Elaine Brown
Subject: RE: 2014 Data Report on Childhood Lead Testing and Elevated Leads
Attachments: 2014 Lead Testing and EBLL 0-5 072015.pdf; 2014 Lead Testing and EBLL 1-2 072015.pdf

That document doesn't exist yet. Please see two attached files, which eventually will be included in the 2014 Data Report.

From: Elaine Brown [mailto:EBrown@livgov.com]
Sent: Monday, September 28, 2015 10:50 AM
To: Scott, Robert L. (DCH) <ScottR9@michigan.gov>
Subject: 2014 Data Report on Childhood Lead Testing and Elevated Leads

Good morning Bob, could you assist me in locating this document, *2014 Data Report on Childhood Lead Testing and Elevated Leads*? Amy Pendell, our staff person for lead testing, is not in the office today, she may have been able to assist me. Thank you, Elaine

Elaine Brown, RN, BSN, MS
Deputy Health Officer/PPHS Director
Livingston County Department of Public Health
2300 E. Grand River Ave. Suite 102
Howell, MI 48843-7578
Phone: 517.552.6806
Fax: 517.546.6995
ebrown@livgov.com

Children Tested for Lead Poisoning -- Calendar Year 2014
All Counties in Michigan

Children less than Six Years of Age

				Children Tested		Children Tested, by Highest Blood Lead Level (BLL)										
County	%Pre-1950 Housing	%Pre-1978 Housing	Children less than Six Years of Age	Number of Children Tested	% Tested	<5 ug/dL	5 to 9 ug/dL, not confirmed by venous	>= 10 ug/dL, not confirmed by venous	Confirmed 5-9 ug/dL (venous only)	Confirmed 10-14 ug/dL (venous only)	Confirmed 15-44 ug/dL (venous only)	Confirmed ≥45 ug/dL (venous only)	Total confirmed ≥ 5 µg/dL	% with confirmed BLL >= 5 ug/dL	Total ≥ 5 µg/dL, confirmed & unconfirmed*	% with BLL >= 5 ug/dL, confirmed & unconfirmed*
Alcona	12.4	61.5	398	53	13.3	51	2	0	0	0	0	0	0	0.0	2	3.8
Alger	29.5	64.1	427	92	21.5	90	1	0	0	1	0	0	1	1.1	2	2.2
Allegan	23.2	51.1	8,806	1,208	13.7	1,177	26	2	3	0	0	0	3	0.2	31	2.6
Alpena	25.3	71.6	1,758	257	14.6	248	7	1	1	0	0	0	1	0.4	9	3.5
Antrim	18.8	52.6	1,370	260	19.0	258	0	0	2	0	0	0	2	0.8	2	0.8
Arenac	19.8	58.2	870	186	21.4	185	1	0	0	0	0	0	0	0.0	1	0.5
Baraga	34.0	71.7	477	135	28.3	134	1	0	0	0	0	0	0	0.0	1	0.7
Barry	27.1	57.3	4,143	491	11.9	468	19	0	3	1	0	0	4	0.8	23	4.7
Bay	33.9	75.6	7,322	1,408	19.2	1,358	31	2	10	3	3	1	17	1.2	50	3.6
Benzie	18.6	46.3	1,041	268	25.7	266	2	0	0	0	0	0	0	0.0	2	0.7
Berrien	28.6	72.2	11,681	1,943	16.6	1,884	24	5	21	4	5	0	30	1.5	59	3.0
Branch	30.9	65.3	3,506	668	19.1	645	18	1	1	3	0	0	4	0.6	23	3.4
Calhoun	36.1	75.3	10,149	2,390	23.5	2,290	36	0	51	7	6	0	64	2.7	100	4.2
Cass	22.4	59.9	3,444	426	12.4	414	7	1	3	1	0	0	4	0.9	12	2.8
Charlevoix	25.3	54.4	1,624	295	18.2	294	1	0	0	0	0	0	0	0.0	1	0.3
Cheboygan	20.9	53.5	1,414	286	20.2	279	6	0	1	0	0	0	1	0.3	7	2.4
Chippewa	25.1	58.6	2,345	440	18.8	436	1	0	3	0	0	0	3	0.7	4	0.9
Clare	14.5	58.8	2,083	446	21.4	442	4	0	0	0	0	0	0	0.0	4	0.9
Clinton	22.5	52.8	5,140	585	11.4	579	1	0	5	0	0	0	5	0.9	6	1.0
Crawford	13.7	55.6	727	85	11.7	84	1	0	0	0	0	0	0	0.0	1	1.2
Delta	33.3	68.0	2,388	413	17.3	397	14	0	1	0	1	0	2	0.5	16	3.9
Dickinson	38.9	71.7	1,575	318	20.2	317	0	0	1	0	0	0	1	0.3	1	0.3
Eaton	20.4	56.4	7,356	1,140	15.5	1,113	20	3	4	0	0	0	4	0.4	27	2.4
Emmet	23.0	48.3	2,042	362	17.7	362	0	0	0	0	0	0	0	0.0	0	0.0
Genesee	19.9	68.0	31,997	6,824	21.3	6,646	97	11	56	9	5	0	70	1.0	178	2.6
Gladwin	12.4	49.5	1,495	291	19.5	291	0	0	0	0	0	0	0	0.0	0	0.0
Gogebic	50.0	76.7	855	154	18.0	152	2	0	0	0	0	0	0	0.0	2	1.3
Grand Traverse	14.7	43.5	6,000	1,371	22.9	1,359	6	3	3	0	0	0	3	0.2	12	0.9
Gratiot	34.7	69.8	2,754	496	18.0	491	4	0	1	0	0	0	1	0.2	5	1.0
Hillsdale	36.5	63.2	3,283	814	24.8	795	14	2	3	0	0	0	3	0.4	19	2.3
Houghton	53.4	75.5	2,477	599	24.2	585	6	0	4	2	2	0	8	1.3	14	2.3
Huron	31.8	68.9	1,873	393	21.0	381	9	0	2	1	0	0	3	0.8	12	3.1
Ingham	24.9	68.2	19,248	4,747	24.7	4,606	94	5	25	11	6	0	42	0.9	141	3.0
Ionia	35.8	63.0	4,878	843	17.3	816	20	2	4	0	1	0	5	0.6	27	3.2
Iosco	12.7	65.6	1,233	150	12.2	146	3	0	1	0	0	0	1	0.7	4	2.7
Iron	44.1	72.1	573	138	24.1	135	3	0	0	0	0	0	0	0.0	3	2.2
Isabella	16.3	48.2	4,208	640	15.2	632	7	0	1	0	0	0	1	0.2	8	1.3
Jackson	33.0	67.9	11,296	2,757	24.4	2,602	107	14	27	3	4	0	34	1.2	155	5.6
Kalamazoo	22.5	62.6	18,588	3,257	17.5	3,172	48	7	23	4	2	1	30	0.9	85	2.6
Kalkaska	13.2	49.3	1,180	217	18.4	216	1	0	0	0	0	0	0	0.0	1	0.5
Kent	24.8	59.2	52,655	10,115	19.2	9,645	325	8	89	22	26	0	137	1.4	470	4.6
Keweenaw	46.9	77.6	115	25	21.7	23	2	0	0	0	0	0	0	0.0	2	8.0
Lake	12.5	52.6	585	120	20.5	118	2	0	0	0	0	0	0	0.0	2	1.7
Lapeer	20.4	52.9	5,687	919	16.2	890	22	3	3	0	1	0	4	0.4	29	3.2
Leelanau	17.9	46.5	1,111	239	21.5	234	4	1	0	0	0	0	0	0.0	5	2.1
Lenawee	33.6	67.2	6,911	1,196	17.3	1,074	78	16	21	3	4	0	28	2.3	122	10.2

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County	%Pre-1950 Housing	%Pre-1978 Housing	Children less than Six Years of Age	Number of Children Tested	% Tested	<5 ug/dL	5 to 9 ug/dL, not confirmed by venous	>= 10 ug/dL, not confirmed by venous	Confirmed 5-9 ug/dL (venous only)	Confirmed 10-14 ug/dL (venous only)	Confirmed 15-44 ug/dL (venous only)	Confirmed ≥45 ug/dL (venous only)	Total confirmed ≥ 5 µg/dL	% with confirmed BLL >= 5 ug/dL	Total ≥ 5 µg/dL, confirmed & unconfirmed*	% with BLL >= 5 ug/dL, confirmed & unconfirmed*
Livingston	11.4	39.0	12,104	1,026	8.5	1,017	4	0	4	1	0	0	5	0.5	9	0.9
Luce	23.8	64.3	370	88	23.8	88	0	0	0	0	0	0	0	0.0	0	0.0
Mackinac	23.4	58.6	587	130	22.1	129	1	0	0	0	0	0	0	0.0	1	0.8
Macomb	9.3	59.1	57,878	9,525	16.5	9,397	73	6	38	2	7	2	49	0.5	128	1.3
Manistee	28.8	63.9	1,307	284	21.7	271	10	0	1	0	2	0	3	1.1	13	4.6
Marquette	27.9	69.4	4,029	471	11.7	458	3	2	8	0	0	0	8	1.7	13	2.8
Mason	32.1	64.6	1,864	414	22.2	387	25	0	2	0	0	0	2	0.5	27	6.5
Mecosta	18.2	53.4	2,520	316	12.5	314	0	0	0	0	2	0	2	0.6	2	0.6
Menominee	35.4	73.2	1,375	261	19.0	245	11	1	3	0	1	0	4	1.5	16	6.1
Midland	15.2	58.7	5,685	477	8.4	472	2	0	2	1	0	0	3	0.6	5	1.0
Missaukee	21.2	56.2	1,111	133	12.0	132	0	0	0	1	0	0	1	0.8	1	0.8
Monroe	23.0	59.0	10,355	1,571	15.2	1,553	15	1	1	1	0	0	2	0.1	18	1.1
Montcalm	27.3	57.7	4,527	748	16.5	735	6	0	5	1	1	0	7	0.9	13	1.7
Montmorency	18.1	58.6	404	83	20.5	82	1	0	0	0	0	0	0	0.0	1	1.2
Muskegon	25.8	66.2	13,224	2,572	19.4	2,415	66	13	62	10	6	0	78	3.0	157	6.1
Newaygo	19.3	53.6	3,581	447	12.5	440	6	1	0	0	0	0	0	0.0	7	1.6
Oakland	14.7	60.5	83,501	14,308	17.1	14,102	94	8	71	20	13	0	104	0.7	206	1.4
Oceana	25.8	57.8	2,091	516	24.7	506	5	0	2	3	0	0	5	1.0	10	1.9
Ogemaw	12.8	61.6	1,289	102	7.9	101	0	0	1	0	0	0	1	1.0	1	1.0
Ontonagon	39.1	73.2	251	48	19.1	46	2	0	0	0	0	0	0	0.0	2	4.2
Osceola	22.6	56.6	1,723	334	19.4	324	4	0	2	2	2	0	6	1.8	10	3.0
Oscoda	17.8	62.1	521	35	6.7	32	2	1	0	0	0	0	0	0.0	3	8.6
Otsego	12.2	50.3	1,641	325	19.8	324	1	0	0	0	0	0	0	0.0	1	0.3
Ottawa	15.7	45.3	21,390	3,012	14.1	2,931	59	5	16	1	0	0	17	0.6	81	2.7
Presque Isle	21.1	66.3	597	111	18.6	109	2	0	0	0	0	0	0	0.0	2	1.8
Roscommon	13.1	58.7	1,156	218	18.9	218	0	0	0	0	0	0	0	0.0	0	0.0
Saginaw	28.1	73.1	14,029	3,670	26.2	3,548	76	8	25	7	6	0	38	1.0	122	3.3
Saint Clair	25.8	59.4	11,046	2,731	24.7	2,655	46	7	15	5	3	0	23	0.8	76	2.8
Saint Joseph	27.5	65.1	5,125	1,012	19.7	971	27	4	7	2	1	0	10	1.0	41	4.1
Sanilac	30.7	64.6	2,879	523	18.2	517	4	0	1	1	0	0	2	0.4	6	1.1
Schoolcraft	25.5	63.3	471	99	21.0	98	0	0	1	0	0	0	1	1.0	1	1.0
Shiawassee	33.9	68.2	4,622	1,169	25.3	1,131	19	2	15	2	0	0	17	1.5	38	3.3
Tuscola	30.2	67.4	3,579	886	24.8	874	10	0	0	2	0	0	2	0.2	12	1.4
Van Buren	23.3	58.1	5,884	862	14.6	832	9	1	17	1	2	0	20	2.3	30	3.5
Washtenaw	17.2	56.5	22,833	2,604	11.4	2,572	15	2	10	2	3	0	15	0.6	32	1.2
Wayne ex Det	22.6	74.5	82,002	18,348	22.4	16,021	164	12	185	33	15	0	233	1.3	409	2.2
Wexford	23.0	53.7	2,582	362	14.0	359	1	0	0	0	2	0	2	0.6	3	0.8
Detroit, City of	62.2	93.2	59,755	22,842	38.2	20,966	279	51	1,183	214	145	4	1,546	6.8	1,876	8.2
MICHIGAN	24.7	64.8	710,976	143,123	20.1	136,152	2,119	212	2,050	387	277	8	2,722	1.9	5,053	3.5

*These columns are included for comparison with previous years' data

July 20, 2015

Sources: US Census Bureau, Census 2010 (Pre-1950 Housing and Pre-1978 Housing) and American Community Survey 2013 5-year estimates (Detroit and county populations);
MDCH Data Warehouse (children tested)

Children Tested for Lead Poisoning -- Calendar Year 2014
All Counties in Michigan

Children One to Two Years of Age

				Children Tested		Children Tested, by Highest Blood Lead Level (BLL)										
County	%Pre-1950 Housing	%Pre-1978 Housing	Children One to Two Years of Age	Number of Children Tested	% Tested	<5 ug/dL	5 to 9 ug/dL, not confirmed by venous	>= 10 ug/dL, not confirmed by venous	Confirmed 5-9 ug/dL (venous only)	Confirmed 10-14 ug/dL (venous only)	Confirmed 15-44 ug/dL (venous only)	Confirmed ≥45 ug/dL (venous only)	Total confirmed ≥ 5 µg/dL	% with confirmed BLL >= 5 ug/dL	Total ≥ 5 µg/dL, confirmed & unconfirmed*	% with BLL >= 5 ug/dL, confirmed & unconfirmed*
Alcona	12.4	61.5	130	43	33.1	41	2	0	0	0	0	0	0	0.0	2	4.7
Alger	29.5	64.1	130	76	58.5	74	1	0	0	1	0	0	1	1.3	2	2.6
Allegan	23.2	51.1	2,888	872	30.2	848	19	2	3	0	0	0	3	0.3	24	2.8
Alpena	25.3	71.6	570	218	38.2	210	7	0	1	0	0	0	1	0.5	8	3.7
Antrim	18.8	52.6	450	191	42.4	189	0	0	2	0	0	0	2	1.0	2	1.0
Arenac	19.8	58.2	281	136	48.4	135	1	0	0	0	0	0	0	0.0	1	0.7
Baraga	34.0	71.7	165	91	55.2	91	0	0	0	0	0	0	0	0.0	0	0.0
Barry	27.1	57.3	1,328	387	29.1	371	13	0	2	1	0	0	3	0.8	16	4.1
Bay	33.9	75.6	2,410	1,233	51.2	1,195	24	2	8	3	1	0	12	1.0	38	3.1
Benzie	18.6	46.3	338	178	52.7	176	2	0	0	0	0	0	0	0.0	2	1.1
Berrien	28.6	72.2	3,855	1,602	41.6	1,554	22	5	14	3	4	0	21	1.3	48	3.0
Branch	30.9	65.3	1,157	239	20.7	232	6	0	0	1	0	0	1	0.4	7	2.9
Calhoun	36.1	75.3	3,366	1,317	39.1	1,257	17	1	35	4	3	0	42	3.2	60	4.6
Cass	22.4	59.9	1,120	364	32.5	353	7	1	2	1	0	0	3	0.8	11	3.0
Charlevoix	25.3	54.4	523	213	40.7	212	1	0	0	0	0	0	0	0.0	1	0.5
Cheboygan	20.9	53.5	457	214	46.8	209	5	0	0	0	0	0	0	0.0	5	2.3
Chippewa	25.1	58.6	775	268	34.6	265	1	0	2	0	0	0	2	0.7	3	1.1
Clare	14.5	58.8	700	359	51.3	355	4	0	0	0	0	0	0	0.0	4	1.1
Clinton	22.5	52.8	1,650	342	20.7	338	1	0	3	0	0	0	3	0.9	4	1.2
Crawford	13.7	55.6	237	67	28.3	66	1	0	0	0	0	0	0	0.0	1	1.5
Delta	33.3	68.0	782	351	44.9	335	14	0	1	0	1	0	2	0.6	16	4.6
Dickinson	38.9	71.7	529	288	54.4	287	0	0	1	0	0	0	1	0.3	1	0.3
Eaton	20.4	56.4	2,410	772	32.0	753	13	3	3	0	0	0	3	0.4	19	2.5
Emmet	23.0	48.3	656	266	40.5	266	0	0	0	0	0	0	0	0.0	0	0.0
Genesee	19.9	68.0	10,583	4,326	40.9	4,207	68	9	34	5	3	0	42	1.0	119	2.8
Gladwin	12.4	49.5	486	193	39.7	193	0	0	0	0	0	0	0	0.0	0	0.0
Gogebic	50.0	76.7	285	117	41.1	115	2	0	0	0	0	0	0	0.0	2	1.7
Grand Traverse	14.7	43.5	1,955	893	45.7	887	3	1	2	0	0	0	2	0.2	6	0.7
Gratiot	34.7	69.8	909	359	39.5	356	2	0	1	0	0	0	1	0.3	3	0.8
Hillsdale	36.5	63.2	1,079	395	36.6	384	6	2	3	0	0	0	3	0.8	11	2.8
Houghton	53.4	75.5	828	505	61.0	493	4	0	4	2	2	0	8	1.6	12	2.4
Huron	31.8	68.9	607	229	37.7	220	8	0	1	0	0	0	1	0.4	9	3.9
Ingham	24.9	68.2	6,426	2,832	44.1	2,749	56	5	14	6	2	0	22	0.8	83	2.9
Ionia	35.8	63.0	1,590	628	39.5	604	18	2	3	0	1	0	4	0.6	24	3.8
Iosco	12.7	65.6	397	124	31.2	121	3	0	0	0	0	0	0	0.0	3	2.4
Iron	44.1	72.1	193	120	62.2	118	2	0	0	0	0	0	0	0.0	2	1.7
Isabella	16.3	48.2	1,392	462	33.2	458	3	0	1	0	0	0	1	0.2	4	0.9
Jackson	33.0	67.9	3,716	2,021	54.4	1,900	87	8	21	2	3	0	26	1.3	121	6.0
Kalamazoo	22.5	62.6	6,166	1,889	30.6	1,838	26	4	16	3	1	1	21	1.1	51	2.7
Kalkaska	13.2	49.3	395	138	34.9	137	1	0	0	0	0	0	0	0.0	1	0.7
Kent	24.8	59.2	17,514	8,193	46.8	7,816	267	6	64	19	21	0	104	1.3	377	4.6
Keweenaw	46.9	77.6	39	21	53.8	19	2	0	0	0	0	0	0	0.0	2	9.5
Lake	12.5	52.6	192	87	45.3	86	1	0	0	0	0	0	0	0.0	1	1.1
Lapeer	20.4	52.9	1,780	705	39.6	680	21	2	1	0	1	0	2	0.3	25	3.5
Leelanau	17.9	46.5	350	169	48.3	165	3	1	0	0	0	0	0	0.0	4	2.4
Lenawee	33.6	67.2	2,248	688	30.6	613	51	6	13	2	3	0	18	2.6	75	10.9

Children Tested for Lead Poisoning -- Calendar Year 2014
All Counties in Michigan

Children One to Two Years of Age

				Children Tested		Children Tested, by Highest Blood Lead Level (BLL)										
County	%Pre-1950 Housing	%Pre-1978 Housing	Children One to Two Years of Age	Number of Children Tested	% Tested	<5 ug/dL	5 to 9 ug/dL, not confirmed by venous	>= 10 ug/dL, not confirmed by venous	Confirmed 5-9 ug/dL (venous only)	Confirmed 10-14 ug/dL (venous only)	Confirmed 15-44 ug/dL (venous only)	Confirmed ≥45 ug/dL (venous only)	Total confirmed ≥ 5 µg/dL	% with confirmed BLL >= 5 ug/dL	Total ≥ 5 µg/dL, confirmed & unconfirmed*	% with BLL >= 5 ug/dL, confirmed & unconfirmed*
Livingston	11.4	39.0	3,871	750	19.4	741	4	0	4	1	0	0	5	0.7	9	1.2
Luce	23.8	64.3	121	79	65.3	79	0	0	0	0	0	0	0	0.0	0	0.0
Mackinac	23.4	58.6	193	113	58.5	112	1	0	0	0	0	0	0	0.0	1	0.9
Macomb	9.3	59.1	19,051	6,156	32.3	6,075	47	5	23	2	3	1	29	0.5	81	1.3
Manistee	28.8	63.9	411	247	60.1	235	9	0	1	0	2	0	3	1.2	12	4.9
Marquette	27.9	69.4	1,364	414	30.4	402	3	2	7	0	0	0	7	1.7	12	2.9
Mason	32.1	64.6	620	111	17.9	106	4	0	1	0	0	0	1	0.9	5	4.5
Mecosta	18.2	53.4	851	279	32.8	277	0	0	0	1	1	0	2	0.7	2	0.7
Menominee	35.4	73.2	442	219	49.5	203	11	1	3	0	1	0	4	1.8	16	7.3
Midland	15.2	58.7	1,842	297	16.1	295	1	0	1	0	0	0	1	0.3	2	0.7
Missaukee	21.2	56.2	359	113	31.5	112	0	0	0	1	0	0	1	0.9	1	0.9
Monroe	23.0	59.0	3,378	1,158	34.3	1,143	12	1	1	1	0	0	2	0.2	15	1.3
Montcalm	27.3	57.7	1,493	494	33.1	484	4	0	4	1	1	0	6	1.2	10	2.0
Montmorency	18.1	58.6	131	64	48.9	63	1	0	0	0	0	0	0	0.0	1	1.6
Muskegon	25.8	66.2	4,384	1,652	37.7	1,546	44	9	40	7	6	0	53	3.2	106	6.4
Newaygo	19.3	53.6	1,172	395	33.7	388	6	1	0	0	0	0	0	0.0	7	1.8
Oakland	14.7	60.5	27,292	7,882	28.9	7,759	61	7	38	9	8	0	55	0.7	123	1.6
Oceana	25.8	57.8	685	276	40.3	271	3	0	1	1	0	0	2	0.7	5	1.8
Ogemaw	12.8	61.6	413	81	19.6	80	0	0	1	0	0	0	1	1.2	1	1.2
Ontonagon	39.1	73.2	82	31	37.8	29	2	0	0	0	0	0	0	0.0	2	6.5
Osceola	22.6	56.6	564	260	46.1	251	3	0	2	3	1	0	6	2.3	9	3.5
Oscoda	17.8	62.1	168	18	10.7	16	2	0	0	0	0	0	0	0.0	2	11.1
Otsego	12.2	50.3	540	197	36.5	197	0	0	0	0	0	0	0	0.0	0	0.0
Ottawa	15.7	45.3	7,046	2,576	36.6	2,507	51	5	12	1	0	0	13	0.5	69	2.7
Presque Isle	21.1	66.3	193	89	46.1	87	2	0	0	0	0	0	0	0.0	2	2.2
Roscommon	13.1	58.7	379	172	45.4	172	0	0	0	0	0	0	0	0.0	0	0.0
Saginaw	28.1	73.1	4,623	2,756	59.6	2,670	54	5	17	5	5	0	27	1.0	86	3.1
Saint Clair	25.8	59.4	3,574	1,333	37.3	1,296	24	3	5	3	2	0	10	0.8	37	2.8
Saint Joseph	27.5	65.1	1,684	691	41.0	665	18	3	2	2	1	0	5	0.7	26	3.8
Sanilac	30.7	64.6	949	291	30.7	286	4	0	0	1	0	0	1	0.3	5	1.7
Schoolcraft	25.5	63.3	151	80	53.0	80	0	0	0	0	0	0	0	0.0	0	0.0
Shiawassee	33.9	68.2	1,503	749	49.8	718	16	2	11	2	0	0	13	1.7	31	4.1
Tuscola	30.2	67.4	1,174	650	55.4	639	10	0	0	1	0	0	1	0.2	11	1.7
Van Buren	23.3	58.1	1,924	507	26.4	490	6	1	8	0	2	0	10	2.0	17	3.4
Washtenaw	17.2	56.5	7,560	1,834	24.3	1,809	10	2	8	2	3	0	13	0.7	25	1.4
Wayne ex Det	22.6	74.5	26,966	9,769	36.2	9,539	100	7	100	18	7	0	125	1.3	232	2.4
Wexford	23.0	53.7	865	312	36.1	309	1	0	0	0	2	0	2	0.6	3	1.0
Detroit, City of	62.2	93.2	20,048	9,641	48.1	8,674	160	25	577	115	88	0	780	8.1	965	10.0
MICHIGAN	24.7	64.8	234,103	87,917	37.6	84,776	1,469	139	1,122	230	179	2	1,533	1.7	3,141	3.6

*These columns are included for comparison with previous years' data

July 20, 2015

Sources: US Census Bureau, Census 2010 (Pre-1950 Housing and Pre-1978 Housing) and American Community Survey 2013 5-year estimates (Detroit and county populations);
MDCH Data Warehouse (children tested)

From: Scott, Robert L. (DHHS)
Sent: Thursday, October 01, 2015 1:05 PM
To: Emily Houk (emily@r2pconsultants.com)
Cc: 'Lishinski Karen (LishinskiK@michigan.gov)';Peeler, Nancy (DHHS)
Subject: EBLL bar graph for presentation
Attachments: EBLL bar graph 100115.pdf

Emily,

Please see attached. Let me know if you need changes.

Bob

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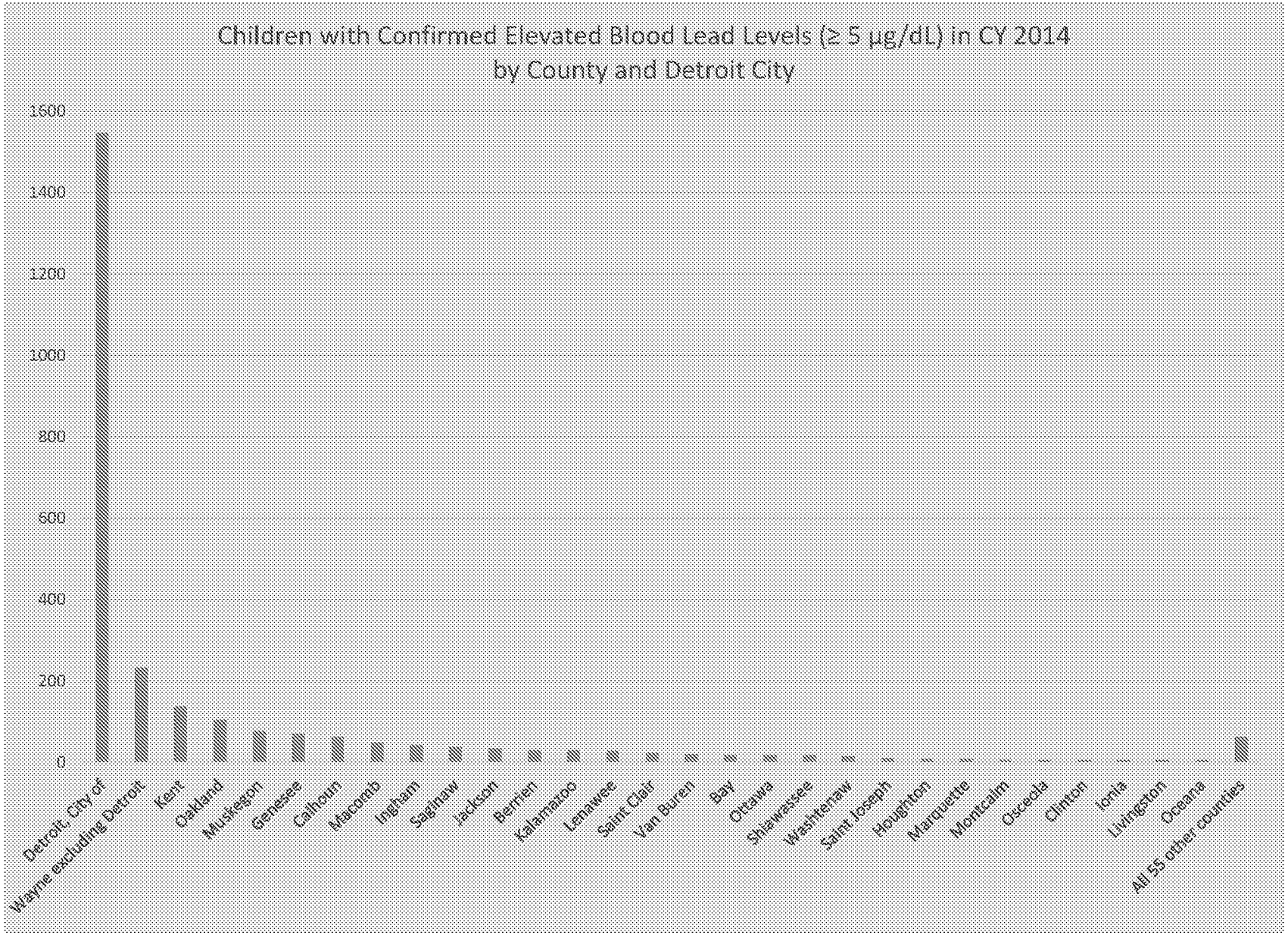

October 1, 2015
Source: MDHHS Data Warehouse

From: Scott, Robert L. (DHHS)
Sent: Thursday, October 01, 2015 6:52 PM
To: Peeler, Nancy (DHHS)
Subject: table and map
Attachments: FlintGenesee map.pdf; FlintGenesee table.pdf

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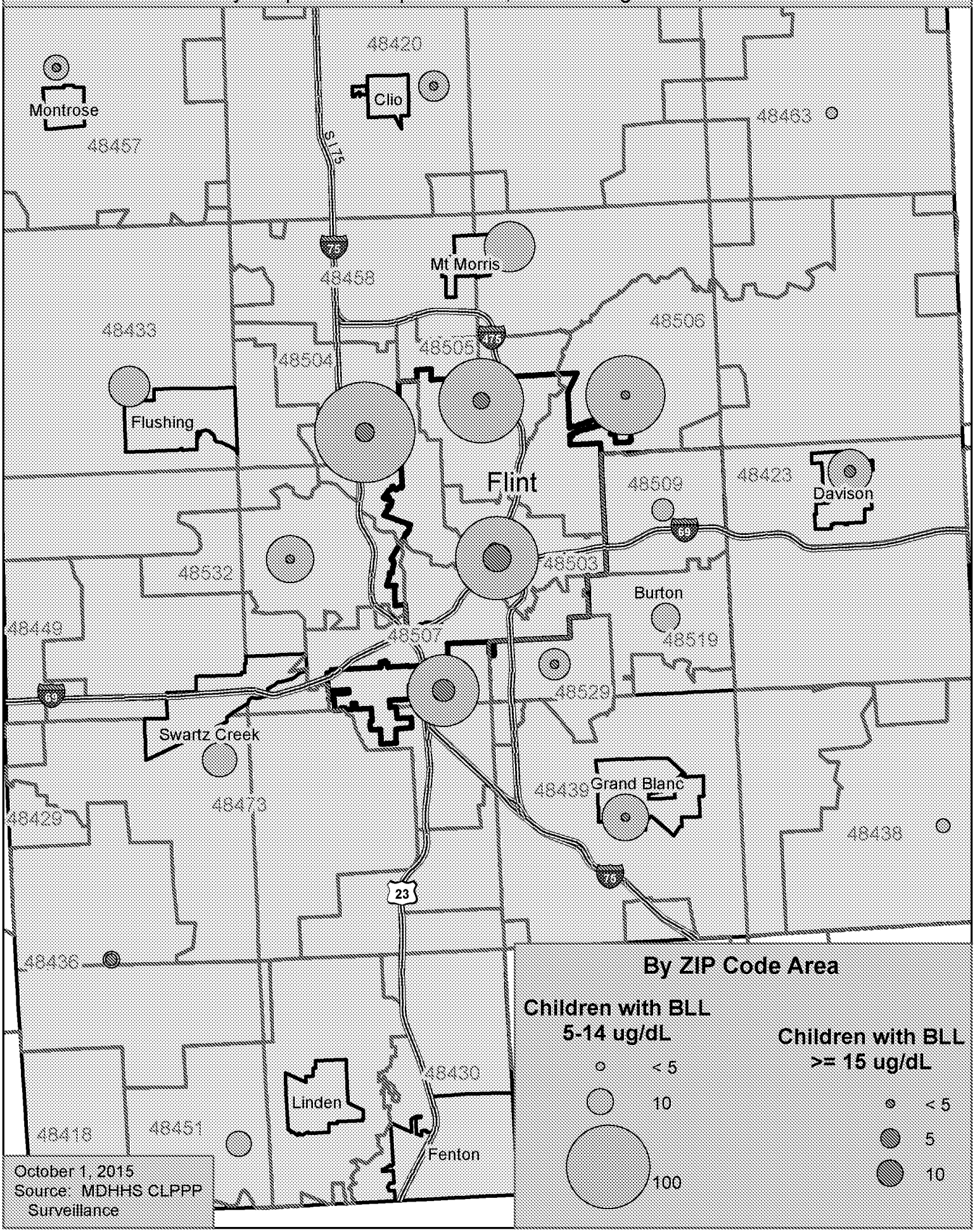
Children with Elevated Blood Lead Levels in Genesee County, by ZIP Code Area
5-year period: September 1, 2010 - August 31, 2015



Children in Genesee County, Tested for Lead Poisoning, by Blood Lead Level

Most Recent 12-Month Period: September 1, 2014 - August 31, 2015

	0 - 4 ug/dL	5 - 14 ug/dL Confirmed*	5 - 14 ug/dL Not Confirmed*	15 - 44 ug/dL Confirmed*	15 - 44 ug/dL Not Confirmed*	>= 45 ug/dL
Flint ZIPS (48501-48507)	2,721	49	53	5	**	0
Genesee County (all ZIPs)	6,086	58	94	6	**	0

Most Recent Five-Year Period: September 1, 2010 - August 31, 2015

	0 - 4 ug/dL	5 - 14 ug/dL Confirmed*	5 - 14 ug/dL Not Confirmed*	15 - 44 ug/dL Confirmed*	15 - 44 ug/dL Not Confirmed*	>= 45 ug/dL
Flint ZIPS (48501-48507)	11,596	287	219	24	**	0
Genesee County (all ZIPs)	26,362	359	415	29	9	0

*One test per child is included in each table: the highest venous result, or if no venous, then the highest capillary result.
Only venous tests are considered to be "confirmed."

**Supressed (N<5)

October 1, 2015

Source: MDHHS CLPPP Surveillance

From: Scott, Robert L. (DHHS)
Sent: Monday, October 05, 2015 3:51 PM
To: Peeler, Nancy (DHHS)
Subject: Flint EBLLs and restesting
Attachments: Flint_EBLLs_Retesting.pdf

Nancy,

Please see attached. I don't have anything in there at this point about follow-up activities. Rereading the email from Mr. Lyon, I'm not sure it's required. He refers to "follow up rates" in the third paragraph, but based on the first two, I think he means rates of follow-up testing.

At any rate, I haven't found much in HHLPSS so far—only one event for a letter sent by Sherry, encouraging a confirmatory venous test. I left a phone message with her. I talked with Dawn Hallwood, director of EH, who indicated Sherry makes some calls of families of children with EBLL--but I'm pretty sure that means she doesn't make visits. Dawn says GCHD does not do any EBL Investigations, but they try to get families into the Lead Safe Home Program to get them an investigation that way.

Thanks,
Bob

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Follow-up for Children in Flint (ZIPs 48501-48507) with Elevated Blood Lead Levels April 2014 through March 2015

Children with Initial Elevated BLL 5-14

	Initial Venous	Initial Capillary	Total
Children w/BLL 5-14	43	70	113
With retest	14	18	32
Retest was >= 5	10	9	19

Children with Initial Elevated BLL >= 15

	Initial Venous	Initial Capillary	Total
Children w/BLL >= 15	3	1	4
With retest	1	1	2
Retest was >= 15	1	0	1

October 5, 2015

Source: MDHHS Data Warehouse

From: Scott, Robert L. (DHHS)
Sent: Monday, October 05, 2015 5:21 PM
To: Peeler, Nancy (DHHS)
Subject: Flint EBLL retesting v2
Attachments: Flint_EBLLs_Retesting_v2.pdf

Please see attached.

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Follow-up for Children in Flint (ZIPs 48501-48507) with Elevated Blood Lead Levels April 2014 through March 2015

Children with Initial Confirmed (Venous) Elevated BLL 5-14

Children w/BLL 5-14:	43	
With retest:	14	
Most recent retest was <5:		4
5 to 14:		9
>= 15:		1

Children with Initial Confirmed (Venous) Elevated BLL >= 15

Children w/BLL >= 15:	3	
With retest:	1	
Most recent retest was <5:		0
5 to 14:		0
>= 15:		1

Children with Initial Capillary Elevated BLL 5-14 (needing confirmation)

Children w/BLL 5-14:	70	
With confirmatory venous:	15	
Confirmatory test was <5:		7
5 to 14:		7
>= 15:		1

Children with Initial Capillary Elevated BLL >= 15 (needing confirmation)

Children w/BLL >= 15:	1
With confirmatory venous:	0

October 5, 2015

Source: MDHHS Data Warehouse

From: Scott, Robert L. (DHHS)
Sent: Tuesday, October 13, 2015 12:19 PM
To: Peeler, Nancy (DHHS)
Cc: 'Lishinski Karen (LishinskiK@michigan.gov)'
Subject: Flint children needing retesting - summary
Attachments: Summary - Flint Children Needing Retesting.pdf

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Children less than Six Years of Age, Living in ZIP Codes 48501-48507, with Elevated Blood Lead Levels Since April 1, 2014, Who Currently Require Follow-Up Testing

Among 75 Children Needing Confirmation of Elevated Capillary BLL

	Number	Percentage
Medicaid-eligible	74	98.7
Not Medicaid	1	1.3
BLL 5-14	74	98.7
BLL > 14	1	1.3
Current Age 1-2 years	54	72.0
Current Age 3-6 years	21	28.0
ZIP 48502	1	1.3
ZIP 48503	16	21.3
ZIP 48504	27	36.0
ZIP 48505	12	16.0
ZIP 48506	6	8.0
ZIP 48507	13	17.3
Elevated Capillary is Only Test to Date	58	77.3
Previous Test was < 5	15	20.0
Previous Test was Elevated Capillary	2	2.7

Among 76 Children with Elevated Venous BLL, Needing Retesting

	Number	Percentage
Medicaid-eligible	70	92.1
Not Medicaid	6	7.9
BLL 5-14	70	92.1
BLL > 14	6	7.9
Current Age 1-2 years	28	36.8
Current Age 3-6 years	48	63.2
ZIP 48502	2	2.6
ZIP 48503	18	23.7
ZIP 48504	21	27.6
ZIP 48505	15	19.7
ZIP 48506	13	17.1
ZIP 48507	5	6.6
Currently in Other ZIP	2	2.6
BLL 5-14 Due for Retest	63	82.9
BLL 5-14 Not Due Yet	7	9.2
BLL >14 Due for Retest	6	7.9
Last Test is Follow-up to Previous Elevated Venous	10	13.2
Have Never Had Follow-up Venous Test	66	86.8

October 13, 2015

Source: MDHHS Data Warehouse

From: Scott, Robert L. (DHHS)
Sent: Wednesday, October 21, 2015 2:56 PM
To: Peeler, Nancy (DHHS);'Lishinski Karen (LishinskiK@michigan.gov)'
Subject: updated Flint Retesting list
Attachments: Flint Retesting 102115.pdf

Nancy and Karen,

Please see attached. Any suggestions for changes? Column order? Sorting? General appearance? Different fields of information?

These lists do not display children whose next test is not currently due, or whose level has fallen below 5. But I'm keeping everyone on a Master List that I will update each week. (Nobody drops off the Master List.)

Bob

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October 21, 2015

Children with Venous BLL >= 5 Due for Retesting

Most Recent Specimen Date	PB Result	Sample Type	Provider Name	Prov Address	Prov City	Last Name	First Name	Date of Birth	Guardian Last Name	Guardian First Name	Phone	House Number	Street Name	Apt	Patient City	ZIP
PHI	5	V	ALLEGIANCE HEALTH	205 N EAST AVE	JACKSON	PHI										
	5	V	DELROSARIO, EVELYN, MD	G3514 BEECHER RD	FLINT											
	6	V	GENESEE COMM HLTH CENTER	422 W 4TH AVE (GCHC)	FLINT											
	8	V	GENESYS REG MED OUTREACH-CPU	ONE GENESYS PKWY (OUTF	GRAND BLANC											
	6	V	GENESYS REG MED OUTREACH-CPU	ONE GENESYS PKWY (OUTF	GRAND BLANC											
	5	V	GENESYS REG MED OUTREACH-CPU	ONE GENESYS PKWY (OUTF	GRAND BLANC											
	5	V	GENESYS REG MED OUTREACH-CPU	ONE GENESYS PKWY (OUTF	GRAND BLANC											
	5	V	GENESYS REG MED OUTREACH-CPU	ONE GENESYS PKWY (OUTF	GRAND BLANC											
	6	V	GENESYS REG MED OUTREACH-CPU	ONE GENESYS PKWY (OUTF	GRAND BLANC											
	17	V	HOLLOWAY, MILTON G, MD	5205 NORKO DR (HOLLOW/	FLINT											
	7	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT											
	5	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT											
	7	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT											
	5	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT											
	7	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT											
	5	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT											
	6	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT											
	5	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT											
	7	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT											
	11	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT											
	9	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT											
	5	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT											
	5	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT											
	10	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT											
	6	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT											
	5	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT											
	6	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT											
	5	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT											
	5	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT											
	5	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT											
	7	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT											
	9	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT											
	11	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT											
	9	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT											
	10	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT											
	8	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT											
	6	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT											
	5	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT											
	5	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT											
	12	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT											
	5	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT											
	22	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT											
	6	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT											
	5	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT											
	6	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT											
	6	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT											
	6	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT											
	25	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT											
	8	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT											
	8	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT											
	5	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT											
	6	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT											
	5	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT											
	12	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT											
	23	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT											
	8	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT											
	27	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT											
	6	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT											
	5	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT											

October 21, 2015

Children with Venous BLL >= 5 Due for Retesting

Most Recent Specimen Date	PB Result	Sample Type	Provider Name	Prov Address	Prov City	Last Name	First Name	Date of Birth	Guardian Last Name	Guardian First Name	Phone	House Number	Street Name	Apt	Patient City	ZIP
PHI	5	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT	PHI										
	6	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT											
	22	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT											
	11	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT											
	8	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT											
	5	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT											
	5	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT											
	6	V	MCLAREN MEDICAL LAB	4000 S SAGINAW ST	FLINT											
	6	v	MCLAREN MEDICAL LAB	4000 S SAGINAW ST	FLINT											
	6	V	PEDIATRIC ADOLESCENT CARE	G3283 BEECHER RD	FLINT											
	7	V	SIMMERT, JOE, DO (S BALLENGER)	2184 S BALLENGER HWY (S	FLINT											
	5	V	SIMMERT, JOE, DO (S BALLENGER)	2184 S BALLENGER HWY (S	FLINT											
	5	V	STOKER, JOHN, L, DO	G5142 MILLER RD	FLINT											
	6	V	WARDE MEDICAL LAB (CPU)	300 W TEXTILE RD (BECKY \	ANN ARBOR											

October 21, 2015

Children with Capillary BLL >= 5 Needing Confirmation

Most Recent Specimen Date	PB Result	Sample Type	Provider Name	Prov Address	Prov City	Last Name	First Name	Date of Birth	Guardian Last Name	Guardian First Name	Phone	House Number	Street Name	Apt	Patient City	ZIP
PHI	5	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT	PHI										
	7	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT											
	6	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT											
	6	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT											
	5	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT											
	5	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT											
	5	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT											
	7	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT											
	6	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT											
	7	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT											
	5	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT											
	5	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT											
	8	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT											
	8	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT											
	5	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT											
	5	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT											
	5	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT											
	6	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT											
	5	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT											
	5	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT											
	6	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT											
	12	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT											
	5	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT											
	5	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT											
	5	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT											
	9	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT											
	6	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT											
	5	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT											
	5	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT											
	6	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT											
	7	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT											
	6	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT											
	5	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT											
	6	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT											
	12	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT											
	6	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT											
	6	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT											
	5	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT											
	8	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT											
	5	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT											
	5	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT											
	8	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT											
	6	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT											
	7	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT											
	11	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT											
	8	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT											
	5	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT											
	5	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT											
	5	C	GRAND BLANC PEDIATRIC CLINIC	8273 S SAGINAW # C (GBPC)	GRAND BLANC											
	6	C	GRAND BLANC PEDIATRIC CLINIC	8273 S SAGINAW # C (GBPC)	GRAND BLANC											
	10	C	GRAND BLANC PEDIATRIC CLINIC	8273 S SAGINAW # C (GBPC)	GRAND BLANC											
	5	C	HASAN, KAMAL, DR	1260 N IRISH RD # A (HASAN	DAVISON											
	5	C	HASAN, KAMAL, DR	1260 N IRISH RD # A (HASAN	DAVISON											
	9	C	HASAN, KAMAL, DR	1260 N IRISH RD # A (HASAN	DAVISON											
	7	C	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT											
	5	C	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT											
	5	C	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT											
	7	C	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT											
	5	C	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT											

October 21, 2015

Children with Capillary BLL >= 5 Needing Confirmation

Most Recent Specimen Date	PB Result	Sample Type	Provider Name	Prov Address	Prov City	Last Name	First Name	Date of Birth	Guardian Last Name	Guardian First Name	Phone	House Number	Street Name	Apt	Patient City	ZIP
PHI	7	C	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT	PHI										
	6	C	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT											
	14	C	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT											
	5	C	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT											
	6	C	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT											
	7	C	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT											
	7	C	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT											
	5	C	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT											
	12	C	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT											
	5	C	IMPERIAL, ALICIA F, MD -LINDEN	2241 S LINDEN RD (IMPERIAL	FLINT											
	5	C	KINRA, NARESH, MD	1375 FLUSHING RD	FLUSHING											
	6	C	KIRBY, MICHAEL, MD	445 N FENWAY DR (KIRBY)	FENTON											
	5	C	KIRBY, MICHAEL, MD	445 N FENWAY DR (KIRBY)	FENTON											
	6	C	MCLAREN OAKLAND LAKE ORION	1240 S LAPEER RD STE 101A	LAKE ORION											
	6	C	MEMORIAL PEDIATRIC CLINIC	802 S KING STE C	OWOSSO											
	6	C	PRIME PEDS & ADOLESCENT	1335 S LINDEN RD	FLINT											
	10	C	PRIME PEDS & ADOLESCENT	1335 S LINDEN RD	FLINT											
	5	C	PRIME PEDS & ADOLESCENT	1335 S LINDEN RD	FLINT											
	5	C	THE CHILDRENS OFFICE	G2184 S BALLENGER HWY	FLINT											

From: Scott, Robert L. (DHHS)
Sent: Tuesday, November 17, 2015 2:49 PM
To: 'Genesee'
Subject: summary

# of children needing confirmation (BLL 5-14): 89
# of children needing confirmation (BLL >= 15): 1
# of confirmed cases needing retesting (BLL 5-14): 65
# of confirmed cases needing retesting (BLL>= 15): 7
# of confirmed cases, not currently due for retest: 8
# of children with most recent BLL <5: 10
Total: 180

Robert L. Scott
Childhood Lead Poisoning Prevention Program
Michigan Department of Health & Human Services
(517) 335-8178
fax (517) 335-8509

From: Scott, Robert L. (DHHS)
Sent: Friday, November 20, 2015 9:27 AM
To: Tijerina, Veronica (DHHS)
Subject: Flint Master List
Attachments: Flint Retesting Master List_Veronica.xlsx

Robert L. Scott
Childhood Lead Poisoning Prevention Program
Michigan Department of Health & Human Services
(517) 335-8178
fax (517) 335-8509

Children in Flint with Elevated Blood Lead Levels

Last Updated 11/13/2015

Child ID	HHLPSS ID	Most Recent Specimen Date	PB Result	Sample Type	Last Name	First Name	Date of Birth	Guardian Last Name	Guardian First Name	Phone	House Number	Street Name	Apt	Patient City	ZIP	Provider Name	Date Child was Added to List	Date New Test Added	Status	Original Specimen Date	Original Pb Result	Original Sample Type	Status Code
			5	V												HURLEY MEDICAL CENTER					5	V	2
			7	V												HURLEY MEDICAL CENTER					7	V	2
			6	V												HURLEY MEDICAL CENTER					6	V	2
			5	C												HURLEY MEDICAL CENTER					5	C	1
			7	C												HURLEY MEDICAL CENTER					7	C	1
			5	V												HURLEY MEDICAL CENTER					5	V	2
			5	C												GENESEE CO HEALTH DEPT SAGINAW					5	C	1
			6	V												HURLEY MEDICAL CENTER					6	V	2
			17	V												HOLLOWAY, MILTON G, MD					17	V	2
			~~3~~	~~V~~												~~HURLEY MEDICAL CENTER~~					~~5~~	~~V~~	4
			5	C												HASAN, KAMAL, DR					5	C	1
			9	C												HASAN, KAMAL, DR					9	C	1
			5	C												IMPERIAL, ALICIA F, MD -LINDEN					5	C	1
			6	V												WARDE MEDICAL LAB (CPU)					6	V	2
			9	V												HURLEY MEDICAL CENTER					9	V	2
			~~5~~	~~V~~												~~HURLEY MEDICAL CENTER~~					~~5~~	~~V~~	3
			8	V												GENESYS REG MED OUTREACH-CPU					8	V	2
			22	V												HURLEY MEDICAL CENTER					22	V	2
			11	V												HURLEY MEDICAL CENTER					11	V	2
			8	V												HURLEY MEDICAL CENTER					8	V	2
			5	V												HURLEY MEDICAL CENTER					5	V	2
			11	C												HASAN, KAMAL, DR					11	C	1
			6	V												HURLEY MEDICAL CENTER					6	V	2
			9	V												HURLEY MEDICAL CENTER					9	V	2
			6	V												HURLEY MEDICAL CENTER					6	V	2
			6	V												HURLEY MEDICAL CENTER					6	V	2
			8	V												HURLEY MEDICAL CENTER					8	V	2
			~~3~~	~~V~~												~~HURLEY MEDICAL CENTER~~					~~11~~	~~V~~	4
			5	V												HURLEY MEDICAL CENTER					5	V	2
			5	C												THE CHILDRENS OFFICE					5	C	1
			5	V												HURLEY MEDICAL CENTER					5	V	2
			5	V												GENESYS REG MED OUTREACH-CPU					5	V	2
			27	V												HURLEY MEDICAL CENTER					27	V	2
			8	V												HURLEY MEDICAL CENTER					8	V	2
			8	C												GENESEE CO HEALTH DEPT SAGINAW					8	C	1
			5	C												HURLEY MEDICAL CENTER					5	C	1
			5	V												HURLEY MEDICAL CENTER					5	V	2
			5	V												GENESYS REG MED OUTREACH-CPU					5	V	2
			9	V												HURLEY MEDICAL CENTER					9	V	2
			5	V												HURLEY MEDICAL CENTER					5	V	2
			5	V												ALLEGIANCE HEALTH					5	V	2
			6	V												HURLEY MEDICAL CENTER					6	V	2
			5	V												HURLEY MEDICAL CENTER					5	V	2
			5	V												HURLEY MEDICAL CENTER					5	V	2
			6	V												HURLEY MEDICAL CENTER					6	V	2
			5	C												GENESEE CO HEALTH DEPT SAGINAW					5	C	1
			6	V												PEDIATRIC ADOLESCENT CARE					6	V	2
			6	V												HURLEY MEDICAL CENTER					6	V	2
			8	V												HURLEY MEDICAL CENTER					8	V	2
			5	V												HURLEY MEDICAL CENTER					5	V	2
			12	C												HURLEY MEDICAL CENTER					12	C	1
			6	C												GRAND BLANC PEDIATRIC CLINIC					6	C	1
			7	C												HURLEY MEDICAL CENTER					7	C	1
			6	C												PRIME PEDS & ADOLESCENT					6	C	1
			6	V												HURLEY MEDICAL CENTER					6	V	2
			5	V												HURLEY MEDICAL CENTER					5	V	2
			10	C												PRIME PEDS & ADOLESCENT					10	C	1
			6	C												GENESEE CO HEALTH DEPT SAGINAW					6	C	1
			10	V												HURLEY MEDICAL CENTER					10	V	2
			8	C												GENESEE CO HEALTH DEPT SAGINAW					8	C	1
			5	C												GENESEE CO HEALTH DEPT SAGINAW					5	C	1
			6	V												HURLEY MEDICAL CENTER					6	V	2
			5	V												DELROSARIO, EVELYN, MD					5	V	2
			6	V												GENESYS REG MED OUTREACH-CPU					6	V	2
			7	V												HURLEY MEDICAL CENTER					7	V	2
			~~6~~	~~V~~												~~HURLEY MEDICAL CENTER~~					~~6~~	~~V~~	3
			14	C												HURLEY MEDICAL CENTER					14	C	3
			10	C												GENESEE CO HEALTH DEPT SAGINAW					10	C	1
			5	C												GENESEE CO HEALTH DEPT SAGINAW					5	C	1
			5	C												GENESEE CO HEALTH DEPT SAGINAW					5	C	1
			6	C												MCLAREN OAKLAND LAKE ORION					6	C	1
			5	V												HURLEY MEDICAL CENTER					5	V	2
			6	C												GENESEE CO HEALTH DEPT SAGINAW					6	C	1
			18	C												GENESEE CO HEALTH DEPT SAGINAW					18	C	1
			25	V												HURLEY MEDICAL CENTER					25	V	2
			12	V												HURLEY MEDICAL CENTER					12	V	2
			5	V												GENESEE COMMUNITY HLTH CENTER					5	V	2
			7	V												HURLEY MEDICAL CENTER					7	V	2
			5	C												GENESEE CO HEALTH DEPT SAGINAW					5	C	
			7	V												HURLEY MEDICAL CENTER					7	V	2
			7	C												HURLEY MEDICAL CENTER					7	C	1
			14	C												HURLEY MEDICAL CENTER					14	C	1
			8	C												LAPEER PEDIATRICS-LAPEER					8	C	
			5	C												GENESEE CO HEALTH DEPT SAGINAW					5	C	1
			~~3~~	~~V~~												~~MEMORIAL PEDIATRIC CLINIC~~					~~6~~	~~C~~	4
			5	C												GENESEE CO HEALTH DEPT SAGINAW					5	C	1
			5	C												GENESEE CO HEALTH DEPT SAGINAW					5	C	1
			6	C												GENESEE CO HEALTH DEPT SAGINAW					6	C	1
			22	V												HURLEY MEDICAL CENTER					22	V	2
			5	C												GENESEE CO HEALTH DEPT SAGINAW					5	C	1
			7	C												GENESEE CO HEALTH DEPT SAGINAW					7	C	1
			6	v												MCLAREN MEDICAL LAB					6	v	2
			5	C												GRAND BLANC PEDIATRIC CLINIC					5	C	1
			6	C												GENESEE CO HEALTH DEPT SAGINAW					6	C	1
			5	V												HURLEY MEDICAL CENTER					5	V	2
			5	C												PRIME PEDS & ADOLESCENT					5	C	1
			~~4~~	~~V~~												~~HURLEY MEDICAL CENTER~~					~~5~~	~~V~~	4
			~~5~~	~~V~~												~~HURLEY MEDICAL CENTER~~					12	C	3
			6	C												GENESEE CO HEALTH DEPT SAGINAW					6	C	1
			6	V												GENESYS REG MED OUTREACH-CPU					6	V	2
			6	C												GENESEE CO HEALTH DEPT SAGINAW					6	C	1
			5	C												GENESEE CO HEALTH DEPT SAGINAW					5	C	1
			5	V												HURLEY MEDICAL CENTER					5	V	2
			12	C												HASAN, KAMAL, DR					12	C	
			5	C												GENESEE CO HEALTH DEPT SAGINAW					5	C	1
			5	C												HURLEY MEDICAL CENTER					5	C	1
			6	C												GENESEE CO HEALTH DEPT SAGINAW					6	C	1
			12	C												GENESEE CO HEALTH DEPT SAGINAW					12	C	1
			16	V												HURLEY MEDICAL CENTER					18	C	2
			6	C												GENESEE CO HEALTH DEPT SAGINAW					6	C	1
			6	V												HURLEY MEDICAL CENTER					6	V	2
			8	V												HURLEY MEDICAL CENTER					8	V	2
			5	V												HURLEY MEDICAL CENTER					5	V	2

PHI

PHI

PHI

PHI

5	C	
5	C	
5	C	
7	C	
9	C	
9	C	
7	C	
~~4~~	~~C~~	
5	C	
5	C	
5	C	
10	V	
5	V	
6	V	
8	C	
9	C	
5	C	
6	C	
11	V	
7	C	
~~3~~	~~C~~	
23	V	
7	C	
5	C	
7	C	
6	C	
6	C	
5	V	
5	V	
~~8~~	~~V~~	
5	C	
5	V	
6	C	
5	C	
8	C	
~~8~~	~~V~~	
6	C	
5	C	
5	C	
5	C	
6	C	
~~4~~	~~C~~	
5	C	
11	V	
5	V	
7	V	
~~1~~	~~V~~	
~~3~~	~~V~~	
~~7~~	~~V~~	
~~10~~	~~V~~	
~~2~~	~~V~~	
6	C	
6	C	
~~7~~	~~V~~	
5		
5	C	
8	C	
7	C	
5	C	
5	C	
7	C	
6	C	
5	C	
5	C	
6	V	
5	V	
6	V	

PHI

GENESEE CO HEALTH DEPT SAGINAW	5	C
KIRBY, MICHAEL, MD	5	C
GENESEE CO HEALTH DEPT SAGINAW	5	C
GENESEE CO HEALTH DEPT SAGINAW	7	C
GENESEE CO HEALTH DEPT SAGINAW	9	C
GENESEE CO HEALTH DEPT SAGINAW	9	C
HURLEY MEDICAL CENTER	7	C
~~SIMMERT, JOE, DO (S BALLENGER)~~	~~7~~	~~V~~
GENESEE CO HEALTH DEPT SAGINAW	5	C
KINRA, NARESH, MD	5	C
GENESEE CO HEALTH DEPT SAGINAW	5	C
HURLEY MEDICAL CENTER	10	V
HURLEY MEDICAL CENTER	5	V
MCLAREN MEDICAL LAB	6	V
GENESEE CO HEALTH DEPT SAGINAW	8	C
HURLEY MEDICAL CENTER	9	C
GENESEE CO HEALTH DEPT SAGINAW	5	C
GENESEE CO HEALTH DEPT SAGINAW	6	C
HURLEY MEDICAL CENTER	11	V
HURLEY MEDICAL CENTER	7	C
~~THE CHILDRENS OFFICE~~	~~5~~	~~V~~
HURLEY MEDICAL CENTER	23	V
GENESEE CO HEALTH DEPT SAGINAW	7	C
HASAN, KAMAL, DR	5	C
HURLEY MEDICAL CENTER	7	C
GENESEE CO HEALTH DEPT SAGINAW	6	C
GENESEE CO HEALTH DEPT SAGINAW	6	C
STOKER, JOHN, L, DO	5	V
GENESYS REG MED OUTREACH-CPU	5	V
~~HURLEY MEDICAL CENTER~~	~~8~~	~~V~~
GENESEE CO HEALTH DEPT SAGINAW	5	C
HURLEY MEDICAL CENTER	5	V
HURLEY MEDICAL CENTER	6	C
HURLEY MEDICAL CENTER	5	C
GENESEE CO HEALTH DEPT SAGINAW	8	C
~~GENESEE CO HEALTH DEPT SAGINAW~~	11	C
GENESEE CO HEALTH DEPT SAGINAW	6	C
GENESEE CO HEALTH DEPT SAGINAW	5	C
GENESEE CO HEALTH DEPT SAGINAW	5	C
GENESEE CO HEALTH DEPT SAGINAW	5	C
GENESEE CO HEALTH DEPT SAGINAW	6	C
~~HURLEY MEDICAL CENTER~~	~~5~~	~~V~~
GENESEE CO HEALTH DEPT SAGINAW	5	C
HURLEY MEDICAL CENTER	11	V
HURLEY MEDICAL CENTER	5	V
HURLEY MEDICAL CENTER	7	V
~~GRAND BLANC PEDIATRIC CLINIC~~	~~10~~	~~C~~
~~GENESEE CO HEALTH DEPT SAGINAW~~	~~5~~	~~C~~
HURLEY MEDICAL CENTER	7	V
~~HURLEY MEDICAL CENTER~~	14	C
~~HURLEY MEDICAL CENTER~~	~~26~~	~~C~~
HURLEY MEDICAL CENTER	6	C
GENESEE CO HEALTH DEPT SAGINAW	6	C
~~GENESEE COMMUNITY HLTH CENTER~~	12	V
MCLAREN MEDICAL LAB	5	
HURLEY MEDICAL CENTER	5	C
GENESEE CO HEALTH DEPT SAGINAW	8	C
GENESEE CO HEALTH DEPT SAGINAW	7	C
GENESEE CO HEALTH DEPT SAGINAW	5	C
GENESEE CO HEALTH DEPT SAGINAW	5	C
GENESEE CO HEALTH DEPT SAGINAW	7	C
KIRBY, MICHAEL, MD	6	C
GENESEE CO HEALTH DEPT SAGINAW	5	C
GENESEE CO HEALTH DEPT SAGINAW	5	C
GENESEE CO HEALTH DEPT SAGINAW	7	C
KIRBY, MICHAEL, MD	6	C
GENESEE CO HEALTH DEPT SAGINAW	5	C
GENESEE CO HEALTH DEPT SAGINAW	5	C
HURLEY MEDICAL CENTER	6	V
HURLEY MEDICAL CENTER	5	V
GENESEE COMM HLTH CENTER	6	V

PHI

5	C	1
5	C	1
5	C	1
7	C	1
9	C	1
9	C	1
7	C	1
~~7~~	~~V~~	~~4~~
5	C	1
5	C	1
5	C	1
10	V	2
5	V	2
6	V	2
8	C	1
9	C	1
5	C	1
6	C	1
11	V	2
7	C	1
~~5~~	~~V~~	~~4~~
23	V	2
7	C	1
5	C	1
7	C	1
6	C	1
6	C	1
5	V	2
5	V	2
~~8~~	~~V~~	3
5	C	1
5	V	2
6	C	1
5	C	1
8	C	1
~~11~~	~~C~~	3
6	C	1
5	C	1
5	C	1
5	C	1
6	C	1
~~5~~	~~V~~	~~4~~
5	C	1
11	V	
5	V	2
7	V	2
~~10~~	~~C~~	4
~~5~~	~~C~~	~~4~~
~~7~~	~~V~~	~~3~~
~~14~~	~~C~~	~~3~~
~~26~~	~~C~~	~~4~~
6	C	1
6	C	1
~~12~~	~~V~~	~~3~~
5		
5	C	1
8	C	1
7	C	1
5	C	1
5	C	1
7	C	1
6	C	1
5	C	1
5	C	1
7	C	1
6	C	1
5	C	1
5	C	1
6	V	2
5	V	2
6	V	2

SUMMARY:

# of children needing confirmation (BLL 5-14):	79
# of children needing confirmation (BLL >= 15):	0
# of confirmed cases needing retesting (BLL 5-14):	66
# of confirmed cases needing retesting (BLL>= 15):	7
# of confirmed cases, not currently due for retest:	6
# of children with most recent BLL <5:	8
Total:	166

Most Recent Specimen Date	PB Result	Sample Type	Provider Name	Prov Address
PHI	17	V	HOLLOWAY, MILTON G, MD	5205 NORKO DR (HOLLOWAY)
	22	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
	27	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
	25	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
	22	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
	23	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
	5	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
	7	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
	6	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
	5	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
	6	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
	5	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
	6	V	WARDE MEDICAL LAB (CPU)	300 W TEXTILE RD (BECKY W)
	9	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
	8	V	GENESYS REG MED OUTREACH-CPU	ONE GENESYS PKWY (OUTREACH)
	11	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
	8	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
	5	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
	6	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
	9	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
	6	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
	6	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
	8	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
	11	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
	5	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
	5	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
	5	V	GENESYS REG MED OUTREACH-CPU	ONE GENESYS PKWY (OUTREACH)
	8	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
	5	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
	5	V	GENESYS REG MED OUTREACH-CPU	ONE GENESYS PKWY (OUTREACH)
	9	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
	5	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
	5	V	ALLEGIANCE HEALTH	205 N EAST AVE
	6	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
	5	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
	5	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
	6	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
	6	V	PEDIATRIC ADOLESCENT CARE	G3283 BEECHER RD
	6	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
	8	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
	5	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
	5	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA

PHI

10	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
6	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
5	V	DELROSARIO, EVELYN, MD	G3514 BEECHER RD
6	V	GENESYS REG MED OUTREACH-CPU	ONE GENESYS PKWY (OUTREACH)
7	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
5	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
12	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
7	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
7	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
6	v	MCLAREN MEDICAL LAB	4000 S SAGINAW ST
5	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
5	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
6	V	GENESYS REG MED OUTREACH-CPU	ONE GENESYS PKWY (OUTREACH)
5	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
6	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
8	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
5	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
7	V	SIMMERT, JOE, DO (S BALLENGER)	2184 S BALLENGER HWY (SIMMERT)
10	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
5	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
6	V	MCLAREN MEDICAL LAB	4000 S SAGINAW ST
11	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
5	V	SIMMERT, JOE, DO (S BALLENGER)	2184 S BALLENGER HWY (SIMMERT)
5	V	STOKER, JOHN, L, DO	G5142 MILLER RD
5	V	GENESYS REG MED OUTREACH-CPU	ONE GENESYS PKWY (OUTREACH)
5	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
7	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
12	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
6	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
5	V	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
6	V	GENESEE COMM HLTH CENTER	422 W 4TH AVE (GCHC)

5	C	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
5	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
5	C	HASAN, KAMAL, DR	1260 N IRISH RD # A (HASAN)
9	C	HASAN, KAMAL, DR	1260 N IRISH RD # A (HASAN)
5	C	IMPERIAL, ALICIA F, MD -LINDEN	2241 S LINDEN RD (IMPERIAL)
5	C	THE CHILDRENS OFFICE	G2184 S BALLENGER HWY
8	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
5	C	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
5	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
12	C	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
6	C	GRAND BLANC PEDIATRIC CLINIC	8273 S SAGINAW # C (GBPC)
7	C	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA

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6	C	PRIME PEDS & ADOLESCENT	1335 S LINDEN RD
10	C	PRIME PEDS & ADOLESCENT	1335 S LINDEN RD
6	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
8	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
5	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
5	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
5	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
6	C	MCLAREN OAKLAND LAKE ORION	1240 S LAPEER RD STE 101A
6	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
7	C	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
14	C	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
5	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
6	C	MEMORIAL PEDIATRIC CLINIC	802 S KING STE C
5	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
5	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
6	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
5	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
7	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
5	C	GRAND BLANC PEDIATRIC CLINIC	8273 S SAGINAW # C (GBPC)
6	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
5	C	PRIME PEDS & ADOLESCENT	1335 S LINDEN RD
12	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
6	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
6	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
5	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
5	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
5	C	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
6	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
12	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
6	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
5	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
5	C	KIRBY, MICHAEL, MD	445 N FENWAY DR (KIRBY)
5	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
7	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
9	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
7	C	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
5	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
5	C	KINRA, NARESH, MD	1375 FLUSHING RD
5	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
8	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
7	C	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
7	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
5	C	HASAN, KAMAL, DR	1260 N IRISH RD # A (HASAN)
7	C	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
6	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
6	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
5	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST

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6	C	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
5	C	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
8	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
11	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
6	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
5	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
5	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
5	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
10	C	GRAND BLANC PEDIATRIC CLINIC	8273 S SAGINAW # C (GBPC)
6	C	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
6	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
5	C	HURLEY MEDICAL CENTER	ONE HURLEY PLAZA
8	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
7	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
5	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
7	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
6	C	KIRBY, MICHAEL, MD	445 N FENWAY DR (KIRBY)
5	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST
5	C	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST

Prov City	Last Name	First Name	Date of Birth	Guardian Last Name	Guardian First Name	Phone
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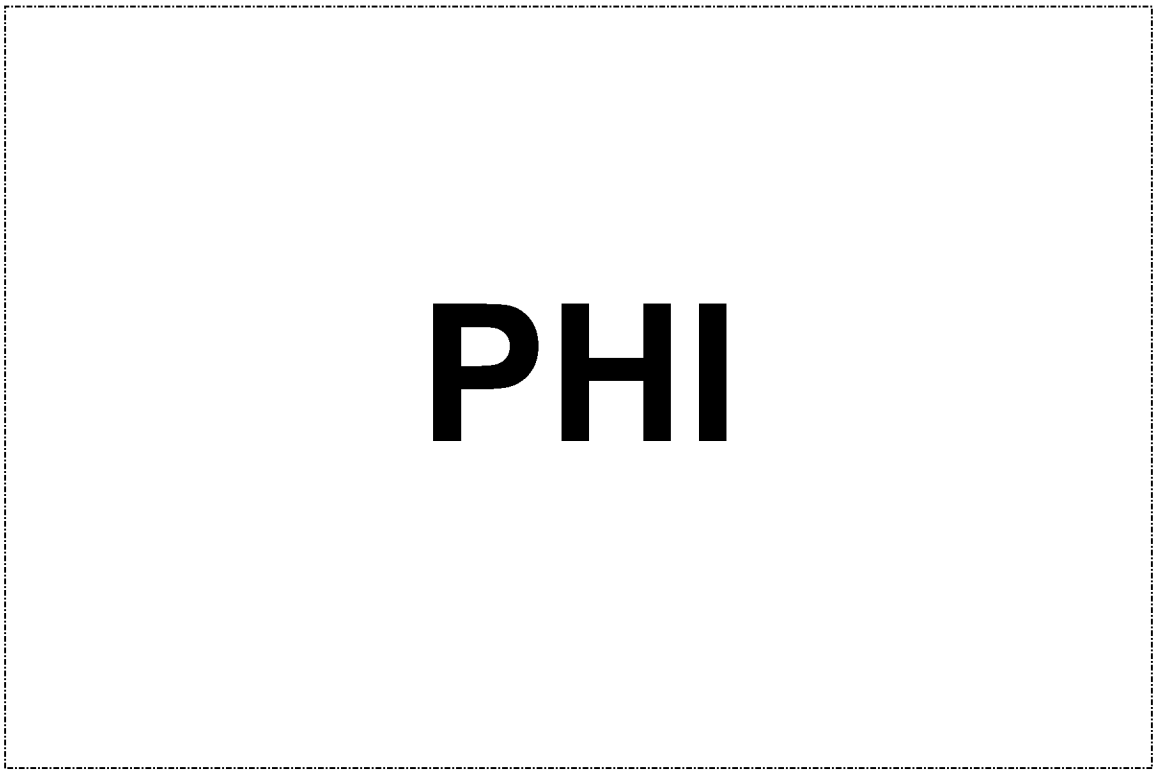

House Number | Street Name | Apt | Patient City | ZIP

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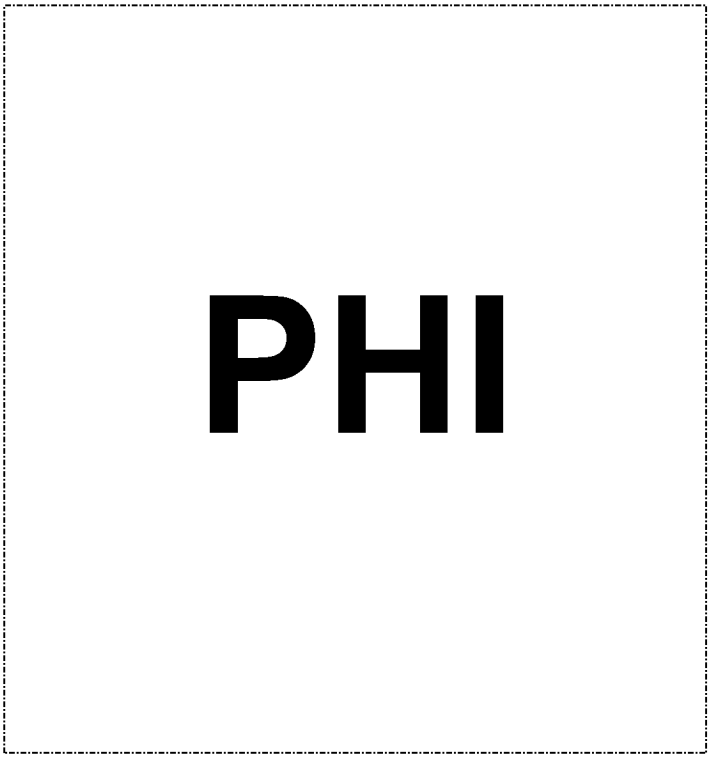
PHI

October 21, 2015

Children with Venous BLL >= 5 Due for Retesting

Most Recent Specimen Date	PB Result	Sample Type	Last Name	First Name	Date of Birth	Guardian Last Name	Guardian First Name	Phone	House Number	Street Name	Apt	Patient City	ZIP	Provider Name	Prov Address	Prov City
PHI	6	V	PHI											GENESEE COMM HLTH CENTER	422 W 4TH AVE (GCHC)	FLINT
	5	V												GENESYS REG MED OUTREACH-CPU	ONE GENESYS PKWY (OUTREACH)	GRAND BLANC
	10	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	5	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	6	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	5	V												DELROSARIO, EVELYN, MD	G3514 BEECHER RD	FLINT
	6	V												GENESYS REG MED OUTREACH-CPU	ONE GENESYS PKWY (OUTREACH)	GRAND BLANC
	5	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	5	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	5	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	17	V												HOLLOWAY, MILTON G, MD	5205 NORKO DR (HOLLOWAY)	FLINT
	8	V												GENESYS REG MED OUTREACH-CPU	ONE GENESYS PKWY (OUTREACH)	GRAND BLANC
	10	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	12	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	7	V												SIMMERT, JOE, DO (S BALLENGER)	2184 S BALLENGER HWY (SIMMERT)	FLINT
	11	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	22	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	11	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	6	v												MCLAREN MEDICAL LAB	4000 S SAGINAW ST	FLINT
	6	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	5	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	5	V												GENESYS REG MED OUTREACH-CPU	ONE GENESYS PKWY (OUTREACH)	GRAND BLANC
	22	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	6	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	6	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	6	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	9	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	5	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	8	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	5	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	6	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	6	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	6	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	6	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	11	V												GENESYS REG MED OUTREACH-CPU	ONE GENESYS PKWY (OUTREACH)	GRAND BLANC
	5	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	5	V												ALLEGIANCE HEALTH	205 N EAST AVE	JACKSON
	6	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	7	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	6	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	7	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	6	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	5	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	7	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	7	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	6	V												WARDE MEDICAL LAB (CPU)	300 W TEXTILE RD (BECKY W)	ANN ARBOR
	6	V												MCLAREN MEDICAL LAB	4000 S SAGINAW ST	FLINT
	5	V												GENESYS REG MED OUTREACH-CPU	ONE GENESYS PKWY (OUTREACH)	GRAND BLANC
	5	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	8	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	9	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	5	V												SIMMERT, JOE, DO (S BALLENGER)	2184 S BALLENGER HWY (SIMMERT)	FLINT
	8	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	27	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	5	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	9	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	6	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	7	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	8	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	5	V												STOKER, JOHN, L, DO	G5142 MILLER RD	FLINT
	23	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	8	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	5	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	25	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	5	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	5	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	6	V												PEDIATRIC ADOLESCENT CARE	G3283 BEECHER RD	FLINT
	5	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	5	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	5	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	12	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	5	V												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT

PHI

5 V
5 V

PHI

HURLEY MEDICAL CENTER ONE HURLEY PLAZA FLINT
HURLEY MEDICAL CENTER ONE HURLEY PLAZA FLINT

October 21, 2015

Children with Capillary BLL >= 5 Needing Confirmation

Most Recent Specimen Date	PB Result	Sample Type	Last Name	First Name	Date of Birth	Guardian Last Name	Guardian First Name	Phone	House Number	Street Name	Apt	Patient City	ZIP	Provider Name	Prov Address	Prov City
	5	C												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	6	C												GRAND BLANC PEDIATRIC CLINIC	8273 S SAGINAW # C (GBPC)	GRAND BLANC
	6	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	5	C												KINRA, NARESH, MD	1375 FLUSHING RD	FLUSHING
	6	C												PRIME PEDS & ADOLESCENT	1335 S LINDEN RD	FLINT
	5	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	5	C												THE CHILDRENS OFFICE	G2184 S BALLENGER HWY	FLINT
	7	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	6	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	8	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	6	C												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	6	C												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	8	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	5	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	11	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	7	C												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	5	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	8	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	6	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	9	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	5	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	5	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	5	C												PRIME PEDS & ADOLESCENT	1335 S LINDEN RD	FLINT
	5	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	5	C												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	5	C												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	7	C												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	7	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	7	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	6	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	5	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	5	C												GRAND BLANC PEDIATRIC CLINIC	8273 S SAGINAW # C (GBPC)	GRAND BLANC
	5	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	5	C												GRAND BLANC PEDIATRIC CLINIC	8273 S SAGINAW # C (GBPC)	GRAND BLANC
	6	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	5	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	6	C												MEMORIAL PEDIATRIC CLINIC	802 S KING STE C	OWOSSO
	5	C												HASAN, KAMAL, DR	1260 N IRISH RD # A (HASAN)	DAVISON
	9	C												HASAN, KAMAL, DR	1260 N IRISH RD # A (HASAN)	DAVISON
	8	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	5	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	5	C												HASAN, KAMAL, DR	1260 N IRISH RD # A (HASAN)	DAVISON
	5	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	6	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	12	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	14	C												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	5	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	5	C												IMPERIAL, ALICIA F, MD -LINDEN	2241 S LINDEN RD (IMPERIAL)	FLINT
	6	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	6	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	12	C												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	5	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	5	C												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	7	C												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	5	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	5	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	7	C												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	7	C												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	5	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	5	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	6	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	7	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	6	C												KIRBY, MICHAEL, MD	445 N FENWAY DR (KIRBY)	FENTON
	10	C												GRAND BLANC PEDIATRIC CLINIC	8273 S SAGINAW # C (GBPC)	GRAND BLANC
	5	C												KIRBY, MICHAEL, MD	445 N FENWAY DR (KIRBY)	FENTON
	5	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	8	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	6	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	5	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	5	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	5	C												HURLEY MEDICAL CENTER	ONE HURLEY PLAZA	FLINT
	12	C												GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	10	C												PRIME PEDS & ADOLESCENT	1335 S LINDEN RD	FLINT

PHI

PHI

PHI	6 C	PHI	GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	5 C		GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	6 C		GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	5 C		GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	5 C		GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	7 C		GENESEE CO HEALTH DEPT SAGINAW	630 S SAGINAW ST	FLINT
	6 C		MCLAREN OAKLAND LAKE ORION	1240 S LAPEER RD STE 101A	LAKE ORION

From: Scott, Robert L. (DHHS)
Sent: Friday, November 20, 2015 11:17 AM
To: Tijerina, Veronica (DHHS)
Subject: RE: Flint Master List
Attachments: Flint Retesting List for GCHD 102315.pdf

From: Tijerina, Veronica (DHHS)
Sent: Friday, November 20, 2015 11:13 AM
To: Scott, Robert L. (DHHS) <ScottR9@michigan.gov>
Subject: RE: Flint Master List

From: Scott, Robert L. (DHHS)
Sent: Friday, November 20, 2015 9:27 AM
To: Tijerina, Veronica (DHHS) <TijerinaV@michigan.gov>
Subject: Flint Master List

Robert L. Scott
Childhood Lead Poisoning Prevention Program
Michigan Department of Health & Human Services
(517) 335-8178
fax (517) 335-8509

Children in PHI with Elevated Blood Lead Levels Last Updated 10/23/15

Most Recent Specimen Date	PB Result	Sample Type	Last Name	First Name	Date of Birth	Guardian Last Name	Guardian First Name	Phone	House Number	Street Name	Apt	Patient City	ZIP	Provider Name	Date Child was Added to List	Date New Test Added	Status
PHI	5	C	PHI											HURLEY MEDICAL CENTER	PHI		Needs Confirm
	8	V												GENESEE COMM HLTH CENTE			Not Due
	6	C												GRAND BLANC PEDIATRIC CLI			Needs Confirm
	6	C												GENESEE CO HEALTH DEPT SA			Needs Confirm
	5	C												KINRA, NARESH, MD			Needs Confirm
	6	C												PRIME PEDS & ADOLESCENT			Needs Confirm
	5	C												GENESEE CO HEALTH DEPT SA			Needs Confirm
	5	C												THE CHILDRENS OFFICE			Needs Confirm
	7	C												GENESEE CO HEALTH DEPT SA			Needs Confirm
	5	V												GENESYS REG MED OUTREAC			Retest Due
	10	V												HURLEY MEDICAL CENTER			Retest Due
	5	V												HURLEY MEDICAL CENTER			Retest Due
	6	C												GENESEE CO HEALTH DEPT SA			Needs Confirm
	6	V												HURLEY MEDICAL CENTER			Retest Due
	5	V												DELROSARIO, EVELYN, MD			Retest Due
	6	V												GENESYS REG MED OUTREAC			Retest Due
	8	C												GENESEE CO HEALTH DEPT SA			Needs Confirm
	6	C												HURLEY MEDICAL CENTER			Needs Confirm
	5	V												HURLEY MEDICAL CENTER			Retest Due
	5	V												HURLEY MEDICAL CENTER			Retest Due
	5	V												HURLEY MEDICAL CENTER			Retest Due
	17	V												HOLLOWAY, MILTON G, MD			Retest Due
	8	V												GENESYS REG MED OUTREAC			Retest Due
	6	C												HURLEY MEDICAL CENTER			Needs Confirm
	10	V												HURLEY MEDICAL CENTER			Retest Due
	5	V												HURLEY MEDICAL CENTER			Not Due
	8	C												GENESEE CO HEALTH DEPT SA			Needs Confirm
	12	V												HURLEY MEDICAL CENTER			Retest Due
	5	C												GENESEE CO HEALTH DEPT SA			Needs Confirm
	8	V												GENESEE CO HEALTH DEPT SA			Not Due
	7	C												HURLEY MEDICAL CENTER			Needs Confirm
	5	C												GENESEE CO HEALTH DEPT SA			Needs Confirm
	7	V												SIMMERT, JOE, DO (S BALLEN			Retest Due
	8	C												GENESEE CO HEALTH DEPT SA			Needs Confirm
	6	C												GENESEE CO HEALTH DEPT SA			Needs Confirm
	11	V												HURLEY MEDICAL CENTER			Retest Due
	9	C												GENESEE CO HEALTH DEPT SA			Needs Confirm
	22	V												HURLEY MEDICAL CENTER			Retest Due
	11	V												HURLEY MEDICAL CENTER			Retest Due
	6	v												MCLAREN MEDICAL LAB			Retest Due
	5	C												GENESEE CO HEALTH DEPT SA			Needs Confirm
	6	V												HURLEY MEDICAL CENTER			Retest Due
	6	V												HURLEY MEDICAL CENTER			Retest Due
	5	V												HURLEY MEDICAL CENTER			Retest Due
	5	C												GENESEE CO HEALTH DEPT SA			Needs Confirm
	5	C												PRIME PEDS & ADOLESCENT			Needs Confirm
	5	C												GENESEE CO HEALTH DEPT SA			Needs Confirm
	5	C												HURLEY MEDICAL CENTER			Needs Confirm
	5	C												HURLEY MEDICAL CENTER			Needs Confirm
	7	C												HURLEY MEDICAL CENTER			Needs Confirm
	5	V												GENESYS REG MED OUTREAC			Retest Due
	22	V												HURLEY MEDICAL CENTER			Retest Due
	7	C												GENESEE CO HEALTH DEPT SA			Needs Confirm
	7	C												GENESEE CO HEALTH DEPT SA			Needs Confirm
	6	V												HURLEY MEDICAL CENTER			Retest Due
	6	C												GENESEE CO HEALTH DEPT SA			Needs Confirm
	5	C												GENESEE CO HEALTH DEPT SA			Needs Confirm
	6	V												HURLEY MEDICAL CENTER			Retest Due

Children in PHI with Elevated Blood Lead Levels Last Updated 10/23/15

Most Recent Specimen Date	PB Result	Sample Type	Last Name	First Name	Date of Birth	Guardian Last Name	Guardian First Name	Phone	House Number	Street Name	Apt	Patient City	ZIP	Provider Name	Date Child was Added to List	Date New Test Added	Status
PHI	6	V	PHI											HURLEY MEDICAL CENTER	PHI		Retest Due
	5	C												GRAND BLANC PEDIATRIC CLI			Needs Confirm
	6	C												GENESEE CO HEALTH DEPT SA			Needs Confirm
	5	C												GENESEE CO HEALTH DEPT SA			Needs Confirm
	6	C												MEMORIAL PEDIATRIC CLINIC			Needs Confirm
	5	C												HASAN, KAMAL, DR			Needs Confirm
	9	C												HASAN, KAMAL, DR			Needs Confirm
	9	V												HURLEY MEDICAL CENTER			Retest Due
	8	C												GENESEE CO HEALTH DEPT SA			Needs Confirm
	5	V												HURLEY MEDICAL CENTER			Retest Due
	8	V												HURLEY MEDICAL CENTER			Retest Due
	5	C												GENESEE CO HEALTH DEPT SA			Needs Confirm
	5	C												HASAN, KAMAL, DR			Needs Confirm
	5	V												HURLEY MEDICAL CENTER			Retest Due
	5	C												GENESEE CO HEALTH DEPT SA			Needs Confirm
	6	V												HURLEY MEDICAL CENTER			Retest Due
	6	C												GENESEE CO HEALTH DEPT SA			Needs Confirm
	6	V												HURLEY MEDICAL CENTER			Retest Due
	12	C												GENESEE CO HEALTH DEPT SA			Needs Confirm
	14	C												HURLEY MEDICAL CENTER			Needs Confirm
	6	V												GENESYS REG MED OUTREAC			Retest Due
	5	C												GENESEE CO HEALTH DEPT SA			Needs Confirm
	11	V												HURLEY MEDICAL CENTER			Retest Due
	5	V												ALLEGIANCE HEALTH			Retest Due
	5	C												IMPERIAL, ALICIA F, MD -LIND			Needs Confirm
	6	C												GENESEE CO HEALTH DEPT SA			Needs Confirm
	6	C												GENESEE CO HEALTH DEPT SA			Needs Confirm
	12	C												HURLEY MEDICAL CENTER			Needs Confirm
	5	C												GENESEE CO HEALTH DEPT SA			Needs Confirm
	5	V												HURLEY MEDICAL CENTER			Retest Due
	5	C												HURLEY MEDICAL CENTER			Needs Confirm
	7	C												HURLEY MEDICAL CENTER			Needs Confirm
	6	V												HURLEY MEDICAL CENTER			Retest Due
	5	C												GENESEE CO HEALTH DEPT SA			Needs Confirm
	5	C												GENESEE CO HEALTH DEPT SA			Needs Confirm
	7	V												HURLEY MEDICAL CENTER			Retest Due
	7	C												HURLEY MEDICAL CENTER			Needs Confirm
	6	V												HURLEY MEDICAL CENTER			Retest Due
	7	C												HURLEY MEDICAL CENTER			Needs Confirm
	5	C												GENESEE CO HEALTH DEPT SA			Needs Confirm
	5	C												GENESEE CO HEALTH DEPT SA			Needs Confirm
	5	V												HURLEY MEDICAL CENTER			Not Due
	7	V												HURLEY MEDICAL CENTER			Retest Due
	6	V												HURLEY MEDICAL CENTER			Retest Due
	5	V												HURLEY MEDICAL CENTER			Retest Due
	7	V												HURLEY MEDICAL CENTER			Retest Due
	6	C												GENESEE CO HEALTH DEPT SA			Needs Confirm
	7	V												HURLEY MEDICAL CENTER			Retest Due
	6	V												WARDE MEDICAL LAB (CPU)			Retest Due
	7	C												GENESEE CO HEALTH DEPT SA			Needs Confirm
	6	V												MCLAREN MEDICAL LAB			Retest Due
	5	V												GENESYS REG MED OUTREAC			Retest Due
	5	V												HURLEY MEDICAL CENTER			Retest Due
	8	V												HURLEY MEDICAL CENTER			Retest Due
	9	V												HURLEY MEDICAL CENTER			Retest Due
	5	V												SIMMERT, JOE, DO (S BALLEN			Retest Due
	6	C												KIRBY, MICHAEL, MD			Needs Confirm
	5	V												GRAND BLANC PEDIATRIC CLI			Low

Children in PHI with Elevated Blood Lead Levels Last Updated 10/23/15

Most Recent Specimen Date	PB Result	Sample Type	Last Name	First Name	Date of Birth	Guardian Last Name	Guardian First Name	Phone	House Number	Street Name	Apt	Patient City	ZIP	Provider Name	Date Child was Added to List	Date New Test Added	Status
PHI	5	V	PHI											GENESEE COMMUNITY HLTH	PHI		Not Due
	8	V												HURLEY MEDICAL CENTER			Retest Due
	27	V												HURLEY MEDICAL CENTER			Retest Due
	5	V												HURLEY MEDICAL CENTER			Retest Due
	5	C												KIRBY, MICHAEL, MD			Needs Confirm
	9	V												HURLEY MEDICAL CENTER			Retest Due
	6	V												HURLEY MEDICAL CENTER			Retest Due
	5	C												GENESEE CO HEALTH DEPT SA			Needs Confirm
	7	V												HURLEY MEDICAL CENTER			Retest Due
	8	C												GENESEE CO HEALTH DEPT SA			Needs Confirm
	6	C												GENESEE CO HEALTH DEPT SA			Needs Confirm
	8	V												HURLEY MEDICAL CENTER			Retest Due
	5	C												GENESEE CO HEALTH DEPT SA			Needs Confirm
	5	C												GENESEE CO HEALTH DEPT SA			Needs Confirm
	5	C												HURLEY MEDICAL CENTER			Needs Confirm
	5	V												STOKER, JOHN, L, DO			Retest Due
	23	V												HURLEY MEDICAL CENTER			Retest Due
	12	C												GENESEE CO HEALTH DEPT SA			Needs Confirm
	8	V												HURLEY MEDICAL CENTER			Retest Due
	10	C												PRIME PEDS & ADOLESCENT			Needs Confirm
	6	C												GENESEE CO HEALTH DEPT SA			Needs Confirm
	5	V												HURLEY MEDICAL CENTER			Retest Due
	25	V												HURLEY MEDICAL CENTER			Retest Due
	5	V												HURLEY MEDICAL CENTER			Retest Due
	5	V												HURLEY MEDICAL CENTER			Retest Due
	5	C												GENESEE CO HEALTH DEPT SA			Needs Confirm
	6	V												PEDIATRIC ADOLESCENT CARI			Retest Due
	3	V												HURLEY MEDICAL CENTER			Low
	5	V												HURLEY MEDICAL CENTER			Retest Due
	6	C												GENESEE CO HEALTH DEPT SA			Needs Confirm
	5	V												HURLEY MEDICAL CENTER			Retest Due
	16	V												HURLEY MEDICAL CENTER			Not Due
	5	C												GENESEE CO HEALTH DEPT SA			Needs Confirm
	5	V												HURLEY MEDICAL CENTER			Retest Due
	5	C												GENESEE CO HEALTH DEPT SA			Needs Confirm
	5	V												HURLEY MEDICAL CENTER			Retest Due
	5	V												HURLEY MEDICAL CENTER			Retest Due
	7	C												GENESEE CO HEALTH DEPT SA			Needs Confirm
	2	V												HURLEY MEDICAL CENTER			Low
	6	C												MCLAREN OAKLAND LAKE OR			Needs Confirm

SUMMARY:

# of children needing confirmation (BLL 5-14):	76
# of children needing confirmation (BLL >= 15):	0
# of confirmed cases needing retesting (BLL 5-14):	65
# of confirmed cases needing retesting (BLL>= 15):	6
# of confirmed cases, not currently due for retest:	6
# of children with most recent BLL <5:	3

From: Scott, Robert L. (DHHS)
Sent: Wednesday, November 25, 2015 1:01 PM
To: McKane, Patricia (DHHS)
Subject: RE: Blood Lead Testing Report through 13Nov2015

Thanks!

From: McKane, Patricia (DHHS)
Sent: Wednesday, November 25, 2015 11:45 AM
To: Scott, Robert L. (DHHS) <ScottR9@michigan.gov>
Subject: Fwd: Blood Lead Testing Report through 13Nov2015

Sent from my iPhone

Begin forwarded message:

> **From:** "Dykema, Linda D. (DHHS)" <DykemaL@michigan.gov>
> **Date:** November 24, 2015 at 9:39:28 AM EST
> **To:** "Miller, Corinne (DHHS)" <MillerC39@michigan.gov>, "Wells, Eden (DHHS)" <WellsE3@michigan.gov>, "Moran, Susan (DHHS)" <MoranS@michigan.gov>
> **Cc:** "Eisner, Jennifer (DHHS)" <EisnerJ@michigan.gov>, "McKane, Patricia (DHHS)" <McKaneP@michigan.gov>
> **Subject: Blood Lead Testing Report through 13Nov2015**
>
> Attached is the blood lead testing report through November 13, 2015 with updated Oct 1 to Oct 31 counts, Nov 1 to Nov 13 counts added, and summary text revised.

From: Scott, Robert L. (DHHS)
Sent: Monday, November 30, 2015 2:20 PM
To: 'Genesee'
Subject: summary

# of children needing confirmation (BLL 5-14): 89
# of children needing confirmation (BLL >= 15): 1
# of confirmed cases needing retesting (BLL 5-14): 65
# of confirmed cases needing retesting (BLL>= 15): 7
# of confirmed cases, not currently due for retest: 8
# of children with most recent BLL <5: 11
Total: 181

Robert L. Scott
Childhood Lead Poisoning Prevention Program
Michigan Department of Health & Human Services
(517) 335-8178
fax (517) 335-8509

From: Scott, Robert L. (DHHS)
Sent: Friday, December 04, 2015 8:53 AM
To: 'Genesee'
Cc: Noble, Kim
Subject: 2014 lead
Attachments: 2014 FundedCommunities 072315.xlsx; 2014 Lead Testing and EBLL 0-5 072015.xlsx; 2014 Lead Testing and EBLL 1-2 072015.xlsx

Robert L. Scott
Childhood Lead Poisoning Prevention Program
Michigan Department of Health & Human Services
(517) 335-8178
fax (517) 335-8509

	A	B	C	D
1	**Children Tested for Lead Poisoning -- Calendar Year 2014**			
2	**Communities Receiving Funding for Lead Poisoning Prevention in FY15**			
3				
4	**Children less than Six Years of Age**			
5				
6				
7	Community	%Pre-1950 Housing	%Pre-1978 Housing	Children less than Six Years of Age
8	Detroit	62.2	93.3	59,755
9	Flint	38.0	89.7	9,639
10	Grand Rapids	48.1	81.5	17,577
11	Hamtramck	78.2	94.6	2,303
12	Highland Park	68.8	87.9	711
13	Jackson	67.6	91.6	3,550
14	Lansing	35.7	81.9	10,236
15	Muskegon/MuskHts	48.6	84.4	4,392
16				
17	Subtotal	53.5	88.4	108,163
18				
19	Michigan	24.7	64.8	710,976
20				
21				
22				
23	**Children One and Two Years of Age**			
24				
25				
26	Community	%Pre-1950 Housing	%Pre-1978 Housing	Children One and Two Years of Age
27	Detroit	62.2	93.3	20,048
28	Flint	38.0	89.7	3,266
29	Grand Rapids	48.1	81.5	5,962
30	Hamtramck	78.2	94.6	756
31	Highland Park	68.8	87.9	214
32	Jackson	67.6	91.6	1,204
33	Lansing	35.7	81.9	3,523

	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
1																
2																
3																
4																
5																
6	Children Tested			Children Tested, by Highest Blood Lead Level (BLL)												
7	Number of Children Tested	% Tested		<5 ug/dL		5 to 9 ug/dL, not confirmed by venous	>= 10 ug/dL, not confirmed by venous		Confirmed 5-9 ug/dL (venous only)	Confirmed 10-14 ug/dL (venous only)	Confirmed 15-44 ug/dL (venous only)	Confirmed ≥45 ug/dL (venous only)		Total confirmed ≥ 5 µg/dL	% with confirmed BLL >= 5 ug/dL	
8	22,842	38.2		20,966		279	51		1,183	214	145	4		1,546	6.8	
9	2,343	24.3		2,237		43	5		45	8	5	0		58	2.5	
10	4,379	24.9		4,020		237	7		74	20	21	0		115	2.6	
11	1,008	43.8		929		25	3		42	6	3	0		51	5.1	
12	289	40.6		243		4	1		28	9	4	0		41	14.2	
13	1,069	30.1		976		63	11		15	1	3	0		19	1.8	
14	2,995	29.3		2,892		68	4		17	10	4	0		31	1.0	
15	1,177	26.8		1,054		47	8		53	9	6	0		68	5.8	
16																
17	36,102	33.4		33,317		766	90		1,457	277	191	4		1,925	5.3	
18																
19	143,123	20.1		136,152		2,119	212		2,050	387	277	8		2,722	1.9	
20																
21																
22																
23																
24																
25	Children Tested			Children Tested, by Highest Blood Lead Level (BLL)												
26	Number of Children Tested	% Tested		<5 ug/dL		5 to 9 ug/dL, not confirmed by venous	>= 10 ug/dL, not confirmed by venous		Confirmed 5-9 ug/dL (venous only)	Confirmed 10-14 ug/dL (venous only)	Confirmed 15-44 ug/dL (venous only)	Confirmed ≥45 ug/dL (venous only)		Total confirmed ≥ 5 µg/dL	% with confirmed BLL >= 5 ug/dL	
27	9,641	48.1		8,674		160	25		577	115	88	0		780	8.1	
28	1,502	46.0		1,431		31	5		27	5	3	0		35	2.3	
29	3,464	58.1		3,180		195	5		51	16	17	0		84	2.4	
30	455	60.2		409		14	3		23	4	2	0		29	6.4	
31	127	59.3		102		3	0		17	3	2	0		22	17.3	
32	740	61.5		666		53	7		12	0	2	0		14	1.9	
33	1,751	49.7		1,689		41	4		9	6	2	0		17	1.0	

	U	V
1		
2		
3		
4		
5		
6		
7	Total ≥ 5 µg/dL, confirmed & unconfirmed*	% with BLL >= 5 ug/dL, confirmed & unconfirmed*
8	1,876	8.2
9	106	4.5
10	359	8.2
11	79	7.8
12	46	15.9
13	93	8.7
14	103	3.4
15	123	10.5
16		
17	2,785	7.7
18		
19	5,053	3.5
20		
21		
22		
23		
24		
25		
26	Total ≥ 5 µg/dL, confirmed & unconfirmed*	% with BLL >= 5 ug/dL, confirmed & unconfirmed*
27	965	10.0
28	71	4.7
29	284	8.2
30	46	10.1
31	25	19.7
32	74	10.0
33	62	3.5

	A	B	C	D
34	Muskegon/MuskHts	48.6	84.4	1,497
35				
36	Subtotal	53.5	88.4	36,470
37				
38	Michigan	24.7	64.8	234,103
39				
40				
41	*These columns are included for comparison with previous years' data			
42	Sources: US Census Bureau, Census 2010 (Pre-1950 Housing & Pre-1978 Housing) and American Community Survey 2013 5-year estimates (Community populations); MDCH Data Warehouse (children tested)			

	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
34	705	47.1		622		29	5		36	7	6	0		49	7.0	
35																
36	18,385	50.4		16,773		526	54		752	156	122	0		1,030	5.6	
37																
38	87,917	37.6		84,776		1,469	139		1,122	230	179	2		1,533	1.8	
39																
40																
41																
42																

	U	V
34	83	11.8
35		
36	1,610	8.8
37		
38	3,141	3.6
39		
40		
41		
42		7/23/2015

	A	B	C	D
1	**Children Tested for Lead Poisoning -- Calendar Year 2014**			
2	**All Counties in Michigan**			
3				
4	**Children less than Six Years of Age**			
5				
6				
7	County	%Pre-1950 Housing	%Pre-1978 Housing	Children less than Six Years of Age
8	Alcona	12.4	61.5	398
9	Alger	29.5	64.1	427
10	Allegan	23.2	51.1	8,806
11	Alpena	25.3	71.6	1,758
12	Antrim	18.8	52.6	1,370
13	Arenac	19.8	58.2	870
14	Baraga	34.0	71.7	477
15	Barry	27.1	57.3	4,143
16	Bay	33.9	75.6	7,322
17	Benzie	18.6	46.3	1,041
18	Berrien	28.6	72.2	11,681
19	Branch	30.9	65.3	3,506
20	Calhoun	36.1	75.3	10,149
21	Cass	22.4	59.9	3,444
22	Charlevoix	25.3	54.4	1,624
23	Cheboygan	20.9	53.5	1,414
24	Chippewa	25.1	58.6	2,345
25	Clare	14.5	58.8	2,083
26	Clinton	22.5	52.8	5,140
27	Crawford	13.7	55.6	727
28	Delta	33.3	68.0	2,388
29	Dickinson	38.9	71.7	1,575
30	Eaton	20.4	56.4	7,356

	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
1																
2																
3																
4																
5																
6	Children Tested			Children Tested, by Highest Blood Lead Level (BLL)												
7	Number of Children Tested	% Tested		<5 ug/dL		5 to 9 ug/dL, not confirmed by venous	>= 10 ug/dL, not confirmed by venous		Confirmed 5-9 ug/dL (venous only)	Confirmed 10-14 ug/dL (venous only)	Confirmed 15-44 ug/dL (venous only)	Confirmed ≥45 ug/dL (venous only)		Total confirmed ≥ 5 µg/dL	% with confirmed BLL >= 5 ug/dL	
8	53	13.3		51		2	0		0	0	0	0		0	0.0	
9	92	21.5		90		1	0		0	1	0	0		1	1.1	
10	1,208	13.7		1,177		26	2		3	0	0	0		3	0.2	
11	257	14.6		248		7	1		1	0	0	0		1	0.4	
12	260	19.0		258		0	0		2	0	0	0		2	0.8	
13	186	21.4		185		1	0		0	0	0	0		0	0.0	
14	135	28.3		134		1	0		0	0	0	0		0	0.0	
15	491	11.9		468		19	0		3	1	0	0		4	0.8	
16	1,408	19.2		1,358		31	2		10	3	3	1		17	1.2	
17	268	25.7		266		2	0		0	0	0	0		0	0.0	
18	1,943	16.6		1,884		24	5		21	4	5	0		30	1.5	
19	668	19.1		645		18	1		1	3	0	0		4	0.6	
20	2,390	23.5		2,290		36	0		51	7	6	0		64	2.7	
21	426	12.4		414		7	1		3	1	0	0		4	0.9	
22	295	18.2		294		1	0		0	0	0	0		0	0.0	
23	286	20.2		279		6	0		1	0	0	0		1	0.3	
24	440	18.8		436		1	0		3	0	0	0		3	0.7	
25	446	21.4		442		4	0		0	0	0	0		0	0.0	
26	585	11.4		579		1	0		5	0	0	0		5	0.9	
27	85	11.7		84		1	0		0	0	0	0		0	0.0	
28	413	17.3		397		14	0		1	0	1	0		2	0.5	
29	318	20.2		317		0	0		1	0	0	0		1	0.3	
30	1,140	15.5		1,113		20	3		4	0	0	0		4	0.4	

	U	V
1		
2		
3		
4		
5		
6		
7	Total ≥ 5 µg/dL, confirmed & unconfirmed*	% with BLL >= 5 ug/dL, confirmed & unconfirmed*
8	2	3.8
9	2	2.2
10	31	2.6
11	9	3.5
12	2	0.8
13	1	0.5
14	1	0.7
15	23	4.7
16	50	3.6
17	2	0.7
18	59	3.0
19	23	3.4
20	100	4.2
21	12	2.8
22	1	0.3
23	7	2.4
24	4	0.9
25	4	0.9
26	6	1.0
27	1	1.2
28	16	3.9
29	1	0.3
30	27	2.4

	A	B	C	D
31	Emmet	23.0	48.3	2,042
32	Genesee	19.9	68.0	31,997
33	Gladwin	12.4	49.5	1,495
34	Gogebic	50.0	76.7	855
35	Grand Traverse	14.7	43.5	6,000
36	Gratiot	34.7	69.8	2,754
37	Hillsdale	36.5	63.2	3,283
38	Houghton	53.4	75.5	2,477
39	Huron	31.8	68.9	1,873
40	Ingham	24.9	68.2	19,248
41	Ionia	35.8	63.0	4,878
42	Iosco	12.7	65.6	1,233
43	Iron	44.1	72.1	573
44	Isabella	16.3	48.2	4,208
45	Jackson	33.0	67.9	11,296
46	Kalamazoo	22.5	62.6	18,588
47	Kalkaska	13.2	49.3	1,180
48	Kent	24.8	59.2	52,655
49	Keweenaw	46.9	77.6	115
50	Lake	12.5	52.6	585
51	Lapeer	20.4	52.9	5,687
52	Leelanau	17.9	46.5	1,111
53	Lenawee	33.6	67.2	6,911
54	Livingston	11.4	39.0	12,104
55	Luce	23.8	64.3	370
56	Mackinac	23.4	58.6	587
57	Macomb	9.3	59.1	57,878
58	Manistee	28.8	63.9	1,307
59	Marquette	27.9	69.4	4,029
60	Mason	32.1	64.6	1,864
61	Mecosta	18.2	53.4	2,520
62	Menominee	35.4	73.2	1,375

	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
31	362	17.7		362		0	0		0	0	0	0		0	0.0	
32	6,824	21.3		6,646		97	11		56	9	5	0		70	1.0	
33	291	19.5		291		0	0		0	0	0	0		0	0.0	
34	154	18.0		152		2	0		0	0	0	0		0	0.0	
35	1,371	22.9		1,359		6	3		3	0	0	0		3	0.2	
36	496	18.0		491		4	0		1	0	0	0		1	0.2	
37	814	24.8		795		14	2		3	0	0	0		3	0.4	
38	599	24.2		585		6	0		4	2	2	0		8	1.3	
39	393	21.0		381		9	0		2	1	0	0		3	0.8	
40	4,747	24.7		4,606		94	5		25	11	6	0		42	0.9	
41	843	17.3		816		20	2		4	0	1	0		5	0.6	
42	150	12.2		146		3	0		1	0	0	0		1	0.7	
43	138	24.1		135		3	0		0	0	0	0		0	0.0	
44	640	15.2		632		7	0		1	0	0	0		1	0.2	
45	2,757	24.4		2,602		107	14		27	3	4	0		34	1.2	
46	3,257	17.5		3,172		48	7		23	4	2	1		30	0.9	
47	217	18.4		216		1	0		0	0	0	0		0	0.0	
48	10,115	19.2		9,645		325	8		89	22	26	0		137	1.4	
49	25	21.7		23		2	0		0	0	0	0		0	0.0	
50	120	20.5		118		2	0		0	0	0	0		0	0.0	
51	919	16.2		890		22	3		3	0	1	0		4	0.4	
52	239	21.5		234		4	1		0	0	0	0		0	0.0	
53	1,196	17.3		1,074		78	16		21	3	4	0		28	2.3	
54	1,026	8.5		1,017		4	0		4	1	0	0		5	0.5	
55	88	23.8		88		0	0		0	0	0	0		0	0.0	
56	130	22.1		129		1	0		0	0	0	0		0	0.0	
57	9,525	16.5		9,397		73	6		38	2	7	2		49	0.5	
58	284	21.7		271		10	0		1	0	2	0		3	1.1	
59	471	11.7		458		3	2		8	0	0	0		8	1.7	
60	414	22.2		387		25	0		2	0	0	0		2	0.5	
61	316	12.5		314		0	0		0	0	2	0		2	0.6	
62	261	19.0		245		11	1		3	0	1	0		4	1.5	

	U	V
31	0	0.0
32	178	2.6
33	0	0.0
34	2	1.3
35	12	0.9
36	5	1.0
37	19	2.3
38	14	2.3
39	12	3.1
40	141	3.0
41	27	3.2
42	4	2.7
43	3	2.2
44	8	1.3
45	155	5.6
46	85	2.6
47	1	0.5
48	470	4.6
49	2	8.0
50	2	1.7
51	29	3.2
52	5	2.1
53	122	10.2
54	9	0.9
55	0	0.0
56	1	0.8
57	128	1.3
58	13	4.6
59	13	2.8
60	27	6.5
61	2	0.6
62	16	6.1

	A	B	C	D
63	Midland	15.2	58.7	5,685
64	Missaukee	21.2	56.2	1,111
65	Monroe	23.0	59.0	10,355
66	Montcalm	27.3	57.7	4,527
67	Montmorency	18.1	58.6	404
68	Muskegon	25.8	66.2	13,224
69	Newaygo	19.3	53.6	3,581
70	Oakland	14.7	60.5	83,501
71	Oceana	25.8	57.8	2,091
72	Ogemaw	12.8	61.6	1,289
73	Ontonagon	39.1	73.2	251
74	Osceola	22.6	56.6	1,723
75	Oscoda	17.8	62.1	521
76	Otsego	12.2	50.3	1,641
77	Ottawa	15.7	45.3	21,390
78	Presque Isle	21.1	66.3	597
79	Roscommon	13.1	58.7	1,156
80	Saginaw	28.1	73.1	14,029
81	Saint Clair	25.8	59.4	11,046
82	Saint Joseph	27.5	65.1	5,125
83	Sanilac	30.7	64.6	2,879
84	Schoolcraft	25.5	63.3	471
85	Shiawassee	33.9	68.2	4,622
86	Tuscola	30.2	67.4	3,579
87	Van Buren	23.3	58.1	5,884
88	Washtenaw	17.2	56.5	22,833
89	Wayne ex Det	22.6	74.5	82,002
90	Wexford	23.0	53.7	2,582
91	Detroit, City of	62.2	93.2	59,755
92	MICHIGAN	24.7	64.8	710,976
93				
94	*These columns are included for comparison with previous years' data			

	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
63	477	8.4		472		2	0		2	1	0	0		3	0.6	
64	133	12.0		132		0	0		0	1	0	0		1	0.8	
65	1,571	15.2		1,553		15	1		1	1	0	0		2	0.1	
66	748	16.5		735		6	0		5	1	1	0		7	0.9	
67	83	20.5		82		1	0		0	0	0	0		0	0.0	
68	2,572	19.4		2,415		66	13		62	10	6	0		78	3.0	
69	447	12.5		440		6	1		0	0	0	0		0	0.0	
70	14,308	17.1		14,102		94	8		71	20	13	0		104	0.7	
71	516	24.7		506		5	0		2	3	0	0		5	1.0	
72	102	7.9		101		0	0		1	0	0	0		1	1.0	
73	48	19.1		46		2	0		0	0	0	0		0	0.0	
74	334	19.4		324		4	0		2	2	2	0		6	1.8	
75	35	6.7		32		2	1		0	0	0	0		0	0.0	
76	325	19.8		324		1	0		0	0	0	0		0	0.0	
77	3,012	14.1		2,931		59	5		16	1	0	0		17	0.6	
78	111	18.6		109		2	0		0	0	0	0		0	0.0	
79	218	18.9		218		0	0		0	0	0	0		0	0.0	
80	3,670	26.2		3,548		76	8		25	7	6	0		38	1.0	
81	2,731	24.7		2,655		46	7		15	5	3	0		23	0.8	
82	1,012	19.7		971		27	4		7	2	1	0		10	1.0	
83	523	18.2		517		4	0		1	1	0	0		2	0.4	
84	99	21.0		98		0	0		1	0	0	0		1	1.0	
85	1,169	25.3		1,131		19	2		15	2	0	0		17	1.5	
86	886	24.8		874		10	0		0	2	0	0		2	0.2	
87	862	14.6		832		9	1		17	1	2	0		20	2.3	
88	2,604	11.4		2,572		15	2		10	2	3	0		15	0.6	
89	18,348	22.4		16,021		164	12		185	33	15	0		233	1.3	
90	362	14.0		359		1	0		0	0	2	0		2	0.6	
91	22,842	38.2		20,966		279	51		1,183	214	145	4		1,546	6.8	
92	143,123	20.1		136,152		2,119	212		2,050	387	277	8		2,722	1.9	
93																
94																

	U	V
63	5	1.0
64	1	0.8
65	18	1.1
66	13	1.7
67	1	1.2
68	157	6.1
69	7	1.6
70	206	1.4
71	10	1.9
72	1	1.0
73	2	4.2
74	10	3.0
75	3	8.6
76	1	0.3
77	81	2.7
78	2	1.8
79	0	0.0
80	122	3.3
81	76	2.8
82	41	4.1
83	6	1.1
84	1	1.0
85	38	3.3
86	12	1.4
87	30	3.5
88	32	1.2
89	409	2.2
90	3	0.8
91	1,876	8.2
92	5,053	3.5
93		
94		

	A	B	C	D
95				
96	July 20, 2015			
97	Sources: US Census Bureau, Census 2010 (Pre-1950 Housing and Pre-1978 Housing) and American Community Survey 2013 5-year estimates (Detroit and county populations);			
98	MDCH Data Warehouse (children tested)			

	A	B	C	D
1	**Children Tested for Lead Poisoning -- Calendar Year 2014**			
2	**All Counties in Michigan**			
3				
4	**Children One to Two Years of Age**			
5				
6				
7	County	%Pre-1950 Housing	%Pre-1978 Housing	Children One to Two Years of Age
8	Alcona	12.4	61.5	130
9	Alger	29.5	64.1	130
10	Allegan	23.2	51.1	2,888
11	Alpena	25.3	71.6	570
12	Antrim	18.8	52.6	450
13	Arenac	19.8	58.2	281
14	Baraga	34.0	71.7	165
15	Barry	27.1	57.3	1,328
16	Bay	33.9	75.6	2,410
17	Benzie	18.6	46.3	338
18	Berrien	28.6	72.2	3,855
19	Branch	30.9	65.3	1,157
20	Calhoun	36.1	75.3	3,366
21	Cass	22.4	59.9	1,120
22	Charlevoix	25.3	54.4	523
23	Cheboygan	20.9	53.5	457
24	Chippewa	25.1	58.6	775
25	Clare	14.5	58.8	700
26	Clinton	22.5	52.8	1,650
27	Crawford	13.7	55.6	237
28	Delta	33.3	68.0	782
29	Dickinson	38.9	71.7	529
30	Eaton	20.4	56.4	2,410

	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
1																	
2																	
3																	
4																	
5																	
6	Children Tested			Children Tested, by Highest Blood Lead Level (BLL)													
7	Number of Children Tested	% Tested		<5 ug/dL		5 to 9 ug/dL, not confirmed by venous	>= 10 ug/dL, not confirmed by venous		Confirmed 5-9 ug/dL (venous only)	Confirmed 10-14 ug/dL (venous only)	Confirmed 15-44 ug/dL (venous only)	Confirmed ≥45 ug/dL (venous only)		Total confirmed ≥ 5 µg/dL	% with confirmed BLL >= 5 ug/dL		Total ≥ 5 µg/dL, confirmed & unconfirmed*
8	43	33.1		41		2	0		0	0	0	0		0	0.0		2
9	76	58.5		74		1	0		0	1	0	0		1	1.3		2
10	872	30.2		848		19	2		3	0	0	0		3	0.3		24
11	218	38.2		210		7	0		1	0	0	0		1	0.5		8
12	191	42.4		189		0	0		2	0	0	0		2	1.0		2
13	136	48.4		135		1	0		0	0	0	0		0	0.0		1
14	91	55.2		91		0	0		0	0	0	0		0	0.0		0
15	387	29.1		371		13	0		2	1	0	0		3	0.8		16
16	1,233	51.2		1,195		24	2		8	3	1	0		12	1.0		38
17	178	52.7		176		2	0		0	0	0	0		0	0.0		2
18	1,602	41.6		1,554		22	5		14	3	4	0		21	1.3		48
19	239	20.7		232		6	0		0	1	0	0		1	0.4		7
20	1,317	39.1		1,257		17	1		35	4	3	0		42	3.2		60
21	364	32.5		353		7	1		2	1	0	0		3	0.8		11
22	213	40.7		212		1	0		0	0	0	0		0	0.0		1
23	214	46.8		209		5	0		0	0	0	0		0	0.0		5
24	268	34.6		265		1	0		2	0	0	0		2	0.7		3
25	359	51.3		355		4	0		0	0	0	0		0	0.0		4
26	342	20.7		338		1	0		3	0	0	0		3	0.9		4
27	67	28.3		66		1	0		0	0	0	0		0	0.0		1
28	351	44.9		335		14	0		1	0	1	0		2	0.6		16
29	288	54.4		287		0	0		1	0	0	0		1	0.3		1
30	772	32.0		753		13	3		3	0	0	0		3	0.4		19

	V
1	
2	
3	
4	
5	
6	
7	% with BLL >= 5 ug/dL, confirmed & unconfirmed*
8	4.7
9	2.6
10	2.8
11	3.7
12	1.0
13	0.7
14	0.0
15	4.1
16	3.1
17	1.1
18	3.0
19	2.9
20	4.6
21	3.0
22	0.5
23	2.3
24	1.1
25	1.1
26	1.2
27	1.5
28	4.6
29	0.3
30	2.5

	A	B	C	D
31	Emmet	23.0	48.3	656
32	Genesee	19.9	68.0	10,583
33	Gladwin	12.4	49.5	486
34	Gogebic	50.0	76.7	285
35	Grand Traverse	14.7	43.5	1,955
36	Gratiot	34.7	69.8	909
37	Hillsdale	36.5	63.2	1,079
38	Houghton	53.4	75.5	828
39	Huron	31.8	68.9	607
40	Ingham	24.9	68.2	6,426
41	Ionia	35.8	63.0	1,590
42	Iosco	12.7	65.6	397
43	Iron	44.1	72.1	193
44	Isabella	16.3	48.2	1,392
45	Jackson	33.0	67.9	3,716
46	Kalamazoo	22.5	62.6	6,166
47	Kalkaska	13.2	49.3	395
48	Kent	24.8	59.2	17,514
49	Keweenaw	46.9	77.6	39
50	Lake	12.5	52.6	192
51	Lapeer	20.4	52.9	1,780
52	Leelanau	17.9	46.5	350
53	Lenawee	33.6	67.2	2,248
54	Livingston	11.4	39.0	3,871
55	Luce	23.8	64.3	121
56	Mackinac	23.4	58.6	193
57	Macomb	9.3	59.1	19,051
58	Manistee	28.8	63.9	411
59	Marquette	27.9	69.4	1,364
60	Mason	32.1	64.6	620
61	Mecosta	18.2	53.4	851
62	Menominee	35.4	73.2	442

	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
31	266	40.5		266		0	0		0	0	0	0		0	0.0		0
32	4,326	40.9		4,207		68	9		34	5	3	0		42	1.0		119
33	193	39.7		193		0	0		0	0	0	0		0	0.0		0
34	117	41.1		115		2	0		0	0	0	0		0	0.0		2
35	893	45.7		887		3	1		2	0	0	0		2	0.2		6
36	359	39.5		356		2	0		1	0	0	0		1	0.3		3
37	395	36.6		384		6	2		3	0	0	0		3	0.8		11
38	505	61.0		493		4	0		4	2	2	0		8	1.6		12
39	229	37.7		220		8	0		1	0	0	0		1	0.4		9
40	2,832	44.1		2,749		56	5		14	6	2	0		22	0.8		83
41	628	39.5		604		18	2		3	0	1	0		4	0.6		24
42	124	31.2		121		3	0		0	0	0	0		0	0.0		3
43	120	62.2		118		2	0		0	0	0	0		0	0.0		2
44	462	33.2		458		3	0		1	0	0	0		1	0.2		4
45	2,021	54.4		1,900		87	8		21	2	3	0		26	1.3		121
46	1,889	30.6		1,838		26	4		16	3	1	1		21	1.1		51
47	138	34.9		137		1	0		0	0	0	0		0	0.0		1
48	8,193	46.8		7,816		267	6		64	19	21	0		104	1.3		377
49	21	53.8		19		2	0		0	0	0	0		0	0.0		2
50	87	45.3		86		1	0		0	0	0	0		0	0.0		1
51	705	39.6		680		21	2		1	0	1	0		2	0.3		25
52	169	48.3		165		3	1		0	0	0	0		0	0.0		4
53	688	30.6		613		51	6		13	2	3	0		18	2.6		75
54	750	19.4		741		4	0		4	1	0	0		5	0.7		9
55	79	65.3		79		0	0		0	0	0	0		0	0.0		0
56	113	58.5		112		1	0		0	0	0	0		0	0.0		1
57	6,156	32.3		6,075		47	5		23	2	3	1		29	0.5		81
58	247	60.1		235		9	0		1	0	2	0		3	1.2		12
59	414	30.4		402		3	2		7	0	0	0		7	1.7		12
60	111	17.9		106		4	0		1	0	0	0		1	0.9		5
61	279	32.8		277		0	0		0	1	1	0		2	0.7		2
62	219	49.5		203		11	1		3	0	1	0		4	1.8		16

	V
31	0.0
32	2.8
33	0.0
34	1.7
35	0.7
36	0.8
37	2.8
38	2.4
39	3.9
40	2.9
41	3.8
42	2.4
43	1.7
44	0.9
45	6.0
46	2.7
47	0.7
48	4.6
49	9.5
50	1.1
51	3.5
52	2.4
53	10.9
54	1.2
55	0.0
56	0.9
57	1.3
58	4.9
59	2.9
60	4.5
61	0.7
62	7.3

	A	B	C	D
63	Midland	15.2	58.7	1,842
64	Missaukee	21.2	56.2	359
65	Monroe	23.0	59.0	3,378
66	Montcalm	27.3	57.7	1,493
67	Montmorency	18.1	58.6	131
68	Muskegon	25.8	66.2	4,384
69	Newaygo	19.3	53.6	1,172
70	Oakland	14.7	60.5	27,292
71	Oceana	25.8	57.8	685
72	Ogemaw	12.8	61.6	413
73	Ontonagon	39.1	73.2	82
74	Osceola	22.6	56.6	564
75	Oscoda	17.8	62.1	168
76	Otsego	12.2	50.3	540
77	Ottawa	15.7	45.3	7,046
78	Presque Isle	21.1	66.3	193
79	Roscommon	13.1	58.7	379
80	Saginaw	28.1	73.1	4,623
81	Saint Clair	25.8	59.4	3,574
82	Saint Joseph	27.5	65.1	1,684
83	Sanilac	30.7	64.6	949
84	Schoolcraft	25.5	63.3	151
85	Shiawassee	33.9	68.2	1,503
86	Tuscola	30.2	67.4	1,174
87	Van Buren	23.3	58.1	1,924
88	Washtenaw	17.2	56.5	7,560
89	Wayne ex Det	22.6	74.5	26,966
90	Wexford	23.0	53.7	865
91	Detroit, City of	62.2	93.2	20,048
92	MICHIGAN	24.7	64.8	234,103
93				
94	*These columns are included for comparison with previous years' data			

	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
63	297	16.1		295		1	0		1	0	0	0		1	0.3		2
64	113	31.5		112		0	0		0	1	0	0		1	0.9		1
65	1,158	34.3		1,143		12	1		1	1	0	0		2	0.2		15
66	494	33.1		484		4	0		4	1	1	0		6	1.2		10
67	64	48.9		63		1	0		0	0	0	0		0	0.0		1
68	1,652	37.7		1,546		44	9		40	7	6	0		53	3.2		106
69	395	33.7		388		6	1		0	0	0	0		0	0.0		7
70	7,882	28.9		7,759		61	7		38	9	8	0		55	0.7		123
71	276	40.3		271		3	0		1	1	0	0		2	0.7		5
72	81	19.6		80		0	0		1	0	0	0		1	1.2		1
73	31	37.8		29		2	0		0	0	0	0		0	0.0		2
74	260	46.1		251		3	0		2	3	1	0		6	2.3		9
75	18	10.7		16		2	0		0	0	0	0		0	0.0		2
76	197	36.5		197		0	0		0	0	0	0		0	0.0		0
77	2,576	36.6		2,507		51	5		12	1	0	0		13	0.5		69
78	89	46.1		87		2	0		0	0	0	0		0	0.0		2
79	172	45.4		172		0	0		0	0	0	0		0	0.0		0
80	2,756	59.6		2,670		54	5		17	5	5	0		27	1.0		86
81	1,333	37.3		1,296		24	3		5	3	2	0		10	0.8		37
82	691	41.0		665		18	3		2	2	1	0		5	0.7		26
83	291	30.7		286		4	0		0	1	0	0		1	0.3		5
84	80	53.0		80		0	0		0	0	0	0		0	0.0		0
85	749	49.8		718		16	2		11	2	0	0		13	1.7		31
86	650	55.4		639		10	0		0	1	0	0		1	0.2		11
87	507	26.4		490		6	1		8	0	2	0		10	2.0		17
88	1,834	24.3		1,809		10	2		8	2	3	0		13	0.7		25
89	9,769	36.2		9,539		100	7		100	18	7	0		125	1.3		232
90	312	36.1		309		1	0		0	0	2	0		2	0.6		3
91	9,641	48.1		8,674		160	25		577	115	88	0		780	8.1		965
92	87,917	37.6		84,776		1,469	139		1,122	230	179	2		1,533	1.7		3,141
93																	
94																	

	V
63	0.7
64	0.9
65	1.3
66	2.0
67	1.6
68	6.4
69	1.8
70	1.6
71	1.8
72	1.2
73	6.5
74	3.5
75	11.1
76	0.0
77	2.7
78	2.2
79	0.0
80	3.1
81	2.8
82	3.8
83	1.7
84	0.0
85	4.1
86	1.7
87	3.4
88	1.4
89	2.4
90	1.0
91	10.0
92	3.6
93	
94	

	A	B	C	D
95				
96	July 20, 2015			
97	Sources: US Census Bureau, Census 2010 (Pre-1950 Housing and Pre-1978 Housing) and American Community Survey 2013 5-year estimates (Detroit and county populations);			
98	MDCH Data Warehouse (children tested)			

From: Scott, Robert L. (DHHS)
Sent: Thursday, December 10, 2015 1:04 PM
To: Taylor, Sherry
Subject: RE: 2014 lead

OK, I'll have to run it by my supervisor.

From: Taylor, Sherry [mailto:STAYLOR@gchd.us]
Sent: Thursday, December 10, 2015 12:42 PM
To: Scott, Robert L. (DHHS) <ScottR9@michigan.gov>
Subject: RE: 2014 lead

The map is going to be used in a Presentation that Toni is giving to a community partner, CHAP. So yes it is an audience outside of the health dept.

Sherry Taylor, RN, BSN
Public Health Nurse Coordinator
Genesee County Health Department
G-3373 S. Saginaw Street
Flint, MI 48529
Telephone: 810- 257-3833
Fax: 810- 237-4612

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From: Scott, Robert L. (DHHS) [mailto:ScottR9@michigan.gov]
Sent: Thursday, December 10, 2015 12:03 PM
To: Taylor, Sherry
Subject: RE: 2014 lead

Sherry,

Can you tell me what the map will be used for? If it will stay internal to GCHD, no problem. But if you're planning to display it to an outside audience, there may be a problem regarding confidentiality. (Even though the map will be similar to last year's, there is more and more attention to what goes out these days.)

Thanks,
Bob

From: Taylor, Sherry [mailto:STAYLOR@gchd.us]
Sent: Thursday, December 10, 2015 11:12 AM

To: Scott, Robert L. (DHHS) <ScottR9@michigan.gov>
Subject: RE: 2014 lead

Thanks

Sherry Taylor, RN, BSN
Public Health Nurse Coordinator
Genesee County Health Department
G-3373 S. Saginaw Street
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From: Scott, Robert L. (DHHS) [mailto:ScottR9@michigan.gov]
Sent: Thursday, December 10, 2015 9:17 AM
To: Taylor, Sherry
Cc: Noble, Kim
Subject: RE: 2014 lead

Sherry,

I'll try to get it done today. Otherwise it'll be Monday, as I'm out tomorrow.

Bob

From: Taylor, Sherry [mailto:STAYLOR@gchd.us]
Sent: Thursday, December 10, 2015 8:52 AM
To: Scott, Robert L. (DHHS) <ScottR9@michigan.gov>
Cc: Noble, Kim <knoble@gchd.us>
Subject: FW: 2014 lead

Hello Bob,

This is just a friendly reminder. Will we be able to get the updated map this week?

Sherry Taylor, RN, BSN
Public Health Nurse Coordinator
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G-3373 S. Saginaw Street
Flint, MI 48529
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From: Taylor, Sherry
Sent: Friday, December 04, 2015 12:51 PM
To: 'Scott, Robert L. (DHHS)'
Subject: RE: 2014 lead

Yes that would be great! Thank you

Sherry Taylor, RN, BSN
Public Health Nurse Coordinator
Genesee County Health Department
G-3373 S. Saginaw Street
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Telephone: 810- 257-3833
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From: Scott, Robert L. (DHHS) [mailto:ScottR9@michigan.gov]
Sent: Friday, December 04, 2015 11:06 AM
To: Taylor, Sherry
Subject: RE: 2014 lead

No, I don't have an update, but I can do it. The 2009-2013 covers five years. Do you want the update to show 2010-2014, to keep the five-year thing?

From: Taylor, Sherry [mailto:STAYLOR@gchd.us]
Sent: Friday, December 04, 2015 10:44 AM
To: Scott, Robert L. (DHHS) <ScottR9@michigan.gov>
Subject: RE: 2014 lead

Thank you Bob,

This is just what I was looking for! Do you happen to have an update of the map of kids tested in Flint area with elevated blood lead levels from 2009 to 2013? It is not something we need today. It is dated 7/23/2014

Thank you

Sherry Taylor, RN, BSN
Public Health Nurse Coordinator
Genesee County Health Department
G-3373 S. Saginaw Street

Flint, MI 48529
Telephone: 810- 257-3833
Fax: 810- 237-4612

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From: Scott, Robert L. (DHHS) [mailto:ScottR9@michigan.gov]
Sent: Friday, December 04, 2015 8:53 AM
To: Taylor, Sherry
Cc: Noble, Kim
Subject: 2014 lead

Robert L. Scott
Childhood Lead Poisoning Prevention Program
Michigan Department of Health & Human Services
(517) 335-8178
fax (517) 335-8509

From: Scott, Robert L. (DHHS)
Sent: Monday, December 14, 2015 5:32 PM
To: Stanbury, Martha (DHHS);Peeler, Nancy (DHHS);Lishinski Karen (LishinskiK@michigan.gov);Wisinski, Courtney (DHHS)
Subject: Flint list
Attachments: Flint EBLL List for GCHD 121415.xlsx

Please see attached. I did not cut out any columns this time, just sent them the whole shebang. Please note there are two tabs.

Robert L. Scott
Childhood Lead Poisoning Prevention Program
Michigan Department of Health & Human Services
(517) 335-8178
fax (517) 335-8509

Children in PHI with Elevated Blood Lead Levels

Last Updated 12/14/2015

PHI PHI PHI PHI PHI PHI

HHLPSS ID	Child ID	Most Recent Specimen Date	Most Recent PB Result	Most Recent Sample Type	Last Name	First Name	Date of Birth	Guardian Last Name	Guardian First Name	Phone	Original House Number	Original Street Name	Original Apt	Original Patient City	Original Zip	Original Case Number (address)	Most Recent House Number	Most Recent Street Name	MR Apt	Most Recent Patient City	MR ZIP	MR Case Number (address)	Re-located	Provider Name	Date Child was Added to List	Date New Test Added	Retesting Status	Child Category	Original Specimen Date	Original Pb Result	Original Sample Type	Status Code	PHN Assigned	1st phone call	2nd phone call	3rd phone call	Contact Successful	Date Letter Mailed or Delivered	Water Filter Initially	Water Filter Delivered	PCP Follow up	First Home Visit to Open for CM	Medicaid Form Sent to Accounting - First	Second Home Visit	Medicaid Form Sent to Accounting - Second	Dropby Visit One	Dropby Visit Two	Certified Letter	Case Closed Date	Case Closed Reason
			5	C																				HURLEY MEDICAL CENTER			Needs Confirm	April14-Sept15				1	KN	11/6/2015	11/9/2015	12/4/2015	YES	12/4/2015	YES	NA										
			6	C																				GRAND BLANC PEDIATRIC CLINIC			Needs Confirm	April14-Sept15				1	KN	11/6/2015	11/9/2015	12/4/2015	UTR	12/4/2015	UTR	NA										
			6	C																				GENESEE CO HEALTH DEPT SAGINAW			Needs Confirm	April14-Sept15				1	KN	11/6/2015	NA	NA	YES	11/13/2015	NO	11/13/2015										
			5	C																				KINRA, NARESH, MD			Needs Confirm	April14-Sept15				1	KN	12/11/2015																
			5	C																				GENESEE CO HEALTH DEPT SAGINAW			Needs Confirm	April14-Sept15				1	KN	11/6/2015	NA	NA	UTR	11/18/2015	UTR	NA										
			5	C																				THE CHILDRENS OFFICE			Needs Confirm	April14-Sept15				1	KN	NA	NA	NA	UTR	11/9/2015	UTR	NA										
			6	C																				GENESEE CO HEALTH DEPT SAGINAW			Needs Confirm	Oct15toDate				1	ST	11/4/2015	12/7/2015	N/A		11/4/2015	YES											
			7	C																				GENESEE CO HEALTH DEPT SAGINAW			Needs Confirm	April14-Sept15				1	KN	11/9/2015	12/4/2015	NA	YES	12/7/2015	NO	12/7/2015										
			10	C																				GENESEE CO HEALTH DEPT SAGINAW			Needs Confirm	Oct15toDate				1	ST	10/21/2015	11/2/2015	NA	UTR	Address unk												
			6	C																				GENESEE CO HEALTH DEPT SAGINAW			Needs Confirm	April14-Sept15				1	ST	10/21/2015	11/2/2015	NA	UTR	Address unk												
			8	C																				GENESEE CO HEALTH DEPT SAGINAW			Needs Confirm	April14-Sept15				1	KN	11/6/2015	11/6/2015	11/16/2015	YES	11/20/2015	NO	11/20/2015										
			6	C																				HURLEY MEDICAL CENTER			Needs Confirm	April14-Sept15				1	KN	11/9/2015	NA	NA	YES	11/13/2015	NO	11/13/2015										
			6	C																				HURLEY MEDICAL CENTER			Needs Confirm	April14-Sept15				1	KN	11/9/2015	12/4/2015															
			14	C																				HURLEY MEDICAL CENTER			Needs Confirm	April14-Sept15				1	KN	11/18/2015	12/2/2015	12/9/2015	UTR	12/9/2015	UTR	NA										
			5	C																				GENESEE CO HEALTH DEPT SAGINAW			Needs Confirm	Oct15toDate				1	KN	NA	NA	NA	NA	11/18/2015	NA	NA										
			12	C																				HASAN, KAMAL, DR			Needs Confirm	April14-Sept15				1	KN	11/18/2015	NA	NA	YES	11/18/2015	YES	NA										
			8	C																				GENESEE CO HEALTH DEPT SAGINAW			Needs Confirm	April14-Sept15				1	KN	11/9/2015	12/4/2015	NA	UTR	12/4/2015	UTR	NO										
			5	C																				GENESEE CO HEALTH DEPT SAGINAW			Needs Confirm	April14-Sept15				1	KN	11/9/2015	11/20/2015	NA	YES	11/25/2015	NO	NO										
			7	C																				HURLEY MEDICAL CENTER			Needs Confirm	April14-Sept15				1	KN	11/9/2015	12/9/2015															
			5	C																				GENESEE CO HEALTH DEPT SAGINAW			Needs Confirm	April14-Sept15				1	KN	11/9/2015	NA	NA	YES	11/9/2015	YES	NA										
			8	C																				GENESEE CO HEALTH DEPT SAGINAW			Needs Confirm	April14-Sept15				1	KN	11/9/2015	NA	NA	YES	11/13/2015	NO	11/13/2015										
			6	C																				GENESEE CO HEALTH DEPT SAGINAW			Needs Confirm	April14-Sept15				1	KN	11/9/2015	12/9/2015	12/9/2015	YES	12/9/2015	NO	12/9/2015										
			9	C																				GENESEE CO HEALTH DEPT SAGINAW			Needs Confirm	April14-Sept15				1	KN	11/9/2015	NA	NA	YES	11/13/2015	NO	11/13/2015										
			5	C																				GENESEE CO HEALTH DEPT SAGINAW			Needs Confirm	April14-Sept15				1	KN	11/9/2015	NA	NA	YES	11/9/2015	Has well	NO										
			5																					MCLAREN MEDICAL LAB			Needs Confirm	Oct15toDate				1	KN	11/19/2015	NA	NA	YES	11/19/2015	YES	NA										
			5	C																				GENESEE CO HEALTH DEPT SAGINAW			Needs Confirm	April14-Sept15				1	KN	11/6/2015	12/4/2015	12/9/2015	UTR	12/9/2015	UTR	NA										
			5	C																				PRIME PEDS & ADOLESCENT			Needs Confirm	April14-Sept15				1	KN	11/6/2015	12/4/2015	NA	UTR	12/4/2015	UTR	NA										
			5	C																				GENESEE CO HEALTH DEPT SAGINAW			Needs Confirm	April14-Sept15				1	KN	11/6/2015	12/4/2015															
			5	C																				HURLEY MEDICAL CENTER			Needs Confirm	April14-Sept15				1	KN	11/6/2015	12/4/2015	NA	UTR	12/4/2015	UTR	NA										
			5	C																				HURLEY MEDICAL CENTER			Needs Confirm	April14-Sept15				1	JW	11/6/2015	12/4/2015	12/9/2015	YES	12/11/2015	NO	will P/U @ WIC										
			7	C																				HURLEY MEDICAL CENTER			Needs Confirm	April14-Sept15				1	JW	11/6/2015	12/4/2015	12/9/2015	YES	12/11/2015	NO	will P/U @ WIC										
			7	C																				GENESEE CO HEALTH DEPT SAGINAW			Needs Confirm	April14-Sept15				1	KN	11/6/2015	12/4/2015	NA	UTR	12/4/2015	UTR	NA										
			7	C																				GENESEE CO HEALTH DEPT SAGINAW			Needs Confirm	April14-Sept15				1	KN	11/9/2015	12/4/2015	NA	YES	12/7/2015	NO	12/7/2015										
			6	C																				GENESEE CO HEALTH DEPT SAGINAW			Needs Confirm	April14-Sept15				1	KN	11/9/2015	NA	NA	YES	11/9/2015	YES	NA										
			9	C																				GENESEE CO HEALTH DEPT SAGINAW			Needs Confirm	Oct15toDate				1	ST	11/16/2015	NA	NA	YES	11/16/2015	NO	11/19/2015										
			5	C																				GENESEE CO HEALTH DEPT SAGINAW			Needs Confirm	April14-Sept15				1	KN	11/6/2015	12/7/2015	NA	UTR	12/7/2015	UTR	NA										
			5	C																				GRAND BLANC PEDIATRIC CLINIC			Needs Confirm	April14-Sept15				1	KN	11/9/2015	11/9/2015	NA	YES	11/9/2015	YES	NA										
			6	C																				GENESEE CO HEALTH DEPT SAGINAW			Needs Confirm	April14-Sept15				1	KN	11/6/2015	12/7/2015	12/10/2015	UTR	12/10/2015	UTR	NA										
			11	C																				HASAN, KAMAL, DR			Needs Confirm	April14-Sept15				1	KN	11/19/2015	11/19/2015	NA	YES	11/19/2015	NO	11/20/2015										
			5	C																				GENESEE CO HEALTH DEPT SAGINAW			Needs Confirm	April14-Sept15				1	KN	11/6/2015	12/7/2015	NA	UTR	12/7/2015	UTR	NA										
			5	C																				HASAN, KAMAL, DR			Needs Confirm	Oct15toDate				1	KN	11/6/2015	12/7/2015	NA	YES	12/7/2015	YES	NA										
			9	C																				HASAN, KAMAL, DR			Needs Confirm	Oct15toDate				1	KN	11/6/2015	12/7/2015	NA	YES	12/7/2015	YES	NA										
			8	C																				GENESEE CO HEALTH DEPT SAGINAW			Needs Confirm	April14-Sept15				1	KN	11/9/2015	12/7/2015	NA	UTR	12/7/2015	UTR	NA										
			5	C																				GENESEE CO HEALTH DEPT SAGINAW			Needs Confirm	April14-Sept15				1	KN	11/9/2015	11/9/2015	NA	YES	11/13/2015	NO	11/13/2015										
			5	C																				GENESEE CO HEALTH DEPT SAGINAW			Needs Confirm	Oct15toDate				1	KN	11/9/2015	NA	NA	YES	11/9/2015	YES	NA										
			5	C																				HASAN, KAMAL, DR			Needs Confirm	April14-Sept15				1	KN	11/9/2015	12/7/2015															
			5	C																				GENESEE CO HEALTH DEPT SAGINAW			Needs Confirm	April14-Sept15				1	KN	11/9/2015	NA	NA	YES	11/9/2015	YES	NA										
			6	C																				GENESEE CO HEALTH DEPT SAGINAW			Needs Confirm	April14-Sept15				1	KN	11/13/2015	12/7/2015															
			12	C																				GENESEE CO HEALTH DEPT SAGINAW			Needs Confirm	April14-Sept15				1	KN	11/16/2015	NA	NA	UTR	Returned	UTR	NA										
			14	C																				HURLEY MEDICAL CENTER			Needs Confirm	April14-Sept15				1	KN	11/16/2015	12/7/2015	NA	YES	12/7/2015	YES	NA										
			5	C																				IMPERIAL, ALICIA F, MD -LINDEN			Needs Confirm	April14-Sept15				1	JW	11/16/2015	12/10/2015	NA	YES	11/16/2015	YES	NA										
			6	C																				GENESEE CO HEALTH DEPT SAGINAW			Needs Confirm	April14-Sept15				1	JW	11/16/2015	12/10/2015	NA	YES	11/16/2015 & 12/10/2015	NO states does not have Flint h2o	NO										
			12	C																				HURLEY MEDICAL CENTER			Needs Confirm	April14-Sept15				1	KN	11/16/2015	12/8/2015															
			5	C																				GENESEE CO HEALTH DEPT SAGINAW			Needs Confirm	April14-Sept15				1	KN	11/16/2015	12/8/2015	NA	YES	12/8/2015	Moved to Mount Morris	NA										
			5	C																				HURLEY MEDICAL CENTER			Needs Confirm	April14-Sept15				1	KN	11/16/2015	NA	NA	YES	11/20/2015	YES	NA										
			7	C																				HURLEY MEDICAL CENTER			Needs Confirm	April14-Sept15				1	KN	11/16/2015	12/8/2015	NA	YES	12/8/2015	YES	NA										
			5	C																				GENESEE CO HEALTH DEPT SAGINAW			Needs Confirm	April14-Sept15				1	KN	11/16/2015	12/8/2015															
			5	C																				GENESEE CO HEALTH DEPT SAGINAW			Needs Confirm	April14-Sept15				1	KN	11/19/2015	11/19/2015	NA	YES	11/19/2015	UTR	NA										
			7	C																				HURLEY MEDICAL CENTER			Needs Confirm	April14-Sept15				1	KN	11/19/2015	12/8/2015															
			7	C																				HURLEY MEDICAL CENTER			Needs Confirm	April14-Sept15				1	KN	11/19/2015	12/8/2015															
			5	C																				GENESEE CO HEALTH DEPT SAGINAW			Needs Confirm	April14-Sept15				1	KN	11/19/2015	NA	NA	UTR	11/19/2015	UTR	NA										
			5	C																				GENESEE CO HEALTH DEPT SAGINAW			Needs Confirm	April14-Sept15				1	KN	11/19/2015	12/8/2015															
			6	C																				GENESEE CO HEALTH DEPT SAGINAW			Needs Confirm	April14-Sept15				1	KN	11/23/2015	12/8/2015	NA	YES	12/8/2015	Fenton	NA										
			7	C																				GENESEE CO HEALTH DEPT SAGINAW			Needs Confirm	April14-Sept15				1	KN	11/23/2015	12/8/2015															
			7	C																				HURLEY MEDICAL CENTER			Needs Confirm	April14-Sept15				1	KN	11/19/2015	NA	NA	UTR	11/19/2015	UTR	NA										
			6	C																				KIRBY, MICHAEL, MD			Needs Confirm	April14-Sept15				1	JW	11/24/2015	NA	NA	YES	11/24/2015	YES	NA										
			5	C																				KIRBY, MICHAEL, MD			Needs Confirm	April14-Sept15				1	KN	11/24/2015	12/8/2015	NA	UTR	12/8/2015	UTR	NA										
			5	C																				GENESEE CO HEALTH DEPT SAGINAW			Needs Confirm	April14-Sept15				1	KN	11/24/2015	12/8/2015															
			8	C																				GENESEE CO HEALTH DEPT SAGINAW			Needs Confirm	April14-Sept15				1	KN	11/24/2015	NA	NA	YES	11/24/2015	YES	NA										
			6	C																				GENESEE CO HEALTH DEPT SAGINAW			Needs Confirm	April14-Sept15				1	KN	11/24/2015	11/24/2015	NA	YES	11/24/2015	NO	Needs										
			5	C																				GENESEE CO HEALTH DEPT SAGINAW			Needs Confirm	April14-Sept15				1	JW	11/24/2015	NA	NA	YES	11/24/2015	NO	Declined										
			5	C																				GENESEE CO HEALTH DEPT SAGINAW			Needs Confirm	April14-Sept15				1	KN	11/30/2015	12/8/2015															
			5	C																				HURLEY MEDICAL CENTER			Needs Confirm	April14-Sept15				1	KN	11/30/2015	12/8/2015															
			6	C																				HURLEY MEDICAL CENTER			Needs Confirm	April14-Sept15				1	JW	no phone	12/9/2015	NA	UTR	11/30/2015												
			6	C																				GENESEE CO HEALTH DEPT SAGINAW			Needs Confirm	April14-Sept15				1	KN	12/1/2015	12/8/2015															
			5	C																				GENESEE CO HEALTH DEPT SAGINAW			Needs Confirm	April14-Sept15				1	JW	12/1/2015	NA	NA	YES	12/2/2015	no	p/u 12/02/15										
			6	C																				GENESEE CO HEALTH DEPT SAGINAW			Needs Confirm	April14-Sept15				1	JW	12/1/2015	NA	NA	YES	12/1/2015	NO	will P/U @ WIC										
			6	C																				GENESEE CO HEALTH DEPT SAGINAW			Needs Confirm	Oct15toDate				1	ST	10/21/2015	10/30/2015	12/7/2015		10/30/2015												
			5	C																				GENESEE CO HEALTH DEPT SAGINAW			Needs Confirm	Oct15toDate				1	JW	12/1/2015	NA	NA	YES	12/2/15 PU	NO	PU 12/2/105 WIC										
			6	C																				GENESEE CO HEALTH DEPT SAGINAW			Needs Confirm	April14-Sept15				1	JW	12/1/2015	12/9/2015															
			6	C																				GENESEE CO HEALTH DEPT SAGINAW			Needs Confirm	April14-Sept15				1	JW	12/1/2015	12/3/2015	NA	YES	12/3/2015	NO	12/3/2015										
			5	C																				GENESEE CO HEALTH DEPT SAGINAW			Needs Confirm	April14-Sept15				1	KN	12/2/2015	12/8/2015															
			5	C																				HURLEY MEDICAL CENTER			Needs Confirm	Oct15toDate				1	KN	12/3/2015	12/3/2015	NA	YES	12/3/2015	YES	NA										
			5	C																				MCLAREN OAKLAND LAKE ORION			Needs Confirm	April14-Sept15				1	JW	12/1/2015	NA	NA	YES	moved to Oakland co in May 2015												
			7	C																																															
			9	C																																															
			6	C																																															
			11	V																				HURLEY MEDICAL CENTER			Retest Due	April14-Sept15				2	KN	11/18/2015	11/20/2015	12/10/2015	YES	12/10/2015	Grand Blanc	NA										
			5	V																				GENESYS REG MED OUTREACH-CPU			Retest Due	April14-Sept15				2	KN	11/16/2015	11/18/2015	NA	YES	11/18/2015	YES	NA										
			10	V																				HURLEY MEDICAL CENTER			Retest Due	April14-Sept15				2	ST	10/21/2015	11/2/2015		UTR	Address unk	Yes per WIC	NA										
			5	V																				HURLEY MEDICAL CENTER			Retest Due	April14-Sept15				2	ST	10/21/2015	11/2/2015		UTR	Address unk	Yes per WIC	NA										
			5	V																				DELROSARIO, EVELYN, MD			Retest Due	April14-Sept15				2	KN	11/16/2015	11/18/2015	12/9/2015	YES	12/9/2015	NO	12/9/2015										
			5	V																				HURLEY MEDICAL CENTER			Retest Due	April14-Sept15				2	KN	11/17/2015	11/19/2015	11/23/2015	YES	11/23/2015	NO	11/13/2015										
			5	V																				HURLEY MEDICAL CENTER			Retest Due	April14-Sept15				2	KN	11/18/2015	NA	NA	YES	11/19/2015	NO	11/19/2015										
			17	V																				HOLLOWAY, MILTON G, MD			Retest Due	April14-Sept15				2	ST	11/13/2015	12/10/2015															
			8	V																				GENESYS REG MED OUTREACH-CPU			Retest Due	April14-Sept15				2	KN	11/18/2015	11/18/2015	NA	UTR	11/18/2015	UTR	NA										
			10	V																				HURLEY MEDICAL CENTER			Retest Due	April14-Sept15				2	KN	11/18/2015	NA	NA	UTR	11/18/2015	UTR	NA										
			22	V																				HURLEY MEDICAL CENTER			Retest Due	April14-Sept15				2	ST	11/19/2015	12/4/2015	NA	YES	12/4/2015	YES	NA										
			11	V																				HURLEY MEDICAL CENTER			Retest Due	April14-Sept15				2	ST	11/19/2015	12/4/2015	NA	YES	12/4/2015	YES	NA										
			6	V																				MCLAREN MEDICAL LAB			Retest Due	April14-Sept15				2	KN	11/19/2015	NA	NA	YES	11/19/2015	Has well	NO										
			6	V																				HURLEY MEDICAL CENTER			Retest Due	April14-Sept15				2	KN	11/23/2015	12/2/2015	12/7/2015	UTR	12/7/2015	UTR	NA										
			5	V																				HURLEY MEDICAL CENTER			Retest Due	April14-Sept15				2	KN	11/23/2015	12/9/2015		UTR	11/23/2015	UTR	NA										
			5	V																				GENESYS REG MED OUTREACH-CPU			Retest Due	April14-Sept15				2	KN	11/23/2015	12/2/2015	NA	YES	12/3/2015	NO	12/3/2015										
			22	V																				HURLEY MEDICAL CENTER			Retest Due	April14-Sept15				2	ST	11/13/2015	12/4/2015															
			6	V																				HURLEY MEDICAL CENTER			Retest Due	April14-Sept15				2	KN	11/23/2015	11/23/2015	NA	YES	11/23/2015	NO	Declined										
			6	V																				HURLEY MEDICAL CENTER			Retest Due	April14-Sept15				2	jw	11/23/2015	12/9/2015															
			6	V																				HURLEY MEDICAL CENTER			Retest Due	April14-Sept15				2	jw	11/23/2015	12/9/2015															
			9	V																				HURLEY MEDICAL CENTER			Retest Due	April14-Sept15				2	jw	11/23/2015	12/9/2015															
			5	V																				HURLEY MEDICAL CENTER			Retest Due	April14-Sept15				2	KN	11/24/2015	12/2/2015	12/7/2015	UTR	12/7/2015	UTR	NA										
			6	V																				HURLEY MEDICAL CENTER			Retest Due	April14-Sept15				2	KN	11/24/2015	NA	NA	YES	11/30/2015	NO	11/30/2015										
			6	V																				HURLEY MEDICAL CENTER			Retest Due	April14-Sept15				2	KN	11/24/2015	12/7/2015	NA	YES	12/7/2015	YES	NA										
			11	V																				HURLEY MEDICAL CENTER			Retest Due	April14-Sept15				2	KN	11/24/2015	12/2/2015															
			5	V																				ALLEGIANCE HEALTH			Retest Due	April14-Sept15				2	KN	11/24/2015	12/2/2015	12/4/2015	UTR	12/4/2015	UTR	NA										
			5	V																				HURLEY MEDICAL CENTER			Retest Due	April14-Sept15				2	KN	11/5/2015	11/19/2015	11/24/2015	YES	12/11/2015	YES	NA								NA		
			6	V																				HURLEY MEDICAL CENTER			Retest Due	April14-Sept15				2	KN	11/24/2015	NA	NA	YES	11/24/2015	YES	NA										
			7	V																				HURLEY MEDICAL CENTER			Retest Due	April14-Sept15				2	KN	11/24/2015	12/2/2015	NA	UTR	12/2/2015	NO	NA										
			6	V																				HURLEY MEDICAL CENTER			Retest Due	April14-Sept15				2	KN	11/24/2015	11/24/2015	NA	YES	11/24/2015	YES	NA										
			7	V																				HURLEY MEDICAL CENTER			Retest Due	April14-Sept15				2	KN	11/25/2015	12/2/2015	12/7/2015	12/10/2015													
			6	V																				HURLEY MEDICAL CENTER			Retest Due	April14-Sept15				2	KN	11/25/2015	12/2/2015	12/7/2015	12/10/2015													
			5	V																				HURLEY MEDICAL CENTER			Retest Due	April14-Sept15				2	KN	11/25/2015	NA	NA	NO	11/25/2015	UTR	NA										
			7	V																				HURLEY MEDICAL CENTER			Retest Due	April14-Sept15				2	KN	11/25/2015	12/2/2015	12/7/2015	UTR	12/7/2015	UTR	NA										
			7	V																				HURLEY MEDICAL CENTER			Retest Due	April14-Sept15				2	KN	11/25/2015	12/2/2015	12/7/2015														
			6	V																				WARDE MEDICAL LAB (CPU)			Retest Due	April14-Sept15				2	KN	11/25/2015	NA	NA	YES	11/25/2015	YES	NA										
			6	V																				MCLAREN MEDICAL LAB			Retest Due	April14-Sept15				2	KN	11/25/2015	12/2/2015	12/4/2015	UTR	12/4/2015	UTR	NA										
			5	V																				GENESYS REG MED OUTREACH-CPU			Retest Due	April14-Sept15				2	KN	11/25/2015	NA	NA	YES	11/25/2015	YES	NA										
			5	V																				HURLEY MEDICAL CENTER			Retest Due	April14-Sept15				2	KN	11/25/2015	12/3/2015	NA	UTR	12/3/2015	UTR	NA										
			8	V																				HURLEY MEDICAL CENTER			Retest Due	April14-Sept15				2	JW	11/25/2015	12/2/2015	12/10/2015	YES	12/2/2015	YES	NA										
			9	V																				HURLEY MEDICAL CENTER			Retest Due	April14-Sept15				2	KN	11/30/2015	12/10/2015		UTR	11/30/2015	UTR	NA										
			8	V																				HURLEY MEDICAL CENTER			Retest Due	April14-Sept15				2	ST	9/8/2015	NA	NA	YES	11/13/2015	NO	10/30/2015										
			27	V																				HURLEY MEDICAL CENTER			Retest Due	April14-Sept15				2	ST	9/8/2015	NA	NA	YES	11/13/2015	NO	10/30/2015										
			5	V																				HURLEY MEDICAL CENTER			Retest Due	April14-Sept15				2	ST	9/8/2015	NA	NA	YES	11/13/2015	NO	10/30/2015										
			9	V																			Yes	HURLEY MEDICAL CENTER			Retest Due	April14-Sept15				2	KN	12/2/2015	12/7/2015	NA	YES	12/7/2015	YES	NA										
			6	V																				HURLEY MEDICAL CENTER			Retest Due	April14-Sept15				2	KN	12/2/2015	12/9/2015	NA	YES	12/9/2015	Pending											
			7	V																				HURLEY MEDICAL CENTER			Retest Due	April14-Sept15				2	KN	12/2/2015	12/9/2015	NA	YES	12/9/2015	Moved	NA								NA		
			8	V																				HURLEY MEDICAL CENTER			Retest Due	April14-Sept15				2	KN	12/2/2015	NA	NA	YES	12/2/2015	YES	NA										
			5	V																				STOKER, JOHN, L, DO			Retest Due	April14-Sept15				2	KN	12/2/2015	NA	NA	YES	12/2/2015	Beecher	NA										
			23	V																				HURLEY MEDICAL CENTER			Retest Due	April14-Sept15				2	ST	12/4/2015																
			8	V																				HURLEY MEDICAL CENTER			Retest Due	April14-Sept15				2	KN	12/2/2015	NA	NA	YES	12/2/2015												
			5	V																				HURLEY MEDICAL CENTER			Retest Due	April14-Sept15				2	KN	12/2/2015	12/2/2015	NA	YES	12/2/2015	moved	NA										
			5	V																				HURLEY MEDICAL CENTER			Retest Due	April14-Sept15				2	KN	12/3/2015	NA	NA	YES	12/3/2015	YES	NA										
			5	V																				HURLEY MEDICAL CENTER			Retest Due	April14-Sept15				2	KN	12/3/2015	12/8/2015															
			6	V																				PEDIATRIC ADOLESCENT CARE			Retest Due	April14-Sept15				2	JW	12/1/2015	NA	NA	YES	12/2/2015	no	p/u 12/02/15										
			5	V																				HURLEY MEDICAL CENTER			Retest Due	April14-Sept15				2	KN	12/3/2015	12/8/2015	12/11/2015	UTR	12/11/2015	UTR	NA										
			5	V																				HURLEY MEDICAL CENTER			Retest Due	April14-Sept15				2	KN	12/3/2015	12/9/2015															
			5	V																				HURLEY MEDICAL CENTER			Retest Due	April14-Sept15				2	KN	12/3/2015	12/8/2015															
			6	V																				GENESEE COMM HLTH CENTER			Not Due for Retest	April14-Sept15				3	KN	11/16/2015	11/30/2015	NA	YES	11/30/2015	UTR	NA										
			5	V																				HURLEY MEDICAL CENTER			Not Due for Retest	April14-Sept15				3	KN	11/16/2015	11/18/2015	12/9/2015	UTR	Returned and new mail 12/10/15	UTR	NA										
			5	V																				HURLEY MEDICAL CENTER			Not Due for Retest	Oct15toDate				3	KN	12/8/2015	NA	NA	YES	12/8/2015	NO	Pending										
			5	V																				HURLEY MEDICAL CENTER			Not Due for Retest	April14-Sept15				3	KN	11/17/2015	NA	NA	YES	11/25/2015	YES	NA										
			10	V																				HURLEY MEDICAL CENTER			Not Due for Retest	Oct15toDate				3	KN	11/18/2015	12/4/2015	NA	YES	12/8/2015	NO	Pending										
			8	V																				HURLEY MEDICAL CENTER			Not Due for Retest	April14-Sept15				3	KN	11/18/2015	NA	NA	YES	11/30/2015	YES	NA										
			8	V																				GENESEE CO HEALTH DEPT SAGINAW			Not Due for Retest	April14-Sept15				3	KN	11/18/2015	11/20/2015	11/24/2015	YES	11/24/2015	YES	NA										
			6	V																				HURLEY MEDICAL CENTER			Not Due for Retest	Oct15toDate				3	KN	11/25/2015	12/2/2015	NA	YES	12/2/2015	Declined	NA										
			8	V																				HURLEY MEDICAL CENTER			Not Due for Retest	April14-Sept15				3	KN	11/20/2015	NA	NA	YES	11/20/2015	NO	12/2/2015										
			7	V																				HURLEY MEDICAL CENTER			Not Due for Retest	Oct15toDate				3																		
			5	V																				HURLEY MEDICAL CENTER			Not Due for Retest	Oct15toDate				3	KN	11/19/2015	NA	NA	YES	11/19/2015	NO	Declined										
			6	V																				HURLEY MEDICAL CENTER			Not Due for Retest	April14-Sept15				3	KN	11/25/2015																
			12	V																				HURLEY MEDICAL CENTER			Not Due for Retest	Oct15toDate				3	KN	11/25/2015	11/25/2015	NA	YES	11/25/2015	YES	NA										
			5	V																			Yes	HURLEY MEDICAL CENTER			Not Due for Retest	Oct15toDate				3	ST	10/20/2015	10/22/2015					10/26/2015										
			28	V																				GENESEE COMMUNITY HLTH CENTER			Not Due for Retest	April14-Sept15				3	KN	11/24/2015	12/2/2015	12/7/2015	YES	12/7/2015	NO	12/7/2015										
			5	V																			Yes	CHILDRENS HOSPITAL OF MICHIGAN			Not Due for Retest	Oct15toDate				3																		
			14	V																			Yes	HURLEY MEDICAL CENTER			Not Due for Retest	April14-Sept15				3	KN	12/2/2015	12/7/2015	NA	YES	12/7/2015	YES	NA										
			10	V																				HURLEY MEDICAL CENTER			Not Due for Retest	April14-Sept15				3	ST	11/19/2015	12/4/2015	NA	YES	pending next results	YES	NA										
			9	V																				HURLEY MEDICAL CENTER			Not Due for Retest	Oct15toDate				3	ST	10/23/2015	11/2/2015	NA	YES	11/2/2015	does not fit	12/2/2015										
			9	V																				GENESEE CO HEALTH DEPT SAGINAW			Not Due for Retest	Oct15toDate				3	ST	10/21/2015	11/2/2015	11/30/2015	YES	11/30/2015	YES	NA										
			7	V																				GENESEE CO HEALTH DEPT SAGINAW			Not Due for Retest	Oct15toDate				3	ST	11/4/2015	NA	NA	YES	11/6/2015	decline- well water	NA										
			5	V																			Yes	GENESEE COMMUNITY HLTH CENTER			Not Due for Retest	April14-Sept15				3	KN	11/13/2015	11/16/2015	NA		11/20/2015	moved	NA										
			5	V																				HURLEY MEDICAL CENTER			Not Due for Retest	April14-Sept15				3	KN	12/3/2015	NA	NA	YES	12/3/2015	NO	12/3/2015										
			[illegible]	[illegible]																				[illegible]			[illegible]	[illegible]				[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]								[illegible]		
			[illegible]	[illegible]																				[illegible]			[illegible]	[illegible]				[illegible]																		
			[illegible]	[illegible]																				[illegible]			[illegible]	[illegible]				[illegible]																		
			[illegible]	[illegible]																				[illegible]			[illegible]	[illegible]				[illegible]		[illegible]	[illegible]	[illegible]														
			[illegible]	[illegible]																			Yes	[illegible]			[illegible]	[illegible]				[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]										
			[illegible]	[illegible]																				[illegible]			[illegible]	[illegible]				[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]										
			[illegible]	[illegible]																				[illegible]			[illegible]	[illegible]				[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]										
			[illegible]	[illegible]																				[illegible]			[illegible]	[illegible]				[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]										
			[illegible]	[illegible]																				[illegible]			[illegible]	[illegible]				[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]										
			[illegible]	[illegible]																				[illegible]			[illegible]	[illegible]				[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]										
			[illegible]	[illegible]																				[illegible]			[illegible]	[illegible]				[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]										
			[illegible]	[illegible]																				[illegible]			[illegible]	[illegible]				[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]										
			[illegible]	[illegible]																				[illegible]			[illegible]	[illegible]				[illegible]		[illegible]	[illegible]	[illegible]														
			[illegible]	[illegible]																				[illegible]			[illegible]	[illegible]				[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]										

PHI		PHI		[illegible]	[illegible]	PHI	HURLEY MEDICAL CENTER	[illegible]	[illegible]	Low	April14-Sept15	[illegible]	[illegible]	V	[illegible]		NA	NA	NA	NA				PHI		
				[illegible]	[illegible]		HURLEY MEDICAL CENTER	[illegible]	[illegible]	Low	April14-Sept15	[illegible]	[illegible]	C	[illegible]		NA	NA	NA	NA						
				[illegible]	[illegible]		PRIME PEDS & ADOLESCENT	[illegible]		Moved Out of County	April14-Sept15	[illegible]	[illegible]	C	[illegible]	[illegible]	[illegible]	NA	NA	YES	[illegible]	out of state	NA			
				[illegible]	[illegible]		GENESYS REG MED OUTREACH CLN	[illegible]		Moved Out of County	April14-Sept15	[illegible]	[illegible]	V	[illegible]	[illegible]	[illegible]	NA	NA	YES	[illegible]	Living in Oakland CO	NA			
				[illegible]	[illegible]		GENESEE CO HEALTH DEPT [illegible]	[illegible]		Moved Out of County	April14-Sept15	[illegible]	[illegible]	C	[illegible]	[illegible]	[illegible]	[illegible]	NA	YES	[illegible]	Living in Oakland CO	NA			
				[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	Moved Out of County	April14-Sept15	[illegible]	[illegible]	V	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	YES	[illegible]	[illegible]	NA		NA	
				[illegible]	[illegible]		UNIVERSITY OF MICHIGAN HOSP	[illegible]	[illegible]	Moved Out of County	April14-Sept15	[illegible]	[illegible]	V	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	YES	[illegible]	[illegible]	[illegible]			

SUMMARY:

# of children needing confirmation (BLL 5-14):	84
# of children needing confirmation (BLL >= 15):	0
# of confirmed cases needing retesting (BLL 5-14):	53
# of confirmed cases needing retesting (BLL>= 15):	5
# of confirmed cases, not currently due for retest:	23
# of children with most recent BLL <5:	15
# of children moved out of county:	5
Total:	185

Children in PHI with Elevated Blood Lead Levels

HHLPSS ID	Child ID	Most Recent Specimen Date	Most Recent PB Result	Most Recent Sample Type	Last Name
PHI			5	C	PHI
			5	V	
			5	V	
			7	V	
			6	V	
			14	V	
			10	V	
			9	V	
			6	V	
			6	V	
			1	V	

Last Updated 12/14/2015

First Name	Date of Birth	Guardian Last Name	Guardian First Name	Phone	Original House Number	Original Street Name
PHI						

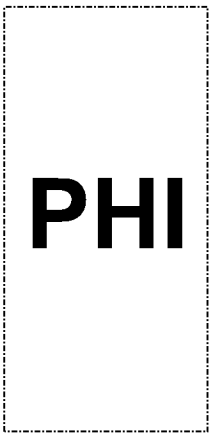
Original Apt	Original Patient City	Original Zip	Original Case Number (address)	Most Recent House Number	Most Recent Street Name	MR Apt	Most Recent Patient City	MR ZIP	MR Case Number (address)	Re-located
PHI										

Provider Name	Date Child was Added to List	Date New Test Added	Retesting Status	Child Category	Original Specimen Date
LAPEER PEDIATRICS-LAPEER	PHI		Needs Confirm	PHI	
HURLEY MEDICAL CENTER			Retest Due		
HURLEY MEDICAL CENTER			Retest Due		
HURLEY MEDICAL CENTER			Retest Due		
HURLEY MEDICAL CENTER			Retest Due		
GENESYS REG MED OUTREACH-CPU			Not Due for Retest		
HURLEY MEDICAL CENTER			Not Due for Retest		
HURLEY MEDICAL CENTER			Not Due for Retest		
HURLEY MEDICAL CENTER			Not Due for Retest		
DAVISON ROAD MEDICAL			Not Due for Retest		
~~HURLEY MEDICAL CENTER~~			~~Low~~		

Original Pb Result	Original Sample Type	Status Code	PHN Assigned	1st phone call	2nd phone call	3rd phone call	Contact Successful	Date Letter Mailed or Delivered	Water Filter Initially	Water Filter Delivered
5	C	1								
5	V	2								
5	V	2								
7	V	2								
6	V	2								
14	V	3	ST	11/16/2015	12/7/2015					12/9/2015
10	V	3								
9	V	3	ST	11/13/2015	NA	NA	YES	11/18/2015	YES	NA
6	V	3								
6	V	3								
~~6~~	~~C~~	~~4~~	~~ST~~	~~11/18/2015~~	~~NA~~	~~NA~~	~~YES~~	~~11/12/2015~~	~~YES~~	~~NA~~

PCP Follow up	First Home Visit to Open for CM	Medicaid Form Sent to Accounting - First	Second Home Visit	Medicaid Form Sent to Accounting - Second	Dropby Visit One	Dropby Visit Two	Certified Letter	Case Closed Date	Case Closed Reason
PHI									

age



From: Scott, Robert L. (DHHS)
Sent: Monday, December 14, 2015 5:38 PM
To: 'Genesee'
Cc: knoble@gchd.us;Stanbury, Martha (DHHS);Peeler, Nancy (DHHS);Lishinski Karen (LishinskiK@michigan.gov);Travis, Rashmi (DHHS)
Subject: Flint EBLL list

Sherry,

I have posted an updated file to your MIBLOODLEAD 112 area of DCH-File Transfer. Sorry it's so late in the day this time.

I have included children ages 6-17 who had EBLLs since April 2014, but I put them on a second tab. If a child started on the list at age 5, and is now 6 years old, that child is still on the first tab.

I've also included more columns this time than I have previously. I wanted to show you everything we have for this file. I'll be on the Tuesday call tomorrow, so if you want me to hide some of those columns, you can let me know.

Thanks,
Bob

Robert L. Scott
Childhood Lead Poisoning Prevention Program
Michigan Department of Health & Human Services
(517) 335-8178
fax (517) 335-8509

From: Scott, Robert L. (DHHS)
Sent: Monday, December 21, 2015 3:34 PM
To: Wisinski, Courtney (DHHS);'Lishinski Karen (LishinskiK@michigan.gov)';Stanbury, Martha (DHHS);Peeler, Nancy (DHHS)
Subject: new Flint EBLL file
Attachments: Flint EBLL List for GCHD 122115.xlsx

Please see attached.

Robert L. Scott
Childhood Lead Poisoning Prevention Program
Michigan Department of Health & Human Services
(517) 335-8178
fax (517) 335-8509

Children in PHI with Elevated Blood Lead Levels Last Updated 12/21/2015

HHLPSS ID	Most Recent Specimen Date	Most Recent PB Result	Most Recent Sample Type	Last Name	First Name	Date of Birth	Guardian Last Name	Guardian First Name	Phone	Most Recent House Number	Most Recent Street Name	MR Apt	Most Recent Patient City	MR ZIP	Re-located	Provider Name	Date Child was Added to List	Date New Test Added	Retesting Status	Child Category	Original Specimen Date	Original Pb Result	Original Sample Type	PHN Assigned	1st phone call	2nd phone call	3rd phone call	Contact Successful	Date Letter Mailed or Delivered	Water Filter Initially	Water Filter Delivered	PCP Follow up	First Home Visit to Open for CM	Medicaid Form Sent to Accounting - First	Second Home Visit	Medicaid Form Sent to Accounting - Second	Dropby Visit One	Dropby Visit Two	Certified Letter	Case Closed Date	Case Closed Reason
		5	C													HURLEY MEDICAL CENTER	10/13/2015		Needs Confirm	April14-Sept15		5	C	KN	11/6/2015	11/9/2015	12/4/2015	YES	12/16/2015	YES	NA										
		6	C													GRAND BLANC PEDIATRIC CLINIC	10/13/2015		Needs Confirm	April14-Sept15		6	C	KN	11/6/2015	11/9/2015	12/4/2015	UTR	12/4/2015	UTR	NA										
		6	C													GENESEE CO HEALTH DEPT SAGINAW	10/13/2015		Needs Confirm	April14-Sept15		6	C	KN	11/6/2015	NA	NA	YES	11/13/2015	NO	11/13/2015										
		5	C													KINRA, NARESH, MD	10/13/2015		Needs Confirm	April14-Sept15		5	C	KN	12/11/2015	12/16/2015	12/17/2015	UTR	12/17/2015	UTR	NA										
		5	C													GENESEE CO HEALTH DEPT SAGINAW	10/13/2015		Needs Confirm	April14-Sept15		5	C	KN	11/6/2015	NA	NA	UTR	11/18/2015	UTR	NA										
		6	C													GENESEE CO HEALTH DEPT SAGINAW	11/13/2015		Needs Confirm	Oct15toDate		6	C	ST	11/4/2015	12/7/2015	N/A		11/4/2015	YES											
		7	C													GENESEE CO HEALTH DEPT SAGINAW	10/13/2015		Needs Confirm	April14-Sept15		7	C	KN	11/9/2015	12/4/2015	NA	YES	12/7/2015	NO	12/7/2015										
		10	C													GENESEE CO HEALTH DEPT SAGINAW	11/9/2015		Needs Confirm	Oct15toDate		10	C	ST	10/21/2015	11/2/2015	NA	UTR	Address unk												
		6	C													GENESEE CO HEALTH DEPT SAGINAW	10/13/2015		Needs Confirm	April14-Sept15		6	C	ST	10/21/2015	11/2/2015	NA	UTR	Address unk												
		8	C													GENESEE CO HEALTH DEPT SAGINAW	10/13/2015		Needs Confirm	April14-Sept15		8	C	KN	11/6/2015	11/6/2015	11/16/2015	YES	11/20/2015	NO	11/20/2015										
		6	C													HURLEY MEDICAL CENTER	10/13/2015		Needs Confirm	April14-Sept15		6	C	KN	11/9/2015	NA	NA	YES	11/13/2015	NO	11/13/2015										
		8	C													GENESEE CO HEALTH DEPT SAGINAW	12/18/2015		Needs Confirm	Oct15toDate		8	C																		
		6	C													HURLEY MEDICAL CENTER	10/13/2015		Needs Confirm	April14-Sept15		6	C	KN	11/9/2015	12/4/2015	12/16/2015														
		14	C													HURLEY MEDICAL CENTER	11/13/2015		Needs Confirm	April14-Sept15		14	C	KN	11/18/2015	12/2/2015	12/9/2015	UTR	12/9/2015	UTR	NA										
		5	C													GENESEE CO HEALTH DEPT SAGINAW	10/26/2015		Needs Confirm	Oct15toDate		5	C	KN	NA	NA	NA	NA	11/18/2015	NA	NA										
		12	C													HASAN, KAMAL, DR	11/13/2015		Needs Confirm	April14-Sept15		12	C	KN	11/18/2015	NA	NA	YES	11/18/2015	YES	NA										
		8	C													GENESEE CO HEALTH DEPT SAGINAW	10/13/2015		Needs Confirm	April14-Sept15		8	C	KN	11/9/2015	12/4/2015	NA	UTR	12/16/2015	UTR	NO										
		5	C													GENESEE CO HEALTH DEPT SAGINAW	10/13/2015		Needs Confirm	April14-Sept15		5	C	KN	11/9/2015	11/20/2015	NA	YES	11/25/2015	NO	NO										
		7	C													HURLEY MEDICAL CENTER	10/13/2015		Needs Confirm	April14-Sept15		7	C	KN	11/9/2015	12/9/2015	12/16/2015	YES	12/16/2015	NA	NA										
		5	C													GENESEE CO HEALTH DEPT SAGINAW	10/13/2015		Needs Confirm	April14-Sept15		5	C	KN	11/9/2015	NA	NA	YES	11/9/2015	YES	NA										
		8	C													GENESEE CO HEALTH DEPT SAGINAW	10/13/2015		Needs Confirm	April14-Sept15		8	C	KN	11/9/2015	NA	NA	YES	11/13/2015	NO	11/13/2015										
		6	C													GENESEE CO HEALTH DEPT SAGINAW	10/13/2015		Needs Confirm	April14-Sept15		6	C	KN	11/9/2015	12/9/2015	12/9/2015	YES	12/9/2015	NO	12/9/2015										
		9	C													GENESEE CO HEALTH DEPT SAGINAW	10/13/2015		Needs Confirm	April14-Sept15		9	C	KN	11/9/2015	NA	NA	YES	11/13/2015	NO	11/13/2015										
		5	C													GENESEE CO HEALTH DEPT SAGINAW	10/13/2015		Needs Confirm	April14-Sept15		5	C	KN	11/9/2015	NA	NA	YES	11/9/2015	Has well	NO										
		5														MCLAREN MEDICAL LAB	11/13/2015		Needs Confirm	Oct15toDate		5		KN	11/19/2015	NA	NA	YES	11/19/2015	YES	NA										
		5	C													GENESEE CO HEALTH DEPT SAGINAW	10/13/2015		Needs Confirm	April14-Sept15		5	C	KN	11/6/2015	12/4/2015	12/9/2015	UTR	12/9/2015	UTR	NA										
		5	C													PRIME PEDS & ADOLESCENT	10/13/2015		Needs Confirm	April14-Sept15		5	C	KN	11/6/2015	12/4/2015	NA	UTR	12/4/2015	UTR	NA										
		5	C													GENESEE CO HEALTH DEPT SAGINAW	10/13/2015		Needs Confirm	April14-Sept15		5	C	KN	11/6/2015	12/4/2015															
		5	C													HURLEY MEDICAL CENTER	10/13/2015		Needs Confirm	April14-Sept15		5	C	KN	11/6/2015	12/4/2015	NA	UTR	12/4/2015	UTR	NA										
		5	C													HURLEY MEDICAL CENTER	10/13/2015		Needs Confirm	April14-Sept15		5	C	JW	11/6/2015	12/4/2015	12/9/2015	YES	12/11/2015	NO	will P/U @ WIC										
		7	C													HURLEY MEDICAL CENTER	10/13/2015		Needs Confirm	April14-Sept15		7	C	JW	11/6/2015	12/4/2015	12/9/2015	YES	12/11/2015	NO	will P/U @ WIC										
		7	C													GENESEE CO HEALTH DEPT SAGINAW	10/13/2015		Needs Confirm	April14-Sept15		7	C	KN	11/6/2015	12/4/2015	NA	UTR	12/4/2015	UTR	NA										
		7	C													GENESEE CO HEALTH DEPT SAGINAW	10/13/2015		Needs Confirm	April14-Sept15		7	C	KN	11/9/2015	12/4/2015	NA	YES	12/7/2015	NO	12/7/2015										
		6	C													GENESEE CO HEALTH DEPT SAGINAW	10/13/2015		Needs Confirm	April14-Sept15		6	C	KN	11/9/2015	NA	NA	YES	11/9/2015	YES	NA										
		9	C													GENESEE CO HEALTH DEPT SAGINAW	11/20/2015		Needs Confirm	Oct15toDate		9	C	ST	11/16/2015	NA	NA	YES	11/16/2015	NO	11/19/2015										
		5	C													GENESEE CO HEALTH DEPT SAGINAW	10/13/2015		Needs Confirm	April14-Sept15		5	C	KN	11/6/2015	12/7/2015	NA	UTR	12/7/2015	UTR	NA										
		5	C													GRAND BLANC PEDIATRIC CLINIC	10/13/2015		Needs Confirm	April14-Sept15		5	C	KN	11/9/2015	11/9/2015	NA	YES	11/9/2015	YES	NA										
		6	C													GENESEE CO HEALTH DEPT SAGINAW	10/13/2015		Needs Confirm	April14-Sept15		6	C	KN	11/6/2015	12/7/2015	12/10/2015	UTR	12/10/2015	UTR	NA										
		11	C													HASAN, KAMAL, DR	11/13/2015		Needs Confirm	April14-Sept15		11	C	KN	11/19/2015	11/19/2015	NA	YES	11/19/2015	NO	11/20/2015										
		5	C													GENESEE CO HEALTH DEPT SAGINAW	10/20/2015		Needs Confirm	April14-Sept15		5	C	KN	11/6/2015	12/7/2015	NA	UTR	12/7/2015	UTR	NA										
		5	C													HASAN, KAMAL, DR	10/13/2015		Needs Confirm	Oct15toDate		5	C	KN	11/6/2015	12/7/2015	NA	YES	12/7/2015	YES	NA										
		9	C													HASAN, KAMAL, DR	10/13/2015		Needs Confirm	Oct15toDate		9	C	KN	11/6/2015	12/7/2015	NA	YES	12/7/2015	YES	NA										
		8	C													GENESEE CO HEALTH DEPT SAGINAW	10/20/2015		Needs Confirm	April14-Sept15		8	C	KN	11/9/2015	12/7/2015	NA	UTR	12/7/2015	UTR	NA										
		5	C													GENESEE CO HEALTH DEPT SAGINAW	10/13/2015		Needs Confirm	April14-Sept15		5	C	KN	11/9/2015	11/9/2015	NA	YES	11/13/2015	NO	11/13/2015										
		5	C													GENESEE CO HEALTH DEPT SAGINAW	10/26/2015		Needs Confirm	Oct15toDate		5	C	KN	11/9/2015	NA	NA	YES	11/9/2015	YES	NA										
		5	C													HASAN, KAMAL, DR	10/13/2015		Needs Confirm	April14-Sept15		5	C	KN	11/9/2015	12/7/2015															
		5	C													GENESEE CO HEALTH DEPT SAGINAW	10/13/2015		Needs Confirm	April14-Sept15		5	C	KN	11/9/2015	NA	NA	YES	11/9/2015	YES	NA										
		6	C													GENESEE CO HEALTH DEPT SAGINAW	10/13/2015		Needs Confirm	April14-Sept15		6	C	KN	11/13/2015	12/7/2015															
		12	C													GENESEE CO HEALTH DEPT SAGINAW	10/13/2015		Needs Confirm	April14-Sept15		12	C	KN	11/16/2015	NA	NA	UTR	Returned	UTR	NA										
		14	C													HURLEY MEDICAL CENTER	10/13/2015		Needs Confirm	April14-Sept15		14	C	KN	11/16/2015	12/7/2015	NA	YES	12/7/2015	YES	NA										
		5	C													IMPERIAL, ALICIA F, MD -LINDEN	10/13/2015		Needs Confirm	April14-Sept15		5	C	JW	11/16/2015	12/10/2015	NA	YES	11/16/2015	YES	NA										
		6	C													GENESEE CO HEALTH DEPT SAGINAW	10/13/2015		Needs Confirm	April14-Sept15		6	C	JW	11/16/2015	12/10/2015	NA	YES	11/16/2015 & 12/10/2015	NO states does not have Flint h2o	NO										
		12	C													HURLEY MEDICAL CENTER	10/13/2015		Needs Confirm	April14-Sept15		12	C	KN	11/16/2015	12/8/2015	12/11/2015	YES	12/11/2015	YES	NA										
		5	C													GENESEE CO HEALTH DEPT SAGINAW	10/13/2015		Needs Confirm	April14-Sept15		5	C	KN	11/16/2015	12/8/2015	NA	YES	12/8/2015	Moved to Mount Morris	NA										
		5	C													HURLEY MEDICAL CENTER	10/13/2015		Needs Confirm	April14-Sept15		5	C	KN	11/16/2015	NA	NA	YES	11/20/2015	YES	NA										
		7	C													HURLEY MEDICAL CENTER	10/13/2015		Needs Confirm	April14-Sept15		7	C	KN	11/16/2015	12/8/2015	NA	YES	12/8/2015	YES	NA										
		5	C													GENESEE CO HEALTH DEPT SAGINAW	10/20/2015		Needs Confirm	April14-Sept15		5	C	KN	11/16/2015	12/8/2015															
		5	C													GENESEE CO HEALTH DEPT SAGINAW	10/13/2015		Needs Confirm	April14-Sept15		5	C	KN	11/19/2015	11/19/2015	NA	YES	11/19/2015	UTR	NA										
		7	C													HURLEY MEDICAL CENTER	10/13/2015		Needs Confirm	April14-Sept15		7	C	KN	11/19/2015	12/8/2015	12/16/2015	UTR	12/16/2015												
		7	C													HURLEY MEDICAL CENTER	10/13/2015		Needs Confirm	April14-Sept15		7	C	KN	11/19/2015	12/8/2015	12/17/2015	UTR	12/17/2015	UTR	NA										
		3	C													HASAN, KAMAL, DR	10/13/2015	12/18/2015	Needs Confirm	April14-Sept15		5	C	KN	11/19/2015	NA	NA	UTR	11/19/2015	UTR	NA										
		5	C													GENESEE CO HEALTH DEPT SAGINAW	10/13/2015		Needs Confirm	April14-Sept15		5	C	KN	11/19/2015	12/8/2015	12/16/2015	UTR	12/16/2015	UTR	NA										
		6	C													GENESEE CO HEALTH DEPT SAGINAW	10/13/2015		Needs Confirm	April14-Sept15		6	C	KN	11/23/2015	12/8/2015	NA	YES	12/8/2015	Fenton	NA										
		7	C													GENESEE CO HEALTH DEPT SAGINAW	10/13/2015		Needs Confirm	April14-Sept15		7	C	KN	11/23/2015	12/8/2015	12/14/2015	UTR	12/14/2015	UTR	NA										
		7	C													HURLEY MEDICAL CENTER	11/13/2015		Needs Confirm	April14-Sept15		7	C	KN	11/19/2015	NA	NA	UTR	11/19/2015	UTR	NA										
		6	C													KIRBY, MICHAEL, MD	10/13/2015		Needs Confirm	April14-Sept15		6	C	JW	11/24/2015	NA	NA	YES	11/24/2015	YES	NA										
		5	C													KIRBY, MICHAEL, MD	10/13/2015		Needs Confirm	April14-Sept15		5	C	KN	11/24/2015	12/8/2015	NA	UTR	12/8/2015	UTR	NA										
		5	C													GENESEE CO HEALTH DEPT SAGINAW	10/13/2015		Needs Confirm	April14-Sept15		5	C	KN	11/24/2015	12/8/2015	12/16/2015														
		8	C													GENESEE CO HEALTH DEPT SAGINAW	10/13/2015		Needs Confirm	April14-Sept15		8	C	KN	11/24/2015	NA	NA	YES	11/24/2015	YES	NA										
		6	C													GENESEE CO HEALTH DEPT SAGINAW	10/13/2015		Needs Confirm	April14-Sept15		6	C	KN	11/24/2015	11/24/2015	NA	YES	11/24/2015	NO	*Needs*										
		5	C													GENESEE CO HEALTH DEPT SAGINAW	10/13/2015		Needs Confirm	April14-Sept15		5	C	JW	11/24/2015	NA	NA	YES	11/24/2015	NO	Declined										
		5	C													GENESEE CO HEALTH DEPT SAGINAW	10/13/2015		Needs Confirm	April14-Sept15		5	C	KN	11/30/2015	12/15/2015															
		5	C													HURLEY MEDICAL CENTER	10/13/2015		Needs Confirm	April14-Sept15		5	C	KN	11/30/2015	12/8/2015	12/16/2015														
		6	C													GENESEE CO HEALTH DEPT SAGINAW	10/13/2015		Needs Confirm	April14-Sept15		6	C	KN	12/16/2015																
		5	C													GENESEE CO HEALTH DEPT SAGINAW	10/13/2015		Needs Confirm	April14-Sept15		5	C	JW	12/1/2015	NA	NA	YES	12/2/2015	no	p/u 12/02/15										
		6	C													GENESEE CO HEALTH DEPT SAGINAW	10/13/2015		Needs Confirm	April14-Sept15		6	C	JW	12/1/2015	NA	NA	YES	12/1/2015	NO	will P/U @ WIC										
		6	C													GENESEE CO HEALTH DEPT SAGINAW	11/9/2015		Needs Confirm	Oct15toDate		6	C	ST	10/21/2015	10/30/2015	12/7/2015		10/30/2015												
	PHI	5	C			PHI										GENESEE CO HEALTH DEPT SAGINAW	10/26/2015		Needs Confirm	Oct15toDate	PHI	5	C	JW	12/1/2015	NA	NA	YES	12/2/15 PU	NO	PU 12/2/105 WIC				PHI						
		5	C													GENESEE CO HEALTH DEPT SAGINAW	10/13/2015		Needs Confirm	April14-Sept15		5	C	JW	12/1/2015	12/9/2015	12/16/2015	UTR	12/16/2015	UTR	NA										
		5	C													GENESEE CO HEALTH DEPT SAGINAW	10/13/2015		Needs Confirm	April14-Sept15		5	C	JW	12/1/2015	12/3/2015	NA	YES	12/3/2015	NO	12/3/2015										
		7	C													GENESEE CO HEALTH DEPT SAGINAW	10/13/2015		Needs Confirm	April14-Sept15		7	C	KN	12/2/2015	12/8/2015	12/11/2015	UTR	12/11/2015	UTR	NA										
		9	C													HURLEY MEDICAL CENTER	10/26/2015		Needs Confirm	Oct15toDate		9	C	KN	12/3/2015	12/3/2015	NA	YES	12/3/2015	YES	NA										
		6	C													MCLAREN OAKLAND LAKE ORION	10/13/2015		Needs Confirm	April14-Sept15		6	C	JW	12/1/2015	NA	NA	YES	moved to Oakland co in May 2015												
		5	V													GENESYS REG MED OUTREACH-CPU	10/13/2015		Retest Due	April14-Sept15		5	V	KN	11/16/2015	11/18/2015	NA	YES	11/18/2015	YES	NA										
		10	V													HURLEY MEDICAL CENTER	10/13/2015		Retest Due	April14-Sept15		10	V	ST	10/21/2015	11/2/2015		UTR	Address unk	Yes per WIC	NA										
		5	V													HURLEY MEDICAL CENTER	10/13/2015		Retest Due	April14-Sept15		5	V	ST	10/21/2015	11/2/2015		UTR	Address unk	Yes per WIC	NA										
		5	V													DELROSARIO, EVELYN, MD	10/13/2015		Retest Due	April14-Sept15		5	V	KN	11/16/2015	11/18/2015	12/9/2015	YES	12/9/2015	NO	12/9/2015										
		5	V													HURLEY MEDICAL CENTER	10/13/2015		Retest Due	April14-Sept15		5	V	KN	11/17/2015	11/19/2015	11/23/2015	YES	11/23/2015	NO	11/13/2015										
		5	V													HURLEY MEDICAL CENTER	10/13/2015		Retest Due	April14-Sept15		5	V	KN	11/18/2015	NA	NA	YES	11/19/2015	NO	11/19/2015										
		17	V													HOLLOWAY, MILTON G, MD	10/13/2015		Retest Due	April14-Sept15		17	V	ST	11/13/2015	12/10/2015															
		8	V													GENESYS REG MED OUTREACH-CPU	10/13/2015		Retest Due	April14-Sept15		8	V	KN	11/18/2015	11/18/2015	NA	UTR	11/18/2015	UTR	NA										
		10	V													HURLEY MEDICAL CENTER	10/13/2015		Retest Due	April14-Sept15		10	V	KN	11/18/2015	NA	NA	UTR	11/18/2015	UTR	NA										
		22	V													HURLEY MEDICAL CENTER	10/13/2015		Retest Due	April14-Sept15		22	V	ST	11/19/2015	12/4/2015	NA	YES	12/4/2015	YES	NA										
		11	V													HURLEY MEDICAL CENTER	10/13/2015		Retest Due	April14-Sept15		11	V	ST	11/19/2015	12/4/2015	NA	YES	12/4/2015	YES	NA										
		6	v													MCLAREN MEDICAL LAB	10/13/2015		Retest Due	April14-Sept15		6	v	KN	11/19/2015	NA	NA	YES	11/19/2015	Has well	NO										
		6	V													HURLEY MEDICAL CENTER	10/13/2015		Retest Due	April14-Sept15		6	V	KN	11/23/2015	12/2/2015	12/7/2015	UTR	12/7/2015	UTR	NA										
		5	V													HURLEY MEDICAL CENTER	10/13/2015		Retest Due	April14-Sept15		5	V	KN	11/23/2015	12/9/2015	12/16/2015	YES	11/23/2015	YES	NA										
		5	V													GENESYS REG MED OUTREACH-CPU	10/13/2015		Retest Due	April14-Sept15		5	V	KN	11/23/2015	12/2/2015	NA	YES	12/3/2015	NO	12/3/2015										
		22	V													HURLEY MEDICAL CENTER	10/13/2015		Retest Due	April14-Sept15		22	V	ST	11/13/2015	12/4/2015															
		6	V													HURLEY MEDICAL CENTER	10/13/2015		Retest Due	April14-Sept15		6	V	KN	11/23/2015	11/23/2015	NA	YES	11/23/2015	NO	Declined										
		6	V													HURLEY MEDICAL CENTER	10/13/2015		Retest Due	April14-Sept15		6	V	jw	11/23/2015	12/9/2015															
		6	V													HURLEY MEDICAL CENTER	10/13/2015		Retest Due	April14-Sept15		6	V	jw	11/23/2015	12/9/2015	12/14/2015	YES	12/14/2015	NO	P/U 12/14/15										
		9	V													HURLEY MEDICAL CENTER	10/13/2015		Retest Due	April14-Sept15		9	V	jw	11/23/2015	12/9/2015															
		5	V													HURLEY MEDICAL CENTER	10/13/2015		Retest Due	April14-Sept15		5	V	KN	11/24/2015	12/2/2015	12/7/2015	UTR	12/7/2015	UTR	NA										
		6	V													HURLEY MEDICAL CENTER	10/13/2015		Retest Due	April14-Sept15		6	V	KN	11/24/2015	12/7/2015	NA	YES	12/7/2015	YES	NA										
		11	V													HURLEY MEDICAL CENTER	10/13/2015		Retest Due	April14-Sept15		11	V	KN	11/24/2015	12/2/2015															
		5	V													ALLEGIANCE HEALTH	10/13/2015		Retest Due	April14-Sept15		5	V	KN	11/24/2015	12/2/2015	12/4/2015	UTR	12/4/2015	UTR	NA										
		5	V													HURLEY MEDICAL CENTER	10/13/2015		Retest Due	April14-Sept15		5	V	KN	11/5/2015	11/19/2015	11/24/2015	YES	12/11/2015	YES	NA								NA		
		6	V													HURLEY MEDICAL CENTER	10/13/2015		Retest Due	April14-Sept15		6	V	KN	11/24/2015	NA	NA	YES	11/24/2015	YES	NA										
		7	V													HURLEY MEDICAL CENTER	10/13/2015		Retest Due	April14-Sept15		7	V	KN	11/24/2015	12/2/2015	NA	UTR	12/2/2015	NO	NA										
		6	V													HURLEY MEDICAL CENTER	10/13/2015		Retest Due	April14-Sept15		6	V	KN	11/24/2015	11/24/2015	NA	YES	11/24/2015	YES	NA										
		7	V													HURLEY MEDICAL CENTER	10/13/2015		Retest Due	April14-Sept15		7	V	KN	11/25/2015	12/2/2015	12/7/2015	12/10/2015													
		6	V													HURLEY MEDICAL CENTER	10/13/2015		Retest Due	April14-Sept15		6	V	KN	11/25/2015	12/2/2015	12/7/2015	12/10/2015													
		5	V													HURLEY MEDICAL CENTER	10/13/2015		Retest Due	April14-Sept15		5	V	KN	11/25/2015	NA	NA	NO	11/25/2015	UTR	NA										
		7	V													HURLEY MEDICAL CENTER	10/13/2015		Retest Due	April14-Sept15		7	V	KN	11/25/2015	12/2/2015	12/7/2015	UTR	Returned	UTR	NA										
		7	V													HURLEY MEDICAL CENTER	10/13/2015		Retest Due	April14-Sept15		7	V	KN	11/25/2015	12/2/2015	12/11/2015														
		6	V													WARDE MEDICAL LAB (CPU)	10/13/2015		Retest Due	April14-Sept15		6	V	KN	11/25/2015	NA	NA	YES	11/25/2015	YES	NA										
		6	V													MCLAREN MEDICAL LAB	10/13/2015		Retest Due	April14-Sept15		6	V	KN	11/25/2015	12/2/2015	12/4/2015	UTR	12/4/2015	UTR	NA										
		5	V													GENESYS REG MED OUTREACH-CPU	10/13/2015		Retest Due	April14-Sept15		5	V	KN	11/25/2015	NA	NA	YES	11/25/2015	YES	NA										
		5	V													HURLEY MEDICAL CENTER	10/13/2015		Retest Due	April14-Sept15		5	V	JW	11/25/2015	12/3/2015	NA	UTR	12/3& 15/2015(new address)	UTR	NA										
		8	V													HURLEY MEDICAL CENTER	10/13/2015		Retest Due	April14-Sept15		8	V	JW	11/25/2015	12/2/2015	12/10/2015	YES	12/2/2015	YES	NA										
		9	V													HURLEY MEDICAL CENTER	10/13/2015		Retest Due	April14-Sept15		9	V	KN	11/30/2015	12/16/2015		UTR	11/30/2015	UTR	NA										
		8	V													HURLEY MEDICAL CENTER	10/13/2015		Retest Due	April14-Sept15		8	V	ST	9/8/2015	NA	NA	YES	11/13/2015	NO	10/30/2015										
		27	V													HURLEY MEDICAL CENTER	10/13/2015		Retest Due	April14-Sept15		27	V	ST	9/8/2015	NA	NA	YES	11/13/2015	NO	10/30/2015										
		5	V													HURLEY MEDICAL CENTER	10/13/2015		Retest Due	April14-Sept15		5	V	ST	9/8/2015	NA	NA	YES	11/13/2015	NO	10/30/2015										
		9	V												Yes	HURLEY MEDICAL CENTER	10/13/2015		Retest Due	April14-Sept15		9	V	KN	12/2/2015	12/7/2015	NA	YES	12/7/2015	YES	NA										
		6	V													HURLEY MEDICAL CENTER	10/13/2015		Retest Due	April14-Sept15		6	V	KN	12/2/2015	12/9/2015	NA	YES	12/9/2015	Pending											
		7	V													HURLEY MEDICAL CENTER	10/13/2015		Retest Due	April14-Sept15		7	V	KN	12/2/2015	12/9/2015	NA	YES	12/9/2015	Moved	NA								NA		
		8	V													HURLEY MEDICAL CENTER	10/13/2015		Retest Due	April14-Sept15		8	V	KN	12/2/2015	NA	NA	YES	12/2/2015	YES	NA										
		5	V													STOKER, JOHN, L, DO	10/13/2015		Retest Due	April14-Sept15		5	V	KN	12/2/2015	NA	NA	YES	12/2/2015	Beecher	NA										
		23	V													HURLEY MEDICAL CENTER	10/13/2015		Retest Due	April14-Sept15		23	V	ST	12/4/2015																
		8	V													HURLEY MEDICAL CENTER	10/13/2015		Retest Due	April14-Sept15		8	V	KN	12/2/2015	NA	NA	YES	12/2/2015												
		5	V													HURLEY MEDICAL CENTER	10/13/2015		Retest Due	April14-Sept15		5	V	KN	12/2/2015	12/2/2015	NA	YES	12/2/2015	moved	NA										
		5	V													HURLEY MEDICAL CENTER	10/13/2015		Retest Due	April14-Sept15		5	V	KN	12/3/2015	NA	NA	YES	12/3/2015	YES	NA										
		5	V													HURLEY MEDICAL CENTER	10/13/2015		Retest Due	April14-Sept15		5	V	KN	12/3/2015	12/8/2015															
		6	V													PEDIATRIC ADOLESCENT CARE	10/13/2015		Retest Due	April14-Sept15		6	V	JW	12/1/2015	NA	NA	YES	12/2/2015	no	p/u 12/02/15										
		5	V													HURLEY MEDICAL CENTER	10/13/2015		Retest Due	April14-Sept15		5	V	KN	12/3/2015	12/8/2015	12/11/2015	UTR	12/11/2015	UTR	NA										
		5	V													HURLEY MEDICAL CENTER	10/13/2015		Retest Due	April14-Sept15		5	V	KN	12/3/2015	12/9/2015	12/16/2015	YES	12/17/2015	YES	NA										
		5	V													HURLEY MEDICAL CENTER	10/13/2015		Retest Due	April14-Sept15		5	V	KN	12/3/2015	12/8/2015	12/14/2015	UTR	12/14/2015	UTR	NA										
		5	V													GENESEE COMM HLTH CENTER	10/13/2015	12/11/2015	Not Due for Retest	April14-Sept15		6	V	KN	11/16/2015	11/30/2015	NA	YES	11/30/2015	UTR	NA										
		7	V												Yes	HURLEY MEDICAL CENTER	11/13/2015	12/18/2015	Not Due for Retest	April14-Sept15		11	V	KN	11/18/2015	11/20/2015	12/10/2015	YES	12/10/2015	Grand Blanc	NA										
		6	V													HURLEY MEDICAL CENTER	10/13/2015	10/20/2015	Not Due for Retest	April14-Sept15		6	V	KN	11/16/2015	11/18/2015	12/18/2015	UTR	Returned and new mail 12/10/15	UTR	NA										
		5	V													HURLEY MEDICAL CENTER	12/4/2015		Not Due for Retest	Oct15toDate		5	V	KN	12/8/2015	NA	NA	YES	12/8/2015	NO	Pending										
		5	V													HURLEY MEDICAL CENTER	10/13/2015		Not Due for Retest	April14-Sept15		5	V	KN	11/17/2015	NA	NA	YES	11/25/2015	YES	NA										
		5	V													HURLEY MEDICAL CENTER	10/30/2015		Not Due for Retest	Oct15toDate		5	V	KN	11/18/2015	12/4/2015	NA	YES	12/8/2015	NO	12/18/2015										
		10	V													HURLEY MEDICAL CENTER	10/13/2015	12/11/2015	Not Due for Retest	April14-Sept15		12	V	KN	11/18/2015	NA	NA	YES	11/30/2015	YES	NA										
		8	V													GENESEE CO HEALTH DEPT SAGINAW	10/20/2015	10/26/2015	Not Due for Retest	April14-Sept15		11	C	KN	11/18/2015	11/20/2015	11/24/2015	YES	11/24/2015	YES	NA										
		8	V													HURLEY MEDICAL CENTER	10/26/2015		Not Due for Retest	Oct15toDate		8	V	ST	11/25/2015	12/2/2015	NA	YES	12/2/2015	Declined	NA										
		6	V													HURLEY MEDICAL CENTER	10/13/2015		Not Due for Retest	April14-Sept15		6	V	KN	11/20/2015	NA	NA	YES	11/20/2015	NO	12/2/2015										
		8	V													HURLEY MEDICAL CENTER	12/11/2015		Not Due for Retest	Oct15toDate		8	V	KN	12/15/2015	NA	NA	YES	12/15/2015	YES	NA										
		2	V													HURLEY MEDICAL CENTER	10/13/2015	12/18/2015	Not Due for Retest	April14-Sept15		6	V	KN	11/24/2015	NA	NA	YES	11/30/2015	NO	11/30/2015										
		7	V													HURLEY MEDICAL CENTER	11/13/2015		Not Due for Retest	Oct15toDate		7	V	KN	11/19/2015	NA	NA	YES	11/19/2015	NO	Declined										
		5	V													HURLEY MEDICAL CENTER	10/20/2015		Not Due for Retest	April14-Sept15		5	V	KN	11/25/2015	12/2/2015	12/14/2015	YES	12/2/2015	YES	NA										
		6	V													HURLEY MEDICAL CENTER	10/26/2015		Not Due for Retest	Oct15toDate		6	V	KN	11/25/2015	11/25/2015	NA	YES	11/25/2015	YES	NA										
		7	V													GENESYS REG MED OUTREACH-CPU	12/18/2015		Not Due for Retest	Oct15toDate		7	V																		

PHI	12	V	PHI	Yes	HURLEY MEDICAL CENTER	10/26/2015	12/11/2015	Not Due for Retest	Oct15toDate	PHI	18	C	ST	10/20/2015	10/22/2015					PHI			
	5	V			GENESEE COMMUNITY HLTH CENTER	10/13/2015		Not Due for Retest	April14-Sept15		5	V	KN	11/24/2015	12/2/2015	12/7/2015	YES	12/7/2015	NO				
	28	V		Yes	CHILDRENS HOSPITAL OF MICHIGAN	12/11/2015	12/11/2015	Not Due for Retest	Oct15toDate		52	V	ST	11/23/2015	NA	NA	YES	11/24/2015	YES				
	5	V		Yes	HURLEY MEDICAL CENTER	10/13/2015	11/13/2015	Not Due for Retest	April14-Sept15		12	C	KN	12/2/2015	12/7/2015	NA	YES	12/7/2015	YES				
	14	V			HURLEY MEDICAL CENTER	10/13/2015	12/11/2015	Not Due for Retest	April14-Sept15		25	V	ST	11/19/2015	12/4/2015	NA	YES	pending next results	YES				
	10	V			HURLEY MEDICAL CENTER	10/30/2015	11/9/2015	Not Due for Retest	Oct15toDate		14	C	ST	10/23/2015	11/2/2015	NA	YES	11/2/2015	does not fit				
	9	V			GENESEE CO HEALTH DEPT SAGINAW	11/9/2015	12/11/2015	Not Due for Retest	Oct15toDate		18	C	ST	12/15/2015	12/17/2015		YES	11/30/2015	YES				
	9	V			GENESEE CO HEALTH DEPT SAGINAW	11/9/2015	12/11/2015	Not Due for Retest	Oct15toDate		9	C	ST	12/14/2015	12/15/2015			11/6/2015	decline- well water				
	7	V		Yes	GENESEE COMMUNITY HLTH CENTER	10/13/2015	11/9/2015	Not Due for Retest	April14-Sept15		12	V	KN	11/13/2015	11/16/2015	NA		11/20/2015	moved				
	5	V			HURLEY MEDICAL CENTER	10/13/2015		Not Due for Retest	April14-Sept15		5	V	KN	12/3/2015	NA	NA	YES	12/3/2015	NO				
	4	V			GENESYS REG MED OUTREACH-CHJ	10/13/2015	12/4/2015	Low	April14-Sept15		6	V	KN	11/18/2015	11/18/2015	12/9/2015	YES	12/9/2015	NO		NA		
	4	C			HURLEY MEDICAL CENTER	10/13/2015	10/30/2015	Low	April14-Sept15		5	V	KN	12/16/2015	12/16/2015	NA	YES	12/16/2015	YES				
	4	C			[illegible]	10/13/2015	10/30/2015	Low	April14-Sept15		7	V	KN	12/16/2015									
	3	V			HURLEY MEDICAL CENTER	10/13/2015	11/9/2015	Low	April14-Sept15		11	V		NA	NA	NA	NA	NA					
	3	V		Yes	LAPEER REGIONAL HOSPITAL	11/13/2015	11/30/2015	Low	April14-Sept15		8	C	KN	NA	NA	NA	UTR	11/18/2015	UTR				
	3	V			MEMORIAL PEDIATRIC CLINIC	10/13/2015	10/30/2015	Low	April14-Sept15		6	C	KN	NA	NA	NA	NA	11/9/2015	NA				
	4	V			HURLEY MEDICAL CENTER	10/13/2015	12/11/2015	Low	April14-Sept15		8	V	ST	11/24/2015	12/2/2015	12/3/2015	YES	pending next results	YES				
	4	V			HURLEY MEDICAL CENTER	10/13/2015	11/13/2015	Low	April14-Sept15		5	V	KN	11/24/2015	NA	NA	YES	11/24/2015	YES				
	3	V			GENESEE CO HEALTH DEPT SAGINAW	12/4/2015	12/4/2015	Low	Oct15toDate		5	C	ST	11/23/2015	NA	NA	YES	11/23/2015	YES				
	4	V			HURLEY MEDICAL CENTER	10/13/2015	12/4/2015	Low	April14-Sept15		6	C	KN	11/18/2015	NA	NA	YES	11/20/2015	NO				
	3	V			HURLEY MEDICAL CENTER	11/20/2015	12/11/2015	Low	Oct15toDate		5	C	ST	11/16/2015	NA	NA	YES	11/16/2015	YES				
	3	V			GRAND BLANC PEDIATRIC CLINIC	10/13/2015	10/26/2015	Low	April14-Sept15		10	C		NA	NA	NA	NA						
	3	V			GENESEE CO HEALTH DEPT SAGINAW	10/30/2015	11/9/2015	Low	Oct15toDate		5	C	ST	10/28/2015	11/2/2015	NA	YES	11/2/2015	does not fit				
	3	V			HURLEY MEDICAL CENTER	10/13/2015	10/26/2015	Low	April14-Sept15		5	V		NA	NA	NA	NA						
	2	V			HURLEY MEDICAL CENTER	10/13/2015	10/26/2015	Low	April14-Sept15		26	C		NA	NA	NA	NA						
	5	C			PRIMA KIDS & ADOLESCENT	10/13/2015		Moved Out of County	April14-Sept15		6	C	KN	12/9/2015	NA	NA	YES	12/9/2015	out of state				
	8	V			GENESYS REG MED OUTREACH-CRU	10/13/2015		Moved Out of County	April14-Sept15		8	V	KN	11/24/2015	NA	NA	YES	11/24/2015	living in Oakland CO				
	5	C			GENESEE CO HEALTH DEPT SAGINAW	10/13/2015		Moved Out of County	April14-Sept15		5	C	KN	11/16/2015	11/24/2015	NA	YES	11/24/2015	living in Oakland CO				
	3	C			THE CHILDRENS OFFICE	10/13/2015	11/10/2015	Moved Out of County	April14-Sept15		5	V	KN	12/2/2015	12/7/2015	12/10/2015	YES	12/10/2015	Brighton		NA		
	2	C			UNIVERSITY OF MICHIGAN HOSP	10/13/2015	10/21/2015	Moved Out of County	April14-Sept15		5	V	KN	12/3/2015	12/8/2015	12/10/2015	YES	12/8/2015	living w/foster				

SUMMARY:

# of children needing confirmation (BLL 5-14):	83
# of children needing confirmation (BLL >= 15):	0
# of confirmed cases needing retesting (BLL 5-14):	51
# of confirmed cases needing retesting (BLL>= 15):	5
# of confirmed cases, not currently due for retest:	26
# of children with most recent BLL <5:	17
# of children moved out of county:	5
Total:	187

Children in PHI with Elevated Blood Lead Levels

HHLPSS ID	Most Recent Specimen Date	Most Recent PB Result	Most Recent Sample Type	Last Name	First Name
PHI					

Last Updated 12/21/2015

Date of Birth	Guardian Last Name	Guardian First Name	Phone	Most Recent House Number	Most Recent Street Name	MR Apt	Most Recent Patient City
PHI							

MR ZIP	Re-located	Provider Name	Date Child was Added to List	Date New Test Added	Retesting Status	Child Category
PHI					Needs Confirm	PHI
					Retest Due	
					Retest Due	
					Retest Due	
					Retest Due	
					Not Due for Retest	
					Not Due for Retest	
					Not Due for Retest	
					Not Due for Retest	
					Not Due for Retest	
					Not Due for Retest	
					~~Low~~	

Original Specimen Date	Original Pb Result	Original Sample Type	PHN Assigned	1st phone call	2nd phone call	3rd phone call	Contact Successful	Date Letter Mailed or Delivered	Water Filter Initially
PHI	5	C	KN	12/15/2015					
	5	V	KN	12/15/2015	NA	NA	UTR	Returned	UTR
	5	V	KN	12/15/2015	NA	NA	UTR	12/15/2015	UTR
	7	V	KN	12/15/2015	NA	NA	UTR	12/15/2015	UTR
	6	V	KN	12/15/2015					
	14	V	ST	11/16/2015	12/7/2015		YES	12/7/2015	NO
	6	V							
	10	V	KN	12/15/2015	NA	NA	YES	12/15/2015	NO
	9	V	ST	11/13/2015	NA	NA	YES	11/18/2015	YES
	6	V	KN	12/15/2015	NA	NA	YES	12/15/2015	NO
	6	V	ST	12/9/2015				12/9/2015	YES
	6	C	ST	11/18/2015	NA	NA	YES	11/12/2015	YES

Water Filter Delivered	PCP Follow up	First Home Visit to Open for CM	Medicaid Form Sent to Accounting - First	Second Home Visit	Medicaid Form Sent to Accounting - Second	Dropby Visit One	Dropby Visit Two	Certified Letter	Case Closed Date
		PHI							
NA									
NA									
NA									
12/9/2015									
12/15/2015									
NA									
12/15/2015									
NA									
NA									

Case Closed Reason

From: Eden <ewells@umich.edu>
Sent: Thursday, October 01, 2015 1:02 PM
To: Moran, Susan (DHHS)
Subject: Fwd: prepost

Sent from my iPhone- I apologize for typos and brevity

Begin forwarded message:

From: "LyonCallo, Sarah (DHHS)" <lyoncallos@michigan.gov>
Date: October 1, 2015 at 10:24:08 AM EDT
To: "Wells, Eden" <ewells@umich.edu>
Cc: "McKane, Patricia (DHHS)" <McKaneP@michigan.gov>, "Miller, Corinne (DHHS)" <MillerC39@michigan.gov>
Subject: RE: prepost

Dear Eden
My apologies if this is duplication. You had asked for percent testing positive for children under age 6 for City of Flint zip codes after the switch for a zip code map.

	48503	48504	48505	48506	48507
Post Flint River	5.9%	5.2%	4.6%	3.2%	1.9%

From: McKane, Patricia (DHHS)
Sent: Thursday, October 01, 2015 9:22 AM
To: LyonCallo, Sarah (DHHS)
Subject: prepost

	48503	48504	48505	48506	48507
Pre	5.7%	5.2%	4.8%	4.7%	3.1%
Post	5.9%	5.2%	4.6%	3.2%	1.9%

For under 6 years.
Patti

Patricia McKane, DVM MPH
Manager, Maternal & Child Health Epidemiology Section Michigan Department of Health and Human Services
Lifecourse Epidemiology and Genomics Division
Ph 517-335-9456
Work Hours M,T,TH 7am -4:30pm, W 7:15 am- 4:45pm, F 7am-11am
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From: Eden Wells <ewells@umich.edu>
Sent: Monday, October 05, 2015 9:01 AM
To: Moran, Susan (DHHS)
Subject: Re: Flint EBL's

DONE

Eden V. Wells, MD, MPH, FACPM
Clinical Associate Professor, Epidemiology
Director, Preventive Medicine Residency
University of Michigan School of Public Health
1415 Washington Heights,
Ann Arbor, MI 48109
Tel: 734-647-5306
Fax: 734-936-2084
ewells@umich.edu

On Mon, Oct 5, 2015 at 8:56 AM, Moran, Susan (DHHS) <MoranS@michigan.gov> wrote:
Eden- I am in DC today- can you get with our program staff and coordinate response - thank you.

Sent from my iPhone

On Oct 5, 2015, at 8:52 AM, Lyon, Nick (DHHS) <LyonN2@michigan.gov> wrote:

> So, I have a process question: If a child tests above 5 micg/dl, the suggested protocol is to provide information on how to mitigate lead exposure in the home and do a follow up blood test in the future. Can someone describe the protocols/requirements that are supposed to be followed and who is doing it?
>
> I am also curious to know how we've done with children who have a confirmed elevated blood level. If I look at the zip code data we were using last week, there have been more than 100 children who have tested at 5 or above from 2014 Q3 – 2015 Q2. How many of those children have been retested and what is their result?
>
> I would also like to know summary level data for these zip codes for how many children have tested above .14, and what the follow up rates have been for them as well.

I think this would and should be the next question that we are receiving…You identified the issue, you are suggesting a test, filter, flush approach…what about the kids who tested above the threshold?

NIck

From: Moran, Susan (DHHS)
Sent: Monday, January 04, 2016 8:35 AM
To: Miller, Corinne (DHHS);Dykema, Linda D. (DHHS);Wells, Eden (DHHS)
Subject: Updated Timeline
Attachments: Timeline 12 30 15.docx

Linda—this is the MDHHS Flint Water timeline, compiled from information discussed during our internal team meeting. The timeline is current through 12-30-15. The most recent update references the provider letter distributed by Medicaid on 12-30-15 -- Blood Lead Guidelines to Address the City of Flint Residents' Potential Exposure to Lead.

At this point, I think it makes sense for your area to be the "keeper of the timeline" and ensure that it is kept up to date, and maintain version control. Let me know if you have any questions.

Sue

Michigan Department of Health and Human Services
Flint Water: Timeline of Key Events

1 Pre July 2015

- Fall 2014 – Genesee County Health Department (GCHD) identified increase in cases of Legionella; MDHHS assisted GCHD in Epidemiologic analysis
- January 2015: MDHHS assisted with case interviews
- 6-4-15 Final Legionellosis outbreak report sent to Genesee County Health Department and discussed with Centers for Disease Control and Prevention. There were 45 cases laboratory confirmed cases of legionella. Healthcare-associated Legionella was suspected for a subset of cases. Results demonstrated that over half (27/45) of the cases had a healthcare facility exposure in the two weeks prior to their illness onset. In response, the healthcare facility has implemented multiple environmental and procedural measures to alleviate the situation.
    - The source of water at the primary residence was evaluated for all cases. Twenty-one of 45 (47%) cases occurred in people whose residence received City of Flint water. Of the 18 persons that did not report healthcare visits, 8 (44%) were exposed to Flint water at their home.
    - Ten cases had no exposure to a Flint hospital in the 2 weeks prior to illness nor were their homes on the Flint water system.
    - Other possible exposures were evaluated and no other known community exposures were identified.
    - Enhanced surveillance has continued for the remainder of 2015.
- 2-26-2015 - (2 calls) initiated by LeAnn Walters. Contacted Childhood Lead Poisoning Prevention Program-CLPPP (Karen Lishinski) – Ms. Walters expressed concern about Flint water quality and provider refusing to test her children; during second call she related that provider agreed to testing
- 3-4-2015 - (1 call) LeAnn Walters contacted CLPPP because child had elevated blood lead level; city officials wouldn't talk to her about her water; Karen provided EPA contact information

2 July 2015

- 7-22-15 Contact from Mark Johnson U.S. Agency for Toxic Substances and Disease Registry (ATSDR) to L. Dykema regarding Flint drinking water status; asking if Environmental Health was engaged
- 7-23-15 Director office inquiry forwarded to Population Health Administration for review/response
- 7-23-15 Division of Environmental Health (Dykema) contacted DEQ for update on drinking water testing/status. S. Busch relates that city in compliance with lead copper rule; one house with high lead level in water was an anomaly as house was connected to old water main but had since been corrected. This home was the residence of LeAnne Walters from 3-4-15 calls.

- 7-24-15 Childhood Lead Poisoning Prevention Program (CLPPP) requests assistance from Epidemiology to assess magnitude of change in 2014 Blood Lead Levels (in children) for city of Flint
    - Results indicate percentage of Elevated Blood Lead Levels (EBLs) for summer 2014, followed seasonal trends and the levels showed decrease by October. Further analysis would be needed to establish causation.
- 7-28-15 Response sent to Director's office

3 AUGUST 2015

- 8-4-15 Meeting with Governor's office and Flint pastors. Flint pastors had information provided to Director in response to 7-23-15 inquiry
- 8-6-15 Informal request from Liane Shekter Smith (DEQ) to Kory Groetsch MDHHS-Division of Environmental Health (DEH) after a meeting (unrelated to Flint situation) to assist with health education regarding lead in drinking water. MDHHS-DEH-supervisor made aware of request.
- 8-24-15 Dr. Mona Hanna Attisha contacts Genesee County Health Department for Blood Lead Level data/information
- 8-31-15 DEH staff meet to discuss communication plan for Flint/DEQ per request from DEQ

4 SEPTEMBER 2015

- 9-2-15 Marc Edwards contacts Bob Scott regarding Flint BLL data
- 9-8-15 Dr. Mona Hanna Attisha contacts CLPPP (K. Lishinski) regarding BLL data
- 9-9-15 Email sent from Dr. Mona Hanna Attisha to CLPPP (K. Lishinski) requesting the BLL data
- 9-11-15 DEH/DEQ conference call regarding draft communication plan; overview.
- 9-15-15 B. Scott responds to Dr. Larry Reynolds, provides chart
- 9-16-15 Dr. Mona Hanna Attisha emailed B. Scott requesting the MCIR (BLL) data
- 9-16-15 Dr. Mona Hanna Attisha contacts Senator Ananich regarding data request
- 9-22-15 Senator Ananich spoke with Director Lyon regarding Dr. Mona Hanna Attisha's data request and Flint water situation
- 9-22-15 DEQ communications office contacted DHHS communications (A. Minicucci) about Healthy Homes Program
- 9-22-15 MDHHS receives copy of Dr. Mona Hanna Attisha's presentation to be presented at upcoming press event
- 9-23-15 MDHHS WIC office receives an inquiry about availability of bottled water through the WIC program. (Per federal regulations, clients can use SNAP benefits to purchase water, but water is not an allowable food item for purchase under the WIC program).
- 9-24-15 Hurley Press Event
- 9-24-15 Director requests response to Flint water situation
- 9-24-15 Bureau of Epidemiology begins analysis of Flint zip code data utilizing the Poisson Regression for statistical analysis
- 9-25-15 MDHHS responds to Detroit Free Press reporter inquiries

- 9/28/2015 Mark Valacak-Genesee County Health Department Health Officer- contacted M. Miller regarding timeframe for completion of MDHHS data analysis
- 9-29-15 Dr. Eden Wells contacts Dr. Mona Hanna Attisha regarding her study results
- 9-30-15 Briefing to Director comparing Lead Copper Rule Testing and Marc Edwards protocol.

5 OCTOBER 2015

- 10-1-15 MDHHS provides information for Flint Water website, including the following documents: Parent Handbook: Is Your Child Safe From Lead Poisoning, Blood Lead Level (BLL) Quick Reference for Primary Care Providers, Lead Screening & Testing for Safe, Healthy Michigan Kids, and finally, Pregnant and Nursing Mothers: What You Need to Know
- 10-2-15 Governor's press conference-MDHHS study results consistent with Hurley findings
- 10-2-15 State Budget Office approval to use carryover emergency funds and transfer of DEQ funds to purchase water filters
- 10-2-15 R.Travis and S. Bien received an inquiry about what Michigan is doing regarding the Flint lead water situation from Jacqlyn Schneider, Deputy Director and Policy Director of US Senate Committee on Agriculture, Nutrition, & Forestry. Ms. Schneider inquired about the availability of Ready -to -Feed formula and asked if we are confident that the water filters that are being provided are sufficient to address the concerns about lead.
- 10-5-15 Filter distribution planning meeting held in Flint with local organizations
- 10-5-15 A teleconference was held with Rashmi Travis, Nancy Peeler, Dr. Eden Wells, Bob Scott, Corinne Miller, Sarah LyonCallo, Patti McKane (MDHSS), and Dr. Mona Hanna-Attisha, Jenny Latanz, and Dr. Richard Sandler (Hurley Lead Research Team) to discuss the nuances of the raw data that was sent on 10-2-15 to the Hurley Research Team.
- 10-5-15 S. Bien provided a response to Jaclyn Schneider indicating the following: that we are in regular contact with the local health department, the majority of WIC clients were already using bottled water to reconstitute infant formula, that a mass distribution (about 4000 filters) of filters was underway, and lead testing was being done adjunct with WIC clinics, and the local health department had additional lead testing opportunities scheduled.
- 10-5-15 MDHHS announces water filters will be available to the public on Oct. 6
- 10-6-15 MDHHS announces extended hours for filter distribution, updates Parent Handout on Flint Water website
- 10-7-15 Flint Mayor's Water Technical Advisory Committee meeting (E. Wells, L. Dykema); recommends switch back to Detroit Water Authority
- 10-8-15 GCHD issues Public Health Advisory
- 10-12-15 Daily calls with GCHD begin. Topics Include:
    - Distribution and tracking of filters
    - Development and implementation of case management in Flint by GCHD
    - Development and implementation of lead environmental inspection contract
    - Development and distribution of educational materials – to providers and parents
    - Testing events (blood lead)
    - Testing events (water mainly / DEQ activtity in the schools)

    - Data analysis (internal meeting)
- 10-13-15 MDEQ/MDHHS/toxic steering group committee meeting discusses use of the Integrated Exposure Update Biokinetic (IEUBK) model for lead in childrenfor the Flint water situation; requested a subcommittee to identify the exposure assumptions that would be developed for schools and homes
- 10-13-15 CLPPP provided Lead Week Toolkit to DEH
- 10-13-15 Began development of the Lead & Your Body infographic
- 10-13-15 MDHHS Division of Environmental Health, MDEQ, and LARA begin weekly briefing regarding school drinking water sampling
- 10-15-15 Angela Minicuci requests the addition of the MDHHS/GCHD Lead Flint Water Fact Sheet to the Flint Water website
- 10-16-15 First of weekly meetings with city of Flint meeting DEQ HHS LARA GCHD (Jim Henry) at the Mayor's office
- 10-16-15 MDHHS (L. Dykema) participates in meeting with superintendent of Flint schools
- 10-19-15 Supplemental funding legislation passed
- 10-20-15 Daily calls to GCHD changed biweekly (ongoing)
- 10-21-15 Dr. Wells and N. Peeler speak to Medicaid Health Plans (Clinical Advisory Committee meeting) regarding Blood lead testing protocol and case management follow up
- 10-22-15 Angela Minicuci requests updates to the Flint Water website of the Lead Flint Water, and Lead and Your Body documents after GCHD edits; Angela Minicuci contacted Sheryl Thompson about recording a video about how to replace a water filter in collaboration with Home Depot
- 10-23-15 DEQ's videographer, Eric Shaw, met with Home Depot employee in Flint to record his instructions about how to install and replace a filter
- 10-27-15 ETC contracted to provide EBL investigation services
- 10-27-15 Briefing to Director regarding IEUBK modeling for school drinking water screening value.
- 10-27-15 S.Bien received an email from USDA regional representative, Bruce Hillman, indicating that our Congressional Representatives had sent a letter to Tom Vilsack, Secretary of USDA inquiring about community response to address immediate and long-term needs. Regional USDA representative indicated he would be in contact with MDHHS WIC office to receive an update. MDHHS WIC office responded that we continue to work with the local health department to assure that clients are getting access to filters and bottled water to mix their infant formula. WIC also indicated that at that time there had not been any requests from WIC clients for Ready to Feed Formula.
- 10-28-15 DEH requested by Eden Wells to help clarify CLPPP report for the Director
- 10-28-15 – Brita filter replacement video was picked up by Angela Minicuci from Eric Shaw
- 10-30-15 Case management (nursing) contract with Genesee County Health Department begin
- 10-30-15 Angela Minicuci requests that the parent and provider letters, along with their attachments, be posted to the Flint Water website
- 10-30-15 (approx.) 8500 parent information packets distributed to GCHD

6 NOVEMBER 2015

- 11-3-15 Director's office received a letter from Tim English, Midwest Regional Administrator for USDA
- 11-4-15 Brita filter replacement video posted to the MDHHS YouTube channel
- 11-5-15 Response to Tim English's inquiry drafted and sent to Director Lyon's office. MDHHS indicates continued monitoring of Ready to Feed formula use and coordinating with Ready to Feed manufacturer and WIC retailers to proactively address any supply or distribution issues with infant formula availability.
- 11/6/15 Bruce Hillman, Regional Representation from USDA, notified S. Bien that they had received questions from Katie Bergh from Senator Stabenow's office regarding availability of Ready to Feed, our communication plan, how many clients had requested Ready to Feed.
- 11-6-15 Additional 3500 parent packets distributed to GCHD
- 11-9-15 Transition of 2.0 CLPPP staff to DEH
- 11-12-15 Phone conference with Karla Ruest, Rashmi Travis (MDHHS), Stan Bien (MDHSS-WIC), Kristin Hanulcik (MDHSS- WIC), Bruce Hillman (USDA), Anne Bartholomew (USDA), Katie Bergh (Senator Stabenow's office), and Jaclyn Schneider (Deputy Staff Director US Senate Committeee on Agriculture, Nurtrition, and Forestry) in regards to the legislative inquiries. Information was provided on how MDHHS is working with the local health department to monitor requests for Ready to Feed formula, continuing to work with the local health department to assure filters and bottled water are provided to clients, and providing educational materials on Ready to Feed formula to WIC clients. To date, only one WIC client had requested Ready to Feed formula.
- 11-13-15 Call with ATSDR, GCHD and MDHS to discuss outreach material
- 11/16/15 Information on Ready to Feed formula (including Talking Points, WIC Provider Letter, and infographic on Ready to Feed formula) was shared with the local health department to share with providers in the community. This same information was provided to Congressional delegates on 11-12-15 phone conference.
- 11-18-15 DHHS Meets with Governor's Flint Water Task Force
- 11-24-15 DEH Project Management Structure implemented
    - Daily Situation Reports-Reps begin being compiled and distributed to MDHHS staff
    - Bi-weekly calls with GCHD change to weekly (ongoing)
- 11-24-15 Information on Ready to Feed formula (including Talking Points, WIC Provider Letter, and infographic on Ready to Feed formula) was shared with Medicaid to share with the Medicaid Health Plans.

7 DECEMBER 2015

- 12-3-15 MDHHS BLL Summary Report released and is posted to Flint water website
- 12-7-15 Angela Minicuci requests update to the Flint Water website of the Lead and Your Body FAQ
- 12-8-15 Angela Minicuci requests removal of the Fight Lead with a Healthy Diet PDF until it's updated
- 12-11-15 MDHHS BLL Summary Report released and is posted to Flint water website

- 12-14-15 Meeting with MSA to develop specifications for production of Medicaid population based blood lead testing reports for children in Flint exposed to Flint city water source
- 12-23-15 MDHHS issues third summary EBLL report noting change in method, report posted to Flint Water website
- 12-30-15 MSA issues L 15-73 – Blood Lead Guidelines to Address the City of Flint Residents' Potential Exposure to Lead. This letter was sent to Practitioners, Clinics, Laboratories and Maternal Infant Health Program (MIHP) Providers in the City of Flint.

From: MoranS@michigan.gov
Sent: Monday, January 04, 2016 3:57 PM
To: Lyon, Nick (DHHS);Becker, Timothy (DHHS);Lasher, Geralyn (DHHS)
Subject: Fwd: 2016-01-04 Flint Drinking Water Action Plan Update - FOIA EXEMPT AND ATTORNEY-CLIENT PRIVILEGED
Attachments: 2016-01-04 Flint Drinking Water Action Plan Update.pdf; ATT00001.htm; 2016-01-04 Home Owner Results Samples Submitted Nov 1 2015 thru December 29 2015.pdf; ATT00002.htm

FYI

Sent from my iPhone

Begin forwarded message:

From: "Dykema, Linda D. (DHHS)" <DykemaL@michigan.gov>
Date: January 4, 2016 at 3:53:01 PM EST
To: "Moran, Susan (DHHS)" <MoranS@michigan.gov>, "Wells, Eden (DHHS)" <WellsE3@michigan.gov>, "Miller, Corinne (DHHS)" <MillerC39@michigan.gov>
Subject: FW: 2016-01-04 Flint Drinking Water Action Plan Update - FOIA EXEMPT AND ATTORNEY-CLIENT PRIVILEGED

Please see the attached DEQ updates and note the discussion of the very high level of lead in drinking water at the Whaley Children's Center, which provides day care services. I'll see if George Krisztian has any additional information on our briefing call tomorrow at 8 am and I'll touch base with the group in LARA that has oversight of child care facilities (used to be in MDCH but recently reassigned) to be sure they are aware.

From: Creagh, Keith (DEQ)
Sent: Monday, January 04, 2016 3:30 PM
To: Scott, Allison (GOV) <scotta12@michigan.gov>; Muchmore, Dennis (GOV) <muchmored@michigan.gov>; Agen, Jarrod (GOV) <AgenJ@michigan.gov>; Emmitt, Beth (GOV) <emmittb@michigan.gov>; Bedan, Morgan (GOV) <BedanM@michigan.gov>; Baird, Richard (GOV) <bairdr@michigan.gov>
Cc: Dickinson, Sarah (GOV) <DickinsonS@michigan.gov>; Edgerton, Shelly (LARA) <EdgertonS1@michigan.gov>; Dykema, Linda D. (DHHS) <DykemaL@michigan.gov>; Creagh, Keith (DEQ) <creaghk@michigan.gov>; Brown, Melanie (TED) <BrownM45@michigan.gov>; Thelen, Mary Beth (DEQ) <THELENM2@michigan.gov>
Subject: 2016-01-04 Flint Drinking Water Action Plan Update - FOIA EXEMPT AND ATTORNEY-CLIENT PRIVILEGED

Dear Governor's Office:

Please provide the following to the Governor as a part of his daily briefing packet. If you have any questions, please let us know.

<!--[if !supportLists]-->· <!--[endif]-->Flint Drinking Water Action Plan Update
<!--[if !supportLists]-->· <!--[endif]-->Home Owner Results Samples Submitted November-December 2015

As a reminder we will prepare these reports to you weekly, every Monday afternoon, for the previous week's actions.

Also, I have copied Melanie Brown as she has been assigned to the DEQ as the Communications Director until further notice.

Thank you.

Keith Creagh
Director

Flint Drinking Water Action Plan Update

FOIA EXEMPT AND ATTORNEY-CLIENT PRIVILEGE

Key Actions:

On December 28-29, 2015, staff from the DEQ and DLARA conducted the formal plumbing evaluation of Flint Community Schools' Northwestern High School and Southwestern Classical Academy. On December 29-30 staff from DEQ and DLARA then performed the follow-up sampling of the drinking fountains and faucets that are used for consumptive purposes at these two facilities. This completes the initial evaluation process for all 13 schools of the Flint Community Schools. Once the Flint Community Schools has had an opportunity to incorporate the recommendations in the plumbing evaluation reports, a follow-up sampling will be scheduled to ensure that all of the issues have been properly addressed.

Evaluations of the Flint Community Schools will continue to be posted to the Flint water Web site: www.mi.gov/flintwater. These reports are being shared with Flint Community Schools Superintendent Bilal Tawwab first and then posted. So far, three reports have been posted, with the remaining reports expected to be completed by the end of January 2016.

A list of schools and childcare facilities served by the Flint water system requesting a plumbing evaluation has been created. These facilities will be contacted during the first two weeks in January to schedule a free plumbing evaluation of their facilities. The protocol used will be the same one used for the Flint Community Schools. To date, there are a total of 10 facilities that have requested a plumbing evaluation. Once these 10 facilities have been scheduled, efforts will be made to reach out to additional facilities that may wish to take advantage of this free program.

Video footage was taken on December 29, 2015, of the plumbing evaluation process and the sampling protocol of the drinking fountains and faucets at Flint Community Schools' Northwestern High School and Southwestern Classical Academy. This footage is being used to create a video that provides an easy-to-understand explanation of how the plumbing evaluations and subsequent sampling is being done in the schools. The target audience for this video is primarily the residents of Flint so that they can get a visual of the efforts already underway, but it is anticipated that this video will also be used as an instructional aid for schools elsewhere in Michigan that are interested in having their facilities evaluated.

Positions:

There are no new positions to report.

Concerns:

There are no new concerns to report.

Significant Event:

On December 29, 2015, Dan Wyant resigned his position as Director of the DEQ. DNR Director Keith Creagh has been appointed Interim Director of the DEQ. Reports have been created and meetings have been scheduled to provide Director Creagh with a history of the Flint situation as well as current plans for moving forward.

Changes from Previous Report:

- The Flint water Web site has been redesigned. The old site was beginning to become cluttered and information was becoming difficult to locate. The new design provides a more user friendly interface and has a more elegant flow. It is anticipated that the redesigned Web site will go live during the week of January 4, 2016.

- The DEQ Laboratory identified a lead result as being alarmingly high. This result was conveyed to Flint Action Plan Coordinator George Krisztian so that the customer could be contacted instead of waiting for the final report to go out. Investigation of the address revealed that the sample was taken at the Whaley Children's Center. The facility was contacted, and the contact there was notified that one of the samples that they submitted was in excess of 2,500 parts per billion (ppb), or more than 160 times higher than the federally-mandated action level of 15 ppb. The contact was instructed to take measures to ensure that water from that point was not being used for consumptive purposes. Since the facility provided childcare, Mr. Krisztian described the free plumbing evaluation service available and offered to put Whaley Children's Center on the list of facilities being evaluated. The contact indicated that they would provide the information to management for consideration.

- A review of the results from the free lead testing offered to all Flint residents since November 1, 2015, show a downward trend compared to results from those prior to November 1, 2015. This can be attributed to a number of factors. The switch to using water from Detroit Water and Sewerage Department, the implementation of supplemental phosphate addition, and the colder temperatures are all possible contributing factors in this trend.

  Since November 1, 2015, a total of 298 samples have been submitted and analyzed by the DEQ Laboratory. Of these samples, 248 or 83.2% show concentrations of 5 ppb or less. In addition, 279 samples or 93.6% show concentrations at or below the action level of 15 ppb.

  While this data is encouraging and indicates that the Flint water supply is moving towards compliance with the Lead and Copper Rule (LCR), it is imperative to view this data cautiously. The LCR specifies what sampling points may be used for compliance purposes. The data for these samples is nonselective and

potentially may not be coming from distribution points that would be allowed under the LCR. In addition, although the paperwork indicates that samples should not go through a filter, it is possible that some residents are using the free lead testing service to ensure the filters that have been provided do, in fact, remove lead.

Other Item:

Attached is a spreadsheet containing data for samples submitted by Flint residents through the free lead testing program.

Prepared by: George Krisztian, Flint Action Plan Coordinator
Laboratory Director
Department of Environmental Quality
Telephone: 517-284-6719
Cell: PPI
January 4, 2016

Home Owner Results - Samples Submitted 11-1-15 Through 12-29-15

SAMPLE NUMBER	DATE SUBMITTED	ANALYTE	RESULT	ADDRESS	ZIP CODE
LF90454	04-Nov-15	LEAD	0.000	2484 NOLEN DR	48504
LF90456	04-Nov-15	LEAD	0.000	2105 TUSCOLA ST	48503
LF90457	04-Nov-15	LEAD	0.000	1217 MAXINE	48503
LF90458	04-Nov-15	LEAD	0.000	2610 PEWANAGA PL	48507
LF90459	04-Nov-15	LEAD	0.000	2508 PIERCE ST	48503
LF90465	04-Nov-15	LEAD	0.000	3905 KELLAR AVE	48504
LF90467	04-Nov-15	LEAD	0.000	2484 NOLEN DR #2	48504
LF90468	04-Nov-15	LEAD	0.000	1680 N CHEVROLET AVE	48504
LF91271	09-Nov-15	LEAD	0.000	1419 MULBERRY LN	48507
LF91273	09-Nov-15	LEAD	0.000	1715 CRESCENT DR	48503
LF91275	09-Nov-15	LEAD	0.000	718 COLUMBIA LN	48503
LF91277	09-Nov-15	LEAD	0.000	3018 CLEMENT ST	48504
LF91278	09-Nov-15	LEAD	0.000	601 WHITE WILLOW DR	48506
LF91280	09-Nov-15	LEAD	0.000	718 COLUMBIA LN	48503
LF91281	09-Nov-15	LEAD	0.000	718 COLUMBIA LN	
LF91283	09-Nov-15	LEAD	0.000	2006 AITKEN AVE	48503
LF91285	09-Nov-15	LEAD	0.000	718 COLUMBIA LN	48503
LF91286	09-Nov-15	LEAD	0.000	3840 GLOUCESTER ST	48503
LF91290	09-Nov-15	LEAD	0.000	3841 LORRAINE AVE	48506
LF91291	09-Nov-15	LEAD	0.000	3614 ALDON LN	48506
LF92698	18-Nov-15	LEAD	0.000	2101 WINDEMERE AVE	48503
LF92699	18-Nov-15	LEAD	0.000	1963 LAUREL OAK DR	48507
LF92702	18-Nov-15	LEAD	0.000	6622 ELMRIDGE DR	
LF92705	18-Nov-15	LEAD	0.000	2438 MISSOURI AVE	48506
LF92712	18-Nov-15	LEAD	0.000	418 E BALTIMORE BLVD	48505
LF92713	18-Nov-15	LEAD	0.000	2101 WINDEMERE AVE	48503
LF92715	18-Nov-15	LEAD	0.000	313 E LYNDON AVE	48505
LF92719	18-Nov-15	LEAD	0.000	4236 KELLAR AVE	48504
LF92722	18-Nov-15	LEAD	0.000	1043 PINEHURST AVE	48507
LF92724	18-Nov-15	LEAD	0.000	822 W HEMPHILL RD	48507
LF92725	18-Nov-15	LEAD	0.000	6310 FLEMING RD	48504
LF92726	18-Nov-15	LEAD	0.000	3245 MONTANA AVE	48506
LF92727	18-Nov-15	LEAD	0.000	1602 S FRANKLIN AVE	48503
LF92728	18-Nov-15	LEAD	0.000	4117 TRUMBULL AVE	
LF92729	18-Nov-15	LEAD	0.000	3302 GRATIOT AVE	48503
LF92730	18-Nov-15	LEAD	0.000	3230 COLORADO	48506
LF92735	18-Nov-15	LEAD	0.000	1326 BEARD ST	
LF92736	18-Nov-15	LEAD	0.000	1214 KENSINGTON AVE	48503
LF92737	18-Nov-15	LEAD	0.000	800 E COURT ST #134	48503
LF92738	18-Nov-15	LEAD	0.000	555 S SAGINAW ST STE 201	48502

Home Owner Results - Samples Submitted 11-1-15 Through 12-29-15

SAMPLE NUMBER	DATE SUBMITTED	ANALYTE	RESULT	ADDRESS	ZIP CODE
LF93550	24-Nov-15	LEAD	0.000	318 BUCKINGHAM AVE/FILTER	48505
LF93554	24-Nov-15	LEAD	0.000	2101 STEDRON ST	48504
LF93561	24-Nov-15	LEAD	0.000	1410 BLUEBERRY LN/6	48507
LF93567	24-Nov-15	LEAD	0.000	6211 OXLEY (MAIL 6201 OXLEY)	
LF93568	24-Nov-15	LEAD	0.000	6201 OXLEY DR	48504
LF93569	24-Nov-15	LEAD	0.000	607 EAST ST APT 3 (A)	48503
LF93570	24-Nov-15	LEAD	0.000	3913 WISNER ST	48504
LF93571	24-Nov-15	LEAD	0.000		
LF93572	24-Nov-15	LEAD	0.000	3510 YALE ST	
LF93573	24-Nov-15	LEAD	0.000	1825 OWEN ST	48503
LF93577	24-Nov-15	LEAD	0.000	3306 BARTH ST	
LF93578	24-Nov-15	LEAD	0.000	1608 BROAD COURT	48503
LF93580	24-Nov-15	LEAD	0.000	312 BUCKINGHAM AVE	48507
LF93586	24-Nov-15	LEAD	0.000	429 CHAVEZ DR (NORTH BOUND)	48503
LF93589	24-Nov-15	LEAD	0.000	916 HUBBARD AVE	48503
LF93591	24-Nov-15	LEAD	0.000	3221 WYOMING AVE	48506
LF93592	24-Nov-15	LEAD	0.000	810 MAC DONALD AVE	48507
LF93593	24-Nov-15	LEAD	0.000	613 E ATHERTON	48507
LF93594	24-Nov-15	LEAD	0.000	700 E COURT ST #303	48503
LF93595	24-Nov-15	LEAD	0.000	4311 OGEMA	48507
LF94259	02-Dec-15	LEAD	0.000	2833 COMANCHE AVE	
LF94263	02-Dec-15	LEAD	0.000	3515 SUNSET DR	48503
LF94265	02-Dec-15	LEAD	0.000	3125 MONTANA AVE	48506
LF94269	02-Dec-15	LEAD	0.000	2833 COMANCHE AVE	
LF94270	02-Dec-15	LEAD	0.000	1920 COLCHESTER RD	48503
LF94272	02-Dec-15	LEAD	0.000	2954 CONCORD ST	48504
LF94280	02-Dec-15	LEAD	0.000	420 GREENFIELD AVE	48503
LF94284	02-Dec-15	LEAD	0.000	1201 N GRAND TRAVERSE #V4	48503
LF94285	02-Dec-15	LEAD	0.000	1201 N GRAND TRAVERSE V2	48503
LF94286	02-Dec-15	LEAD	0.000	1201 N GRAND TRAVERSE #V3	48503
LF94287	02-Dec-15	LEAD	0.000	1802 CARMEN BROOK PKY	48507
LF94288	02-Dec-15	LEAD	0.000	3407 LEITH ST	48506
LF94289	02-Dec-15	LEAD	0.000	3915 OGEMA	
LF94290	02-Dec-15	LEAD	0.000	3501 SHERWOOD DR	48503
LF94291	02-Dec-15	LEAD	0.000	1201 N GRAND TRAVERS J3	48503
LF94293	02-Dec-15	LEAD	0.000	1201 NORTH GRAND TRAVERSE #1	48503
LF94294	02-Dec-15	LEAD	0.000	1201 N GRAND TRAVERSE #2	48503
LF94296	02-Dec-15	LEAD	0.000	3109 BEECHER RD	48503
LF94299	02-Dec-15	LEAD	0.000	1201 N GRAND TRAVERSE #V1	48503
LF94301	02-Dec-15	LEAD	0.000	1802 CARMENBROOK PKY	48507

Home Owner Results - Samples Submitted 11-1-15 Through 12-29-15

SAMPLE NUMBER	DATE SUBMITTED	ANALYTE	RESULT	ADDRESS	ZIP CODE
LF94303	02-Dec-15	LEAD	0.000	346 ALLENDALE PLACE	48503
LF94304	02-Dec-15	LEAD	0.000	412 SHEFFIELD AVE	
LF95909	10-Dec-15	LEAD	0.000	2761 CHICAGO BLVD	48503
LF95910	10-Dec-15	LEAD	0.000	3401 MILLER RD	48503
LF95912	10-Dec-15	LEAD	0.000	1606 BARBARA DR	48504
LF95916	10-Dec-15	LEAD	0.000	4018 PARK FOREST DR	48507
LF95921	10-Dec-15	LEAD	0.000	3602 MILBOURNE AVE	48504
LF95923	10-Dec-15	LEAD	0.000	1001 BEARD ST	48503
LF95925	10-Dec-15	LEAD	0.000	3822 W COURT ST	48532
LF95926	10-Dec-15	LEAD	0.000	1901 CASTLE LN	48504
LF95928	10-Dec-15	LEAD	0.000	665 E HEMPHILL RD	48507
LF95930	10-Dec-15	LEAD	0.000	2201 KANSAS ST	48506
LF95932	10-Dec-15	LEAD	0.000	214 W FOSS	48
LF97319	18-Dec-15	LEAD	0.000	3505 COMANCHE AVE	48507
LF97320	18-Dec-15	LEAD	0.000	4509 TRUMBULL DR	48504
LF97321	18-Dec-15	LEAD	0.000	1604 E COURT	48503
LF97322	18-Dec-15	LEAD	0.000	1302 BARNEY AVE	48503
LF97324	18-Dec-15	LEAD	0.000	1925 HASLER ST	48503
LF97326	18-Dec-15	LEAD	0.000	2201 HILLS ST	48503
LF97332	18-Dec-15	LEAD	0.000	6709 COLONIAL DR	48505
LF97333	18-Dec-15	LEAD	0.000	3921 BRANCH RD	48506
LF97335	18-Dec-15	LEAD	0.000	505 EAST ST	48503
LF97336	18-Dec-15	LEAD	0.000	1925 HOSLER ST	48503
LF97337	18-Dec-15	LEAD	0.000	106 E PIPER AVE	48505
LF97338	18-Dec-15	LEAD	0.000	1013 BLANCHARD	48503
LF97339	18-Dec-15	LEAD	0.000	209 S CUMBERLAND ST	
LF97341	18-Dec-15	LEAD	0.000	2014 HILLS ST	
LF97345	18-Dec-15	LEAD	0.000	5366 OAK TREE CT	48532
LF97348	18-Dec-15	LEAD	0.000	4202 CIRCLE DR	48507
LF97919	29-Dec-15	LEAD	0.000	532 S VERNON AVE	48503
LF97921	29-Dec-15	LEAD	0.000	3901 CHEYENNE AVE	48507
LF97926	29-Dec-15	LEAD	0.000	1223 BENNETT AVE	48506
LF97928	29-Dec-15	LEAD	0.000	3123 CHAMBERS ST	48507
LF97929	29-Dec-15	LEAD	0.000	2101 STEDRON	48504
LF97930	29-Dec-15	LEAD	0.000	5838 EDGAR HOLT DR	
LF97931	29-Dec-15	LEAD	0.000	5838 EDGAR HOLT	48505
LF97932	29-Dec-15	LEAD	0.000	7002 PEMBERTON DR	
LF97933	29-Dec-15	LEAD	0.000	7002 PEMBERTON DR BLDG 15	
LF97934	29-Dec-15	LEAD	0.000	4060 M L KING APT 11	48505
LF97936	29-Dec-15	LEAD	0.000	5838 EDGAR HOLT	48505

Home Owner Results - Samples Submitted 11-1-15 Through 12-29-15

SAMPLE NUMBER	DATE SUBMITTED	ANALYTE	RESULT	ADDRESS	ZIP CODE
LF97937	29-Dec-15	LEAD	0.000	906 GARLAND ST	48503
LF97940	29-Dec-15	LEAD	0.000	5838 EDGAR HOLT DR	
LF97941	29-Dec-15	LEAD	0.000	454 DOUGHERTY PL	48504
LF97942	29-Dec-15	LEAD	0.000	1201 N GRAND TRAVERSE N	
LF97944	29-Dec-15	LEAD	0.000	3123 CHAMBERS ST (BRITA)	48507
LF97947	29-Dec-15	LEAD	0.000	2510 NEBRASKA AVE	48506
LF97951	29-Dec-15	LEAD	0.000	902 E COURT #308 RICHERT MANOR	
LF97953	29-Dec-15	LEAD	0.000	5838 EDGAR HOLT	
LF97956	29-Dec-15	LEAD	0.000	3800 RICHFIELD RD	
LF97958	29-Dec-15	LEAD	0.000	5838 EDGAR HOLT DR	48505
LF97960	29-Dec-15	LEAD	0.000	7002 PEMBERTON DR BLDG 29	48505
LF97966	29-Dec-15	LEAD	0.000	2200 N DORT HWY	48507
LF97967	29-Dec-15	LEAD	0.000	2200 N DORT HWY	48507
LF97968	29-Dec-15	LEAD	0.000	3930 HERRICK ST	
LF97969	29-Dec-15	LEAD	0.000	5709 OXLEY DR	
LF97973	29-Dec-15	LEAD	0.000	605 JOSEPHINE	
LF97982	29-Dec-15	LEAD	0.000	2610 M L KING SALEM LUTHERAN	
LF91269	09-Nov-15	LEAD	0.001	2937 CONCORD ST	48504
LF91282	09-Nov-15	LEAD	0.001	726 W DARTMOUTH ST	48505
LF91284	09-Nov-15	LEAD	0.001	210 W STEWART AVE	48505
LF92700	18-Nov-15	LEAD	0.001	317 BEDE ST	48507
LF92701	18-Nov-15	LEAD	0.001	4629 MILTON DR	48507
LF92703	18-Nov-15	LEAD	0.001	6626 ELMRIDGE DR	48505
LF92706	18-Nov-15	LEAD	0.001	532 BURROUGHS AVE	48507
LF92711	18-Nov-15	LEAD	0.001	3826 BROWN ST	48532
LF92714	18-Nov-15	LEAD	0.001	4515 OGEMA	48507
LF93581	24-Nov-15	LEAD	0.001	3701 DAKOTA AVE	485
LF93582	24-Nov-15	LEAD	0.001	3312 BENNETT AVE	48506
LF93588	24-Nov-15	LEAD	0.001	1406 BLUEBERRY LN	48507
LF94267	02-Dec-15	LEAD	0.001	3210 NORWOOD DR	
LF94275	02-Dec-15	LEAD	0.001	2806 THOMAS ST	48504
LF94278	02-Dec-15	LEAD	0.001	3406 DEARBORN AVE	48507
LF94281	02-Dec-15	LEAD	0.001	707 ALGONQUIN AVE	48507
LF94283	02-Dec-15	LEAD	0.001	2954 CONCORD ST	48504
LF94298	02-Dec-15	LEAD	0.001	1819 FRANCIS AVE	48505
LF95920	10-Dec-15	LEAD	0.001	1221 BARNEY	48503
LF95935	10-Dec-15	LEAD	0.001	3320 MILLER RD	48503
LF97318	18-Dec-15	LEAD	0.001	2313 HILLS STREET	48503
LF97325	18-Dec-15	LEAD	0.001	653 S SAGINAW #105	48502
LF97327	18-Dec-15	LEAD	0.001	912 CRAWFORD ST	

Home Owner Results - Samples Submitted 11-1-15 Through 12-29-15

SAMPLE NUMBER	DATE SUBMITTED	ANALYTE	RESULT	ADDRESS	ZIP CODE
LF97340	18-Dec-15	LEAD	0.001	3141 WYOMING AVE	
LF97343	18-Dec-15	LEAD	0.001	3614 DAKOTA AVE	48506
LF97952	29-Dec-15	LEAD	0.001	1201 N GRAND TRAVERSE	
LF97962	29-Dec-15	LEAD	0.001	1201 N GRAND TRAVERSE	48503
LF97965	29-Dec-15	LEAD	0.001	631 E ATHERTON	48507
LF90455	04-Nov-15	LEAD	0.002	1217 MAXINE	48503
LF90461	04-Nov-15	LEAD	0.002	3741 WORCHESTER DR	48503
LF91270	09-Nov-15	LEAD	0.002	915 E COURT ST #405	48503
LF91274	09-Nov-15	LEAD	0.002	4221 BROWNELL BLVD	48504
LF91288	09-Nov-15	LEAD	0.002	112 E STEWART AVE	48505
LF91289	09-Nov-15	LEAD	0.002	2601 CIRCLE DR	48507
LF92709	18-Nov-15	LEAD	0.002	3802 GREENBROOK LN	48507
LF92716	18-Nov-15	LEAD	0.002	3825 DAVISON RD	48506
LF92718	18-Nov-15	LEAD	0.002	4109 TRUMBULL AVE	48504
LF92720	18-Nov-15	LEAD	0.002	932 LYON ST	48503
LF92721	18-Nov-15	LEAD	0.002	3420 PARKSIDE DR	48503
LF92732	18-Nov-15	LEAD	0.002	1331 BEARD ST	48503
LF93563	24-Nov-15	LEAD	0.002	1616 DURAND	48503
LF93583	24-Nov-15	LEAD	0.002	4309 CUTHBERTSON	48507
LF93585	24-Nov-15	LEAD	0.002	3502 BRINTWOOD DR	48503
LF94268	02-Dec-15	LEAD	0.002	326 FERNDALE PLACE	48503
LF94274	02-Dec-15	LEAD	0.002	3914 STERLING ST	48504
LF94276	02-Dec-15	LEAD	0.002	3550 HAWTHORNE DR	48503
LF94295	02-Dec-15	LEAD	0.002	630 W ATHERTON RD	48507
LF94297	02-Dec-15	LEAD	0.002	3636 BRENTWOOD	48503
LF94300	02-Dec-15	LEAD	0.002	3623 NORWOOD DR	48503
LF95918	10-Dec-15	LEAD	0.002	2020 KANSAS	48506
LF95919	10-Dec-15	LEAD	0.002	3102 BROWNELL BLVD	48504
LF95929	10-Dec-15	LEAD	0.002	3501 HAWTHORNE DR	48
LF95934	10-Dec-15	LEAD	0.002	2564 TYRONE ST	48504
LF97316	18-Dec-15	LEAD	0.002	224 E COURT ST APT 405	49502
LF97323	18-Dec-15	LEAD	0.002	1902 S AVERILL	48507
LF97330	18-Dec-15	LEAD	0.002		
LF97344	18-Dec-15	LEAD	0.002	732 VERMILYA AVE	
LF97950	29-Dec-15	LEAD	0.002	1201 N GRAND TRAVERSE	
LF97955	29-Dec-15	LEAD	0.002	3123 CHAMBERS ST	
LF97974	29-Dec-15	LEAD	0.002	2302 MOUNTAIN AVE	48503
LF90466	04-Nov-15	LEAD	0.003	1670 DUPONT ST	48504
LF91287	09-Nov-15	LEAD	0.003	218 W STEWART AVE	48505
LF92697	18-Nov-15	LEAD	0.003	325 BEDE ST	48507

Home Owner Results - Samples Submitted 11-1-15 Through 12-29-15

SAMPLE NUMBER	DATE SUBMITTED	ANALYTE	RESULT	ADDRESS	ZIP CODE
LF92707	18-Nov-15	LEAD	0.003	3825 DAVISON RD #2	48506
LF92708	18-Nov-15	LEAD	0.003	1914 MILLER RD	48503
LF92717	18-Nov-15	LEAD	0.003	3816 PARK FOREST DR	
LF92723	18-Nov-15	LEAD	0.003	509 WELLER ST	48504
LF93551	24-Nov-15	LEAD	0.003	318 BUCKINGHAM AVE (#2)	48507
LF93557	24-Nov-15	LEAD	0.003	1302 BLANCHARD AVE	48503
LF93579	24-Nov-15	LEAD	0.003	1807 WOODLIN DR	48504
LF94264	02-Dec-15	LEAD	0.003	322 FERNDALE PLACE	48503
LF94266	02-Dec-15	LEAD	0.003	1402 EAST COURT ST	48503
LF94273	02-Dec-15	LEAD	0.003	1801 SENECA ST	48504
LF94292	02-Dec-15	LEAD	0.003	2721 COVENTRY CT	48503
LF95913	10-Dec-15	LEAD	0.003	2702 MACKIN RD	48504
LF95924	10-Dec-15	LEAD	0.003	429 BURROUGHS AVE	48507
LF97317	18-Dec-15	LEAD	0.003	1521 BROOKWOOD DR	48503
LF97329	18-Dec-15	LEAD	0.003	1102 SOUTH DR	48503
LF97334	18-Dec-15	LEAD	0.003	224 E COURT APT 107	48502
LF97918	29-Dec-15	LEAD	0.003	1839 OAK BROOK CIR	
LF97925	29-Dec-15	LEAD	0.003	1223 BENNETT AVE	
LF97939	29-Dec-15	LEAD	0.003	1201 N GRAND TRAVERSE B	48503
LF97948	29-Dec-15	LEAD	0.003	3800 RICHFIELD RD #513	
LF97959	29-Dec-15	LEAD	0.003	1201 N GRAND TRAVERSE	48503
LF97977	29-Dec-15	LEAD	0.003	605 JOSEPHINE	
LF97983	29-Dec-15	LEAD	0.003	2302 MOUNTAIN AVE	48503
LF90460	04-Nov-15	LEAD	0.004	3510 ROBIN ST	48505
LF90463	04-Nov-15	LEAD	0.004	1014 BARRINGTON DR	
LF92704	18-Nov-15	LEAD	0.004	2020 CROOKED LN	48503
LF92731	18-Nov-15	LEAD	0.004	919 GLADWYN ST/MAIL TO 3302	48504
LF93564	24-Nov-15	LEAD	0.004	1410 BLUEBERRY LN/5	48507
LF93574	24-Nov-15	LEAD	0.004	3709 CIRCLE DR	48507
LF94302	02-Dec-15	LEAD	0.004	1934 CAMBRIDGE AVE	48503
LF95917	10-Dec-15	LEAD	0.004	3748 GLOUCESTER	
LF95922	10-Dec-15	LEAD	0.004	1909 WABASH	48505
LF97957	29-Dec-15	LEAD	0.004	1201 N GRAND TRAVERSE	
LF97963	29-Dec-15	LEAD	0.004	1230 DUPONT ST	
LF97964	29-Dec-15	LEAD	0.004	2380 NOLEN DR	48504
LF97981	29-Dec-15	LEAD	0.004	2610 M L KING AVE SALEM LUTHERAN	
LF91276	09-Nov-15	LEAD	0.005	746 S SAGINAW ST	48502
LF92710	18-Nov-15	LEAD	0.005	1262 GRACELAWN	48505
LF93556	24-Nov-15	LEAD	0.005	1410 BLUEBERRY LN/3	48507
LF93558	24-Nov-15	LEAD	0.005	318 BUCKINGHAM AVE #5	48507

Home Owner Results - Samples Submitted 11-1-15 Through 12-29-15

SAMPLE NUMBER	DATE SUBMITTED	ANALYTE	RESULT	ADDRESS	ZIP CODE
LF93559	24-Nov-15	LEAD	0.005	318 BUCKINGHAM #1	
LF93562	24-Nov-15	LEAD	0.005	1410 BLUEBERRY LN/4	48507
LF94261	02-Dec-15	LEAD	0.005	314 WESTCOMBE AVE	48503
LF94279	02-Dec-15	LEAD	0.005	1202 BEARD ST	48503
LF95911	10-Dec-15	LEAD	0.005	2821 BRANDON ST	48503
LF95914	10-Dec-15	LEAD	0.005	3517 MILLER RD	48503
LF97346	18-Dec-15	LEAD	0.005	1926 CAMBRIDGE AVE	48503
LF97949	29-Dec-15	LEAD	0.005	1926 HOWARD AVE BLDG 11	
LF90462	04-Nov-15	LEAD	0.006	2621 DELAWARE AVE	48506
LF92734	18-Nov-15	LEAD	0.006	1320 BEARD ST	48503
LF93555	24-Nov-15	LEAD	0.006	1410 BLUEBERRY LN/2	48507
LF94262	02-Dec-15	LEAD	0.006	629 ROOME CT	48503
LF95931	10-Dec-15	LEAD	0.006	213 FOSS AVE	48505
LF97943	29-Dec-15	LEAD	0.006	801 FLORAL PARK	
LF93587	24-Nov-15	LEAD	0.007	2020 MILLER RD	48503
LF93566	24-Nov-15	LEAD	0.008	2630 PARKSIDE DR	
LF93576	24-Nov-15	LEAD	0.008	KITCHEN	48504
LF93590	24-Nov-15	LEAD	0.008	3113 ARIZONA AVE	48506
LF94282	02-Dec-15	LEAD	0.008	620 LINCOLN	58507
LF97328	18-Dec-15	LEAD	0.008	1201 ALVORD AVE	48507
LF97331	18-Dec-15	LEAD	0.008	2830 EPSILON TRAIL	
LF97347	18-Dec-15	LEAD	0.008	119 GRACE ST	48503
LF97923	29-Dec-15	LEAD	0.008	1201 N GRAND TRAVERSE	48503
LF97971	29-Dec-15	LEAD	0.008	2610 ML KING AVE	
LF93553	24-Nov-15	LEAD	0.009	318 BUCKINGHAM #4	48507
LF95915	10-Dec-15	LEAD	0.009	2013 E COURT ST	48503
LF97342	18-Dec-15	LEAD	0.009	415 W 2ND STREET	
LF97922	29-Dec-15	LEAD	0.009	1201 N GRAND TRAVERSE	48503
LF97946	29-Dec-15	LEAD	0.009	1201 N GRAND TRAVERSE O	
LF94277	02-Dec-15	LEAD	0.010	3401 LEITH ST	48506
LF95927	10-Dec-15	LEAD	0.011	720 COMMONWEALTH AVE	48503
LF97349	18-Dec-15	LEAD	0.011	906 MARQUETTE ST	48504
LF97920	29-Dec-15	LEAD	0.011	1918 LEITH ST	48506
LF97978	29-Dec-15	LEAD	0.011	2005 BARTH ST	48504
LF94271	02-Dec-15	LEAD	0.012	314 FERNDALE	48503
LF95933	10-Dec-15	LEAD	0.012	3014 CHEYENNE AVE	48507
LF97927	29-Dec-15	LEAD	0.012	1201 N GRAND TRAVERSE	
LF97980	29-Dec-15	LEAD	0.012	2610 M L KING SALEM LUTHERAN	48505
LF97976	29-Dec-15	LEAD	0.015	2610 M L KING AVE	48505
LF95908	10-Dec-15	LEAD	0.017	2030 FERRIS AVE	48503

Home Owner Results - Samples Submitted 11-1-15 Through 12-29-15

SAMPLE NUMBER	DATE SUBMITTED	ANALYTE	RESULT	ADDRESS	ZIP CODE
LF97938	29-Dec-15	LEAD	0.017	1201 N GRAND TRAVERSE	48503
LF93575	24-Nov-15	LEAD	0.018	428 CRAPO	
LF93565	24-Nov-15	LEAD	0.022	1014 DELL AVE	48507
LF97961	29-Dec-15	LEAD	0.022	7002 PEMBERTON DR BLDG 2	48505
LF90464	04-Nov-15	LEAD	0.027	UNKNOWN	
LF93560	24-Nov-15	LEAD	0.028	1410 BLUEBERRY LN/1	48507
LF97935	29-Dec-15	LEAD	0.029	1201 N GRAND TRAVERSE E	48503
LF94260	02-Dec-15	LEAD	0.030	402 ALLENDALE PL	48503
LF91279	09-Nov-15	LEAD	0.033	227 E ALMA AVE	48505
LF92733	18-Nov-15	LEAD	0.036	1134 SIMCOE AVE	48507
LF97351	18-Dec-15	LEAD	0.040	1642 BELLE AVE	48506
LF97350	18-Dec-15	LEAD	0.041	1918 LEITH 1	48506
LF93552	24-Nov-15	LEAD	0.042	318 BUCKINGHAM #3	48507
LF97924	29-Dec-15	LEAD	0.042	1201 N GRAND TRAVERSE	48503
LF91272	09-Nov-15	LEAD	0.050	1426 MAPLEWOOD AVE	48506
LF93584	24-Nov-15	LEAD	0.055	2521 TRUMBULL AVE	48504
LF97954	29-Dec-15	LEAD	0.213	1201 N GRAND TRAVERS	48505
LF97945	29-Dec-15	LEAD	2.516	1201 N GRAND TRAVERSE	

From: Moran, Susan (DCH)
Sent: Wednesday, September 23, 2015 6:30 PM
To: Wells, Eden (DCH)
Subject: Fwd: Flint Water FAQ Document
Attachments: Flint water FAQs.pdf; ATT00001.htm

Looping you in on this evolving situation.

Sent from my iPhone

Begin forwarded message:

> **From:** "Robinson, Mikelle (DCH)" <RobinsonM18@michigan.gov>
> **Date:** September 23, 2015 at 5:04:00 PM EDT
> **To:** "Miller, Corinne (DCH)" <MillerC39@michigan.gov>, "Dykema, Linda D. (DCH)" <DykemaL@michigan.gov>
> **Cc:** "Moran, Susan (DCH)" <Moran5@michigan.gov>
> **Subject: FW: Flint Water FAQ Document**
>
> Hi Corinne and Linda,
>
> Geralyn and Elizabeth requested a call with DEQ today in order to brief Nick and respond to some legislative inquiries. Below are my notes from the call that I sent to brief Sue and Mark as well as a Q & A document that DEQ developed and is currently being vetted by the Gov's office. Just wanted to be sure to keep you in the loop on this.
>
> The DEQ PIO (Brad Wurfel) gave a long summary about the Flint water issue. He said bottom line is that the water itself is safe but they have an old water treatment plant and old cast iron pipes that haven't been upgraded in more than 40 years. 15,000 homes have old connections with varying levels of lead. Flint is not in violation of the lead standards however they could optimize the water supply by adding phosphate. Flint is also working on a meaningful optimization plan that will be completed sometime next year. He said that DEQ briefed the Mayor and some legislators on Monday on the situation**. He said Flint's water supply is not an imminent public health problem but a public confidence problem due to the many groups getting involved and controversial reports/media coverage on it.**
>
> Some data from a local group of Peds is showing an uptick in blood lead levels which seems to contradict the data that CLPP collects. I've asked Rashmi to follow-up with Nancy P on a) the issue of the lead testing that a group of pediatricians did in Flint? b) messaging about lead, where it is found in the environment c) a brief explanation in writing that explains the results from the blood lead tests that Nancy's program has access to. I found the charts a bit hard to read/interpret. d) availability of any local programs that might be relevant, and e)anything else that might be useful for us to share with Genesee CHD. I'll also check with Linda D. on this. *(Linda, any thoughts on what might be useful?)*
>
> DEQ developed a Q & A document that is being reviewed by the Gov's office and they will share with us. They will post this on their website after it is approved. DEQ would like the local health department to get involved in the messaging about what can be done such as running the water before using or get

a filtration system. **Mark or I will need to follow-up with H.O. Valacak once we have some suggested talking points and information that can be provided to the public.**

The city owns only the first couple of feet of pipes in connections with homes, the rest is privately owned by the homeowner therefore it would be their expense to replace. The longer water sits in lead pipes, the higher the lead readings. DEQ's testing protocol produces consistent results across the state and matches the EPA's protocol. There are other areas of the state with the same problem. He estimated it would take $60 M to replace the city's infrastructure. The city has request $30 M from the state to help with the situation. The state told them to check with Congress. But we are calling on EPA to assist along with our Congressional delegation.

Brad said they are hoping to have their director submit an op ed to the Flint paper (and perhaps have Nick co-sign) with a message such as lead is a serious issue and there are actions that can be taken to minimize exposure. He wants to coordinate our messaging to align. He will circle back with Geralyn on this. Also, they will be reviewing the various water test results and will look at Flint's water treatment protocols. He cautioned that they are receiving FOIA requests every day.

Let me know if you have questions.

Mikelle

From: Moran, Susan (DHHS)
Sent: Tuesday, October 06, 2015 12:04 PM
To: Miller, Corinne (DHHS)
Subject: RE: PHA Director briefing

Thank you.

From: Miller, Corinne (DHHS)
Sent: Tuesday, October 06, 2015 10:14 AM
To: Moran, Susan (DHHS)
Subject: RE: PHA Director briefing

Maternal and child health epidemiology staff analyzed the MDHHS childhood lead poisoning data to assess whether or not the switch to using Flint River water for the city of Flint impacted childhood lead poisoning levels (>= 5 micrograms per deciliter). An increase was noted after the switch but when controlling for such things as multiple tests, age of children and seasonality in a statistical model the difference was elevated but not statistical significant, that is not beyond chance.

From: Moran, Susan (DHHS)
Sent: Tuesday, October 06, 2015 9:58 AM
To: Miller, Corinne (DHHS)
Subject: PHA Director briefing

Can I get 1 or 2 bullets from you describing Epi involvement in Flint water spill during the period 9/15/15-9/30/15.

Susan Moran MPH, Senior Deputy Director
Population Health and Community Services Administration
Capitol View Building
201 Townsend St 6th Floor
Lansing, MI
48913
Phone: 517 335 8024
Fax: 517 335 9032
morans@michigan.gov

From: Moran, Susan (DHHS)
Sent: Wednesday, October 14, 2015 9:46 AM
To: Stiffler, Kathleen A. (DHHS);Prokop, Jackie (DHHS);Miles, Richard C. (DHHS)
Cc: Priest, Chris (DHHS);Linn, Cindy (DHHS)
Subject: RE: Public Comment Review of Proposed Medicaid Policy (Project #1555-LHD)

Thank you Jackie- your explanation is very helpful.

From: Stiffler, Kathleen A. (DHHS)
Sent: Tuesday, October 13, 2015 1:52 PM
To: Prokop, Jackie (DHHS); Miles, Richard C. (DHHS); Moran, Susan (DHHS)
Cc: Priest, Chris (DHHS); Linn, Cindy (DHHS)
Subject: RE: Public Comment Review of Proposed Medicaid Policy (Project #1555-LHD)

Thanks for providing this detail Jackie. I want to add that our push on the MHP side re: lead case management as a result of the new contract language in the rebid, could (hopefully will) increase the billings for these in-home environmental lead visit numbers (beyond the paltry 50 to date). We are looking at and discussing other options, but wanted to be sure everyone is aware that we are working on some things with your staff Sue (and with Medicaid Policy) to improve this.

From: Prokop, Jackie (DHHS)
Sent: Tuesday, October 13, 2015 1:47 PM
To: Miles, Richard C. (DHHS); Moran, Susan (DHHS)
Cc: Stiffler, Kathleen A. (DHHS); Priest, Chris (DHHS); Linn, Cindy (DHHS)
Subject: RE: Public Comment Review of Proposed Medicaid Policy (Project #1555-LHD)

Hi Sue,

I will try to make a long story short regarding this proposed policy change. There are two types of blood lead home visits. First, there is a nurse assessment visit where the provider goes to the family's home to discuss and teach about blood lead related issues. These visits are not part of this bulletin.

The second, is the in-home lead environmental visit, where current policy allows LHD staff to visit up to two residences for each child with an elevated blood lead level. A second residence may need to be assessed if a child spends equal time at two residences. This is the policy CMS is requiring us to change to only allow for an environment visit in one residence. CMS gave us a sunset date in our state plan to end the second residence visit as of October 2010, and we have been discussing and pushing back on this change since then. They believe that we must limit coverage for environmental investigations to one residence.

CMS wants to finalize this SPA. Just a note – the volume of in-home lead environmental visit is very low. Since FY13, less than 50 visits have been paid and these were primarily for one residence. So most if not all of these would have still been covered under the proposed policy.

As for CMS' concerns from a regulatory perspective they have been citing the following:

42 CFR 440.130(a) is the citation for "diagnostic service" which is how this was defined.

From Chapter 5 (Early and Periodic Screening) of the State Medicaid Manual on CMS' website (Section 5123.2, 1a.):

a. Diagnosis, Treatment, and Follow-Up.--If a child is found to have blood lead levels equal to or greater than 10 ug/dL, providers are to use their professional judgment, with reference to CDC guidelines covering patient management and treatment, including follow up blood tests and initiating investigations to determine the source of lead, where indicated. Determining the source of lead may be reimbursable by Medicaid under certain circumstances. Reimbursement is limited to a health professional's time and activities during an on-site investigation of a child's home (or primary residence). The child must be diagnosed as having an elevated blood lead level. Medicaid reimbursement is not available for any testing of substances (water, paint, etc.) which are sent to a laboratory for analysis.

Let me know if you need anything further.

From: Miles, Richard C. (DHHS)
Sent: Monday, October 12, 2015 10:49 AM
To: Moran, Susan (DHHS)
Cc: Stiffler, Kathleen A. (DHHS); Prokop, Jackie (DHHS)
Subject: RE: Public Comment Review of Proposed Medicaid Policy (Project #1555-LHD)

We pulled it back because MDHHS leadership was concerned about heightened anxiety resulting from the Flint crisis and because the potential fiscal impact would be minimal, even if CMS determined that we needed to fund any second investigation with all GF. There just aren't that many cases where a second home needs to be tested. Furthermore, this instance of noncompliance is to the advantage of the beneficiary.

From: Moran, Susan (DHHS)
Sent: Monday, October 12, 2015 10:40 AM
To: Miles, Richard C. (DHHS)
Cc: Stiffler, Kathleen A. (DHHS); Prokop, Jackie (DHHS)
Subject: Re: Public Comment Review of Proposed Medicaid Policy (Project #1555-LHD)

Why did you decide to pull the policy back?

Sent from my iPad

On Oct 12, 2015, at 10:36 AM, Miles, Richard C. (DHHS) <MilesR6@michigan.gov> wrote:

> The decision has already been made to pull back this policy, even though it has absolutely nothing to do with the Flint crisis. For the record, the state plan history related to this policy dates back to 2010. I am copying Jackie Prokop to request that someone in Policy provide you with the applicable federal regulation.
>
> ---
>
> **From:** Moran, Susan (DHHS)
> **Sent:** Monday, October 12, 2015 9:39 AM
> **To:** Stiffler, Kathleen A. (DHHS); Miles, Richard C. (DHHS)
> **Subject:** FW: Public Comment Review of Proposed Medicaid Policy (Project #1555-LHD)
>
> Heads up – you will likely receive request from Nick to hold off on this policy due to Flint water situation. Can you provide me with the "Medicaid federal regulations" that limit to just one visit- Thanks.
>
> ---
>
> **From:** MSADraftPolicy
> **Sent:** Thursday, October 08, 2015 12:58 PM

To: Becker, Timothy (DHHS); Bergquist, Phillip (DHHS); Breems, Jonathan (DHHS); Collins, Vendella (DHHS); Colston, Leslie (DHHS); DCH-OIG; Eggleston, Debbie (DHHS); Fosdick, David (DTMB); Frost, Erik (DHHS); Grijalva, Nancy (DHHS); Hanley, Farah (DHHS); Harkins, Chris (DTMB); Hertel, Elizabeth (DHHS); Krause, Kurt (DHHS); Lyon, Nick (DHHS); Miles, Richard C. (DHHS); Minicuci, Angela (DHHS); Moran, Susan (DHHS); Parker, Karen (DHHS); Rick, Matthew (DHHS); Robinson, Mikelle (DHHS); Scott, Teri (DHHS); Sederburg, Kari (DHHS); Stiffler, Kathleen A. (DHHS); Travis, Rashmi (DHHS); Welehodsky, Jared (DHHS)
Subject: Public Comment Review of Proposed Medicaid Policy (Project #1555-LHD)

Attached are proposed Medicaid policy changes for your public comment review. The proposed policy discusses blood lead poisoning environmental investigations.

Comments on this proposed policy are due November 12, 2015.

Comments may be forwarded to Brad Barron at BarronB@michigan.gov or to the address noted on the attached transmittal sheet.

From: Moran, Susan (DHHS)
Sent: Thursday, October 15, 2015 8:42 AM
To: Stiffler, Kathleen A. (DHHS)
Subject: FW: Blood testing- version4 October 15
Attachments: Blood Testing Protocol Planning Template Meeting 10-15-15 V4..docx; ATT00001.htm

Let me know if you want someone from your area looped into these case management/follow up meetings. I think it would be a good idea.

From: Wells, Eden (DHHS)
Sent: Thursday, October 15, 2015 8:36 AM
To: Mona Hanna-Attisha; Peeler, Nancy (DHHS); Travis, Rashmi (DHHS); GJOHNSON@gchd.us; LaRocco, Toni
Cc: Moran, Susan (DHHS); Miller, Corinne (DHHS); Miller, Mark (DHHS); Scott, Robert L. (DHHS); Scott, Linda (DHHS); Scott, Jackie (DHHS); Shah, Sandip (DHHS); Dykema, Linda D. (DHHS); Priem, Wesley F. (DHHS); Lasher, Geralyn (DHHS); Hertel, Elizabeth (DHHS)
Subject: Fwd: Blood testing- version4 October 15

Today's draft- early next week the primary group will meet to plan case management planning. We will work on Nancy and Bob's questions in interim.

Wes- please advise as to exactly what information you would want to collect on any child getting a blood test/ in the event further case management or abatement is required-

Eden.

Begin forwarded message:

> **From:** Eden <ewells@umich.edu>
> **Date:** October 15, 2015 at 8:31:46 AM EDT
> **To:** "Eden V. Wells" <wellse3@michigan.gov>
> **Subject: Fwd: Blood testing- version4 October 15**
>
> Sent from my iPhone- I apologize for typos and brevity
>
> Begin forwarded message:
>
> > **From:** "Wells, Eden (DHHS)" <WellsE3@michigan.gov>
> > **Date:** October 14, 2015 at 4:29:58 PM EDT
> > **To:** "ewells@umich.edu" <ewells@umich.edu>, "Wells, Eden (DHHS)" <WellsE3@michigan.gov>
> > **Subject: Blood testing- send out in AM 10/15**
> >
> > Eden V. Wells, MD, MPH, FACPM
> > Chief Medical Executive
> > Michigan Department of Health and Human Services
> > 201 Townsend St., 5th Floor CVB

Lansing, MI 48913

Blood Testing Protocol Planning Template--- Oct 15 8:00 AM v4

GCHD and MDHHS

Toni LaRocco, Nancy Peeler, Rashmi Travis

I. **Prioritization of Testing**
   a. Children <6 already tested positive by capillary since April 2014 (n=75)
      i. Every week GCHD letters go out, educational material is also sent out (nutrition lead sources, etc.)
      ii. Sending letters at 5ug/dL (new; previously doing at 10 ug/dL)- Letter includes in bold to follow up with PCP
      iii. 10 ug/dL: making phone call (or sending letter if unable to reach) offering an office visit where clients are given a lead kit which includes: vacuum with hepa filter, mop, simple green and soon will include NSF water filter, gloves and Swiffer. Education regarding use of above, nutrition and medical follow up guidance to return to PCP.
      iv. 20 ug/dL: two visits with nurse and sanitarian with a referral to MDHHS Lead Safe Homes
   b. Retesting of Flint children with EBLL of venous samples- all due for first or subsequent follow-ups
      i. No additional letters to this group—[note-no funding avail at this time to chase these folks- Medicaid already covered initial]
   c. School children those in the 3 schools identified as having elevated water lead (Freeman, Brunnell, Eisenhower)
   d. Every school facility- prioritization in this order:
      i. 0-5 years age
         1. Daycare
         2. Great Start Readiness Pre-school (funded by MDE)
         3. Early Headstart
         4. Headstart
      ii. 5-12 years of age
         1. Elementary
      iii. >12 years of age
         1. Middle
         2. High

II. **Implementation of Testing**
   a. **Partners**
      i. McLaren Health Plan
         1. McLaren Health Plan is involved with Toni last few weeks. **Nov 5th** is a screening (capillary) event for McLaren clients as well as interested community members. This is a walk-in event-
            a. Online lead registry (HHLPS) could be accessed to check child's status
            b. McLaren has access to MCIR but not HHLPS
         2. McLaren will contact their clients, and test their clients

3. GCHD will market to whole community, and GCHD WIC staff will draw other community members-cap or venous as indicated
4. GCHD will look up kids prior to drawing…..if ever drawn and elevated GCHD will do a venous draw instead.

ii. UM-Flint Nursing students- Toni has been in touch with Nursing school and Licensed (BSN)nursing students may be able to assist Nov 5 and other times possible

iii. Hurley Pediatrics (Mona)-(n=900)
1. Mona has all Hurley clinic kids that need a redraw back to April 2014
2. AND a list of all lead labs drawn from the Hurley Lab back to April 2014

iv. Children's Healthcare Access Program-(MHEF and United Way)- target Medicaid groups by 4 clinics (Hamilton, Hurley, Dr. Akpinar and Mott)- they can access the majority of the Medicaid children in Flint and have data-sharing agreements already in place. Has social workers staff and 211 and case management, and filter follow-up
1. Mott Children's Clinic (Reynolds)
2. Housed at GFHC!
3. Meeting tomorrow AM (Mona and Toni will be there)
4. Hamilton FQHC
a. CHAP-
b. Toni spoke with Susan from CHAP 10/14…..they are paid from a grant through the Health Endowment Fund and we have contracted (not signed yet but will be) to run Medicaid Match through GCHD. Doing things like arranging transportation to get lead levels drawn good role for them as it is reimbursable with Medicaid Outreach.

v. Molina- Serve largest number of Peds/Medicaid-

vi. GCMS Pete Levine---network information with all providers to get testing protocol information to them

vii. Greater Flint Health Coalition-networking information to providers

b. Sites

i. Patient centered medical home- whenever possible! Very important. Getting tests done outside of the medical home creates lack of continuity and lack of follow-up. Encourage as much as possible to "go see your doctor".
1. Which then means that we need to educate the doctors with direct messaging about who to test, when to test, what is follow-up, available resources (211), premade patient education flyers, etc. Focus should be on lead in water education info.

ii. GCHD- (as above in I.a.)

iii. McLaren (Nov 5, 2015) at Burton Branch GCHD- all day

iv. Farmer's Market (GCHD and Hurley Peds) held on (T, TH, Saturdays)
1. Hurley staff can draw blood at this site

v. Molina- TBD (see below)

vi. Other health plans- TBD (see below)

III. Handling of Results/messaging

Comment [TL1]: Meeting with PIO and UMFlint Nursing in order to get assistance with Lead testing clinics. 11/5/15 a go. Will be contacting other Medicaid Health Plans to try and have clinic with them at the Farmers Markets

a. CLPP and GCHD currently have protocol lab test result sharing (HHLPSS)
    i. Bob Scott can assist in navigation
    ii. MDHHS Bureau of Labs can provide surge capacity for lab testing if needed
b. All clients drawn will sign a release allowing result to be shared with primary provider
c. Secondary prevention messaging for all community
    i. nutrition, good vitamins
    ii. wrap-around services
    iii. Breastfeeding, breastfeeding, breastfeeding – breastfeeding is protective for lead in water! Increase number of LC's, support breastfeeding peer programs, etc. Flint has low breastfeeding rate.
    iv. positive parenting/nurse family partnership, infant support services
    v. WIC enrollment
    vi. SNAP double bucks enrollment

Comment [EVW2]: a. - In the event case management and/or abatement is needed- can all children getting blood drawn have their contact information filled out along with this release?

IV. Actions and Assignments

a. Toni and CHAP will contact Molina to set up similar program as McLaren
b. Toni will contact all health plans- if issues, contact Wells
c. MDHHS will provide support as requested for any events
d. Hilda at GCHD needs to blast provider information about lead to all providers (blast fax and list serves)
e. FAQ water lead sheet to be sent out today
f. [Consider- Get HEDIS rates at provider level for lead (doesn't address follow-up, though)]
g. Next Call: TBD early next week (of 10/19)- Begin planning for Case Management Response
h. Mona and Toni- if there is a need for increased capillary testing machines---advise MDHHS
i. Activities/follow up by Nancy/Bob
    i. work with Communications to support linkage to other early childhood/school state partners at MDE that we already work with that were listed in the plan - Office of Great Start is the link to child care providers (related to subsidy payments and to their subcontract to ECIC to run regional child care resource/TA centers); they are also the state liaison to Head Start/Early Head Start and the Great Start Readiness at-risk preschools. And of course their School Health office.
    ii. Access to HHLPSS data system - currently only GCHD has access - Bob thinks that 2 staff there have been trained to use the system, but we need to confirm when we are back at the office. As I referenced above, we are looking at lead privacy laws to see who else (besides GCHD) might be able to have access to the CLPPP data about follow-up testing.
    iii. Also, Bob can attend the event on November 5th if you think that would be of help.
    iv. Regarding CLPPP sending the our list of children needing follow-up to Hurley (when we think there is a Hurley provider), we are also confirming that we can do that based on privacy laws.

v. We will follow up to make sure that the new CLPPP toolkit materials for providers get out to all of you - our Provider Quick Reference document, and the video Eden referenced is coming ssoon
vi. Exploring legal issues around access to the data.

Questions from Nancy/Bob –October 14

I b. Medicaid will pay for 2 nursing visits. Toni, I wanted to double check, at what levels is GCHD currently sending out nurses to follow up on elevated blood lead levels (even if only 2 visits) ? And I wasn't sure if I understood on the call - is GCHD billing Medicaid for those visits for children enrolled in Medicaid?

II a iiii We agree that CHAP could be a good resource that could try to find kids and help get them connected for testing/follow-up testing. Are they paid by health plans/clinics to carry out activities, e.g. that is who their direction comes from (I know that was the model in Kent County)? I ask that related to our thinking about who the CLPPP data (e.g. access to the HHLPSS data system) could go to - we have to explore the privacy laws for the lead data (see below).

III a iiii We concur about using Lead Care machines, but only if there is a better protocol to ensure that children with an elevated capillary test get back for venous testing.

From: Travis, Rashmi (DHHS)
Sent: Sunday, October 04, 2015 10:14 PM
To: Colston, Leslie (DHHS)
Cc: Peeler, Nancy (DHHS);Scott, Robert L. (DHHS)
Subject: Conference call on lead data

Leslie
Bob Scott and Nancy Peeler would like to discuss some nuances with the raw data sent to Hurley. Please schedule a phone call Mon (10/5) morning with Corinne Miller, Eden Wells, Sarah Lyon Callo, nancy, Bob, and I. Please be available to take notes. Nancy and Bob will Be leading the discussion.
Thanks
Rashmi

Sent from my iPhone

From: Moran, Susan (DHHS)
Sent: Tuesday, November 03, 2015 6:24 PM
To: Travis, Rashmi (DHHS);Bien, Stan (DHHS)
Cc: Colston, Leslie (DHHS);Robinson, Mikelle (DHHS);Anderson, Paula (DHHS)
Subject: FW: FNS Correspondence to State: MI WIC - RTF Formula - Flint
Attachments: FNS Correspondence to State MI WIC RTF 11-3-15.pdf; ATT00001.htm

Importance: High

Please make this a priority- I advised Nick that we would provide a summary of actions to date (tomorrow). Based on this letter, are there additional actions that we should initiate? Please draft a letter for Nick's signature.

From: Lyon, Nick (DHHS)
Sent: Tuesday, November 03, 2015 6:18 PM
To: Becker, Timothy (DHHS); Grijalva, Nancy (DHHS); Hertel, Elizabeth (DHHS); Lasher, Geralyn (DHHS); Minicuci, Angela (DHHS); Eden Wells; Moran, Susan (DHHS); Bien, Stan (DHHS); Robinson, Mikelle (DHHS)
Subject: Fwd: FNS Correspondence to State: MI WIC - RTF Formula - Flint

I need to what we are going to do and respond with a formal letter under my signature ASAP, even tomorrow if we can craft a reasonable response that includes our actions.

Begin forwarded message:

> **From:** "English, Tim - FNS" <TIM.ENGLISH@fns.usda.gov>
> **Date:** November 3, 2015 at 6:09:27 PM EST
> **To:** "Nick Lyon (LyonN2@michigan.gov)" <LyonN2@michigan.gov>
> **Cc:** "Bien, Stan (DCH) (biens@michigan.gov)" <biens@michigan.gov>, "Mikkelson, Julie - FNS" <JULIE.MIKKELSON@fns.usda.gov>, "Hillman, Bruce - FNS" <bruce.hillman@fns.usda.gov>, "Whitford, Debbie - FNS" <Debbie.whitford@fns.usda.gov>, "Bartholomew, Anne - FNS" <Anne.Bartholomew@fns.usda.gov>, "Solis, Patricia - FNS" <PATRICIA.SOLIS@fns.usda.gov>
> **Subject: FNS Correspondence to State: MI WIC - RTF Formula - Flint**
>
> Nick,
>
> Please find the attached correspondence signed November 3, 2015 requesting your assistance in broadly communicating the availability of Ready to Feed formula and other supportive services to WIC participants and families in Flint in response to the high levels of lead in the water supply.
>
> Please let me know if you have any questions.
>
> Tim English
> Regional Administrator
> Midwest Region

United States Department of Agriculture

Food and Nutrition Service

Midwest Region

77 W. Jackson Blvd.
20th Floor
Chicago, IL
60604-3591

November 3, 2015

Nick Lyon, Director
Michigan Department of Health and Human Services
235 S. Grand Avenue, Suite 1514
P.O. Box 300037
Lansing, MI 48993

Dear Mr. Lyon:

I am writing to request your assistance and support in ensuring WIC participants and families in the Flint, Michigan community are aware of the availability of Ready to Feed (RTF) Formula and other supportive services in response to high levels of lead in the water supply.

On October 23, 2015, Senator Stabenow, Senator Peters, and Representative Kildee wrote to USDA Secretary Vilsack to express concern for infants and children participating in the WIC program in Flint where high levels of lead have been detected in the drinking water that is normally used to prepare infant formula provided by the WIC Program. The letter also requested assistance in ensuring that all WIC participants and families are made aware of the availability and option of RTF formula and other services in the Flint community to affected families.

We understand that participants in any of the affected zip codes in Flint are provided an option during the WIC screening and assessment procedures to receive RTF infant formula, and are provided a water filter if needed to mitigate the lead levels in the drinking water. We also understand that WIC participants are referred to the local health department for blood lead testing and are provided nutrition education on mitigating lead absorption through dietary changes. Additionally, caregivers of WIC infant participants have the option to return powder infant formula in their possession to the WIC local clinic and exchange it for RTF.

FNS recommends that the Michigan WIC State agency and the local WIC clinic immediately implement a proactive communication strategy regarding infant formula options to affected WIC participants in the Flint community that may not be scheduled to visit the WIC clinic in the near future. Furthermore, we recommend the Michigan WIC Program implement a broad outreach and educational effort regarding the other supportive services available to WIC participants and families in response to the high levels of lead in the water supply of Flint.

This letter also serves as confirmation of the availability of additional FNS food funds for Michigan, if needed, to cover any potential increased costs for RTF infant formula. FNS is available to provide technical assistance to DHS as your agency responds to this situation. If you have any questions, please let me know, or have your staff contact Bruce Hillman at 312-886-4590.

USDA IS AN EQUAL OPPORTUNITY PROVIDER AND EMPLOYER

Sincerely,

Tim English
Regional Administrator

cc: Stan Bien, Director Michigan WIC
Debra Whitford, USDA
Julie Mikkelson, USDA
Bruce Hillman, USDA
Anne Bartholomew, USDA

From: Moran, Susan (DHHS)
Sent: Wednesday, November 04, 2015 7:32 AM
To: Travis, Rashmi (DHHS);Robinson, Mikelle (DHHS)
Cc: Colston, Leslie (DHHS)
Subject: RE: FNS Correspondence to State: MI WIC - RTF Formula - Flint

Sounds good.

From: Travis, Rashmi (DHHS)
Sent: Wednesday, November 04, 2015 6:52 AM
To: Robinson, Mikelle (DHHS)
Cc: Moran, Susan (DHHS)
Subject: Re: FNS Correspondence to State: MI WIC - RTF Formula - Flint

I would like to have a discussion this am. I have my staff meeting from 9am-11am. Stan is out of the office today. But I could ask Leslie to get him and Kristin Hanulcik on a call with us today to discuss.

Sent from my iPhone

On Nov 3, 2015, at 7:59 PM, Robinson, Mikelle (DHHS) <RobinsonM18@michigan.gov> wrote:

> I think we should discuss this in the morning before they prepare a response. Rashmi and I talked a bit about this today and there are a few things to consider.
>
> Sent from my iPad
>
> On Nov 3, 2015, at 6:24 PM, Moran, Susan (DHHS) <MoranS@michigan.gov> wrote:
>
> > Please make this a priority- I advised Nick that we would provide a summary of actions to date (tomorrow). Based on this letter, are there additional actions that we should initiate? Please draft a letter for Nick's signature.
> >
> > ---
> >
> > **From:** Lyon, Nick (DHHS)
> > **Sent:** Tuesday, November 03, 2015 6:18 PM
> > **To:** Becker, Timothy (DHHS); Grijalva, Nancy (DHHS); Hertel, Elizabeth (DHHS); Lasher, Geralyn (DHHS); Minicuci, Angela (DHHS); Eden Wells; Moran, Susan (DHHS); Bien, Stan (DHHS); Robinson, Mikelle (DHHS)
> > **Subject:** Fwd: FNS Correspondence to State: MI WIC - RTF Formula - Flint
> >
> > I need to what we are going to do and respond with a formal letter under my signature ASAP, even tomorrow if we can craft a reasonable response that includes our actions.
> >
> > Begin forwarded message:

From: "English, Tim - FNS" <TIM.ENGLISH@fns.usda.gov>
Date: November 3, 2015 at 6:09:27 PM EST
To: "Nick Lyon (LyonN2@michigan.gov)"
<LyonN2@michigan.gov>
Cc: "Bien, Stan (DCH) (biens@michigan.gov)"
<biens@michigan.gov>, "Mikkelson, Julie - FNS"
<JULIE.MIKKELSON@fns.usda.gov>, "Hillman, Bruce - FNS"
<bruce.hillman@fns.usda.gov>, "Whitford, Debbie - FNS"
<Debbie.whitford@fns.usda.gov>, "Bartholomew, Anne - FNS"
<Anne.Bartholomew@fns.usda.gov>, "Solis, Patricia - FNS"
<PATRICIA.SOLIS@fns.usda.gov>
Subject: FNS Correspondence to State: MI WIC - RTF Formula - Flint

Nick,

Please find the attached correspondence signed November 3, 2015 requesting your assistance in broadly communicating the availability of Ready to Feed formula and other supportive services to WIC participants and families in Flint in response to the high levels of lead in the water supply.

Please let me know if you have any questions.

Tim English
Regional Administrator
Midwest Region
USDA-FNS

<FNS Correspondence to State MI WIC RTF 11-3-15.pdf>

2. Initial discussions occurred with MDHHS staff and GCHD beginning in the summer of 2014. These discussions continued until the fall of 2014 when staff began to document and elevate the issue in email communications.

MDHHS staff were:

- Tracking the outbreak via electronic disease reports (these often start as Electronic Laboratory Reports and additional case information is provided by the county health department)
- Asked GCHD for the initial line list of cases (first step in an outbreak investigation)
- Reinforced with GCHD staff the need for clinical specimens
- Offered assistance with developing a an outbreak specific questionnaire to supplement the routine information obtained on LD cases
- Reaching out to GCHD administration to establish a formal point of contact within GCHD for MDHHS and DEQ to utilize
- Established the need for timely follow-up and response to cases so that all potential exposures could be properly assessed

2.b. Coordination of messaging to providers and the general public regarding the outbreak was discussed with GCHD and offers of assistance were refused. In addition, without an identified source of exposure (like was able to be determined in the NYC outbreak) there were no specific warnings for the public or actions that they could take to prevent LD.

2.c. The tracebacks from 2014 and 2015 have been completed. That information is summarized in multiple reports issued by MDHHS. After assessing the status of the investigation in early 2015, MDHHS staff developed a plan to work with GCHD to complete the information retrospectively and for all new cases. The tracebacks in 2014 were completed largely by MDHHS staff and CDC staff working in fellowships at MDHHS.

3. There are standard definitions used by WHO and CDC to declare an outbreak over. Two incubation periods is an established standard. MDHHS staff began developing that report in April of 2015. At that time 2 cases had been reported in January, No cases were reported in February, one case was reported in March, and no cases were reported in April. While the report was being finalized an additional case was reported in May. Between the March and May cases, the threshold was met for declaring that part of the outbreak over. Again, citing the recent NYC outbreak, additional cases were reported after the outbreak was declared over.

Additionally, "The outbreak is over" is a partial quote that has been used extensively by the media. The entire statement from that sentence and paragraph report follows with:

> "As we enter the summer season, MDHHS recommends vigilant legionellosis awareness and surveillance in Genesee County, including interviewing of cases or proxies with the enhanced legionellosis questionnaire within one week of reporting. MDHHS also recommends the clinical community assist in LD surveillance through accurate identification, testing, and reporting of all suspect cases. Obtaining respiratory specimens in addition to urinary antigen testing is of critical importance in these increased surveillance efforts."

The efforts described in this statement are continuing even today, which is how the additional cases were identified and why we ~~are~~ reported it out in the full version of the 2015 report.

3.a. Clinical specimens are collected at the point of care in a healthcare facility by a healthcare provider such as a nurse, physician, or respiratory therapist. MDHHS staff ~~cannot~~ obtain these specimens. They rely on the healthcare community to provide these specimens for testing. Throughout the course of the outbreak MDHHS ~~asked~~ GCHD to work with their provider community to ensure these specimens were obtained. That didn't happen. MDHHS have since worked directly with infection control practitioners to develop guidance specifically for this outbreak on screening patients, collecting specimens, and shipping them to MDHHS BOL so that necessary isolates can be obtained. This activity is ongoing.

4.a. MDHHS staff were working continuously with GCHD and CDC throughout 2015 and still today. Epidemiologic data was collected in a standardized way ~~and~~ has been reviewed by all agencies. In Legionnaire's disease outbreaks we look for common community exposures that can be assessed and investigated. The only common exposure that has been identified is McLaren Hospital in Flint.

5. MDHHS continues to work with GCHD and CDC:

- These staff have developed a toolkit called Developing a Water Management Program to Reduce Legionella Growth & Spread in Buildings. MDHHS and GCHD will be the first state and local agencies to distribute and implement these tools.
- MDHHS recently updated and distributed Legionellosis Guidance for Clinicians which covers testing, clinical specimen collection and shipping, diagnosing, and treating Legionnaire's disease. This was sent to the three hospitals in Genesee County and to all providers in Genesee County who are subscribed to our Health Alert Network.
- We have reviewed ~~GCHD~~ and provided feedback on the GCHD surveillance plan for 2016.

The Governor has provided funding to Wayne State University to...

6. Hundreds of cases of Legionnaire's disease are reported in Michigan every year. Most of these cases are sporadic, and not able to be linked together as clusters and outbreaks. Nationally, Legionnaire's disease has been on the rise since 2003. The last cluster identified in Michigan occurred during the summer of 2013

13. On 1/28/2015 Shannon Johnson (Legionnaire's disease SME) sent the following email to her unit manager, section manager, and division director:

> "I just spoke with Corinne, Nick Lyon has requested some information on the Genesee situation. I gave her the epi curves, the cumulative case count graph for Genesee and the surrounding counties, and forwarded her the email we sent Genesee yesterday afternoon. I also gave her a brief synopsis of the conference call from yesterday. I told her if she needed any additional information to let me know. Think she has already spoken with some of you, but just wanted to make sure we're all on the same page."

21. Michigan is a home rule state. The health officer at GCHD has primary authority in Genesee County. MDHHS are available to assist GCHD staff upon invitation. In the case of the rise in reported cases of LD,

MDHHS staff reached out repeatedly to all levels of GCHD from the beginning of this outbreak to try to assist their investigation. MDHHS staff routinely seek input from experts at CDC, and especially during outbreaks. Authority is local, then state, then federal.
GCHD has primary responsibility to inform the public for all events of public health significance occurring in their jurisdiction.
MDHHS has established an internal reporting mechanism for ongoing outbreaks to be shared with the Population Health and Community Services Administration.

22. Routine communications regarding reportable conditions and outbreaks occur between CDC and MDHHS staff.
MDHHS staff were most concerned with ensuring consistent, reliable, and efficient communications between the three agencies. This was requested by CDC and MDHHS on multiple occasions.
GCHD, MDHHS, and CDC jointly participated on conference calls discussing the investigation during the course of the outbreak.

23.a. MDHHS staff did not prevent GCHD from communicating with the CDC.
The email you reference was preceded by an email on 6/6/2015 from Laurel Garrison of CDC stating:

> "Jim, I think it would be best for you to reach out to CDC if needed once you have talked this out with the county. Perhaps you should have a talk with them about sharing information with the state first, and then if needed you will pull us in. Laurel"

CDC and the state were trying to ensure that consistent, reliable, and efficient communication between the three agencies involved.

24. CDC, MDHHS, and GCHD staff were all discussing the outbreak at that time. MDHHS staff were aware and involved. CDC was reiterating the concerns of MDHHS at that time and was encouraging GCHD to act quickly. Many of the recommendations made by Laurel Garrison in that email were already being undertaken by staff at MDHHS to facilitate the investigation.

25. At no point did MDHHS staff try to sabotage this investigation. MDHHS was continually working with GCHD to conduct a comprehensive investigation and to try to determine the source of the outbreak. From the beginning of this outbreak the two suspected sources were the Flint water system and a single healthcare facility in Flint.

26. MDHHS maintained surveillance for LD in 2015 and continued to work with CDC and GCHD. The initial offer to GCHD to assist them with conducting outreach to the healthcare provider community and to the general public was made 01/27/2015.

4/30/15 – MDHHS call with GCHD & CDC (see agenda) EIS Officer and CDC/CSTE Waterborne disease fellow present findings of analysis of interview data. MDHHS then has a separate call with DEQ.

Call Agenda

Summarizing the Investigation/Epidemiology
- Preliminary Statistics MDHHS (Shannon & Susan)
- Interview Data MDHHS (Lily & Meghan)
  - EPI Info Analysis
- EPI Curve GCHD
- Discussion of Current Investigation All

Environmental Investigation
- Environmental Sampling Protocol CDC
- Discussion All

Additional Recommendations
- Additional Recommendations CDC/All

5/1/15 – GCHD sends CDC (cc's MDHHS) an update on confirmed case counts. CDC replies to GCHD (cc's MDHHS) offering some information about investigating water-related health effects in general (not specific to legionella) and suggests they may be applicable to this investigation.

5/7/15 – 5/13/15 – EIS officer and 2 CDC/CSTE fellows analyze questionnaire data for MDHHS

5/8/15 - CDC/CSTE waterborne disease fellow wrote in her monthly report to the Waterborne Disease Branch that "Investigating Legionnaires' Disease outbreak localized to a single county. Interviewing cases and entering data into EpiInfo. Analyzing interview data."

5/13/15 – 5/27/15 – EIS officer and both CDC/CSTE fellows work together on legionella analysis and report writing for MDHHS, exchanging multiple emails about the analysis. They discuss whether there have been one or two cases who spent their entire incubation period hospitalized.

5/15/15 – CDC legionella group sends MDHHS email asking if they've been able to find anything yet with the epi analysis. MDHHS replies to CDC and GCHD with an update noting "nothing remarkable stands out (other than the initial hospital cluster)."

5/18/15 – MDHHS provided updated clinical guidance to GCHD for HAN; drafted letter to be mailed out to cases not yet interviewed (unable to contact) as a last call.

5/22/15 – EIS officer sends preliminary summary of questionnaire data for the first 45 cases to MDHHS CD colleagues for review

5/28/15 – EIS Officer provides updated results of legionella data analysis to MDHHS CD Division colleagues. MDHHS legionella epidemiologist replies to EIS Officer and both CDC/CSTE fellows "Thanks for all your hard work on the analysis! It turned out really, really well. You did an excellent job!"

March 2015) to complete epi data. Obtained death certificates for deceased cases. Updated MDSS case records. MDHHS mapped cases on Flint water system map

3/5/15 – EIS officer wrote in her February monthly report: "Assisted in the development of a Legionellosis exposure and travel history interview tool to be used to investigate a current outbreak in Michigan (3 hours)."

3/6/15 - CDC/CSTE waterborne disease fellow wrote in her monthly report to the Waterborne Disease Branch that "Investigating Legionnaires' Disease outbreak localized to a single county. Developed supplemental questionnaire, Epiinfo form, and database, and interviewed cases."

3/26/15 – CDC/CSTE waterborne disease fellow gives update on interviews to MDHHS staff, noting that they had been able to contact 32 of the 44 cases (MDHHS had interviewed 10 and GCHD 4 to date).

4/9/15 - CDC/CSTE waterborne disease fellow wrote in her monthly report to the Waterborne Disease Branch that "Investigating Legionnaires' Disease outbreak localized to a single county. Interviewing cases and entering data into Epi Info for analysis. No clear associations identified yet."

4/22/15 – MDHHS call with CDC and GCHD. GCHD follows up by email to CDC saying "We appreciate your comments about a measured response. We recognize we don't have the data we need for further action."

4/23/15 – CDC legionella group responds to GCHD, "If you are interested in discussing the Legionella action items in more detail, please let me know your availability for a conference call involving county, state, and RDB." CDC/CSTE Waterborne disease fellow offers to MDHHS colleagues to begin preliminary analysis of interview data received to date.

4/27/15 – GCHD replies "Our team is available Friday, May 8th…if that would work for you and our state colleagues."

CDC legionella group emails GCHD stating that CDC leadership is very concerned about the Genesee County legionella outbreak and says it deserves a comprehensive investigation and that CDC feels a sense of urgency. She describes assistance that they can provide from Atlanta as well as offering assistance through an Epi-Aid.

GCHD replies that they are trying to coordinate schedules for 4/30 or 5/1. CDC legionella group replies, "yes, let's try to schedule something for this week." They agree to have a call on 4/30 with CDC, GCHD, and MDHHS.

4/28/15 – CDC/CSTE waterborne disease fellow prepares analysis and brief summary for call with CDC. CDC legionella group sends document on CDC Sampling Procedure and Potential Sampling Sites to GCHD.

4/29/15 – MDHHS EIS officer and CDC/CSTE fellows finalize epi analysis from survey results. DEQ meets with McLaren & Hurley to review HACCP programs re plumbing systems

Fiedler, Jay (DHHS)

From:	Cupal, Suzanne <scupal@gchd.us>
Sent:	Wednesday, December 30, 2015 12:02 PM
To:	Cooley, Laura A. (CDC/OID/NCIRD); Rygiel, Christine
Cc:	Fiedler, Jay (DHHS); Moore, Matt (CDC/OID/NCIRD); Garrison, Laurel (CDC/OID/NCIRD); Lytle, Darren; rodgers.mark@epa.gov; Yoder, Jonathan S. (CDC/OID/NCEZID); Sarisky, John (CDC/ONDIEH/NCEH); Johnson, Mark (ATSDR/DCHI/CB); Henry, James; Valacak, Mark; Johnson, M.D., Gary; LaRocco, Toni
Subject:	RE: Genesee County Water Issues Meeting 1/4/15 11am
Attachments:	Final Genesee supplemental questionnaire.pdf; Flint Water System Issues Discussion Agenda.docx

Attached is an agenda for our meeting on Monday morning at 11am along with the call in information. There are several objectives for this meeting:

- Organize a review of the Flint water system in order to assess health risk (Legionella, other water illnesses, contaminants, other health issues)
- Share information regarding the current Legionella epidemiologic data review process which includes feedback on the current Legionella questionnaire
- Identify ASHRAE 188 Education/Outreach resources
- Discuss lessons learned in other communities that may assist our situation (Lead, etc.)
- Review risk assessment communication resources
- Discuss the creation of a Health Assessment Advisory Team

Just a quick review of what has happened since our conference call:

- GC has one new reported Legionella case (reported yesterday)
- We have discussed data needed for a water system review
- Epidemiologic data is being analyzed related to Legionella cases from May 2015 to present
- Marc Edwards has shared Legionella test data from 2 hospital systems using Flint water. Legionella was present in both. This reinforces our concerns and the need for ASHRAE 188 education/outreach. He will test additional buildings in the new year.

We hope the creation of a Health Assessment Advisory Team will allow us to identify potential risks in advance and to create appropriate messaging. We expect that this call will allow us to clearly identify next steps and which parties are best suited to assist in addressing those concerns. GCHD staff will meet in the EOC.

We greatly appreciate your participation in the call.

Suzanne

Suzanne Cupal, M.P.H.
Public Health Supervisor
Genesee County Health Department
630 S. Saginaw Street
Suite 4
Flint, MI 48502
(810) 768-7970
scupal@gchd.us

x Filter Backers
x CDC Bathory
x Eden shifting to what we know.

EMPower
CMS - Approved medical device.
- Get info for Flint data
- Staff Rep for Marcus.
- Need HIPAA compliant files.
- Access to a portal

From: Cooley, Laura A. (CDC/OID/NCIRD) [mailto:whz3@cdc.gov]
Sent: Tuesday, December 29, 2015 3:59 PM
To: Rygiel, Christine; Cupal, Suzanne
Cc: Fiedler, Jay (CDC michigan.gov); Moore, Matt (CDC/OID/NCIRD); Garrison, Laurel (CDC/OID/NCIRD)
Subject: RE: Legionella - Genesee County

Sure! I will be happy to take a look! Stay tuned...

I am looping back in the other folks from our team, as well as Jay. I think they fell off the exchange when I had to resend that initial email to you, Suzanne. My apologies!
Suzanne, you mentioned that Monday we will be talking about next steps. Somewhere earlier in that email exchange there was something about the 2 hospitals that Marc Edwards tested. Were they positive for Legionella? Just to catch us up to speed, could either of you give us a quick rundown of:

- What's happened in the interim since our call December 10?
- What are the *Legionella*-specific activities taking place currently?
- What kind of next steps are you hoping to define? Epi investigation? Environmental investigation? Remediation?

I hope I am not making things more complicated. We just want the conversation to be as productive as possible... the more we understand about the current situation and needs beforehand, the better prepared we can be.

Again, thank you!
Laura

Laura Cooley, MD, MPHTM
Legionellosis Surveillance & Outbreak Response
NCIRD/DBD/Respiratory Diseases Branch
Centers for Disease Control and Prevention
1600 Clifton Road, MS C-25
Atlanta, GA 30329
Tel: 404.639.2096
Fax: 404.315.4680
E-mail: LCooley@cdc.gov

From: Rygiel, Christine [mailto:crygiel@gchd.us]
Sent: Tuesday, December 29, 2015 3:32 PM
To: Cooley, Laura A. (CDC/OID/NCIRD) <whz3@cdc.gov>
Cc: Cupal, Suzanne <scupal@gchd.us>
Subject: Legionella - Genesee County

Laura Cooley,

My name is Christine Rygiel and I am the Epidemiologist for the Genesee County Health Department. I am currently working with the Michigan Department of Health and Human Services (MDHHS) with a summary analysis with all the information collected from our questionnaire (attached), as well as information we gathered from the hospital records. Please have a look at our questionnaire. We would appreciate feedback on anything that may improve the interview process. Also, I would be more than happy to share the data analysis once we have finished it! But with the recent holidays it may be a few weeks. Once we finish analyzing this data, we hope to have a better understanding of what might be ruled in or ruled out as a possible explanation for the increase in Legionella over the past couple years.

In addition, we had another confirmed case this morning. We are still gathering information on this individual.

Let me know if you have any questions!

Christine Rygiel, MPH, MB (ASCP)
Epidemiologist
Genesee County Health Department
630 S. Saginaw Street, Suite #4
Flint, MI 48502-1540
Office: 810-257-3815 | Fax: 810-257-3147

Genesee County
Health Department

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For a copy of the Health Department's Notice of Information Practices, contact the Health Department or visit the Health Department's website at http://www.gchd.us/

From: "Cupal, Suzanne" <Suzanne>
To: Valacak
Mark:
CC: Henry
James:
Date: 12/1/2015 1:40:31 PM
Subject: FW: Rough Draft Legionnaires Disease Media Release
Attachments: Legionnaires Disease 11.15.doc
Legionnaires Disease 11 15 apa.doc

FYI...

Suzanne Cupal, M.P.H.
Public Health Supervisor
Genesee County Health Department
630 S. Saginaw Street
Suite 4
Flint, MI 48502
(810) 768-7970
scupal@gchd.us

From: Garrison, Laurel (CDC/OID/NCIRD) [mailto:lee5@cdc.gov]
Sent: Tuesday, December 01, 2015 1:27 PM
To: Cupal, Suzanne
Cc: Yoder, Jonathan S. (CDC/OID/NCEZID); Sarisky, John (CDC/ONDIEH/NCEH); Johnson, Mark (ATSDR/DCHI/CB)
Subject: Fw: Rough Draft Legionnaires Disease Media Release
Importance: High

Hi Suzanne,
Please see below. The state asked me to share this directly with you. Thanks for considering our feedback. Can you share a copy of the final release?
Thanks, Laurel

From: Garrison, Laurel (CDC/OID/NCIRD)
Sent: Tuesday, December 01, 2015 11:30 AM Eastern Standard Time
To: Fiedler, Jay (CDC michigan.gov); Collins, Jim (CDC michigan.gov)
Cc: Yoder, Jonathan S. (CDC/OID/NCEZID); Sarisky, John (CDC/ONDIEH/NCEH); Johnson, Mark (ATSDR/DCHI/CB)
Subject: FW: Rough Draft Legionnaires Disease Media Release

Hi Jim and Jay,

See below and attached. Are you in the loop on this? I have concerns about this last paragraph:

"We remain vigilant with our surveillance efforts and are reaching out to the Environmental Protection Agency for their expertise in reviewing our data. A formal report has been submitted to the Centers for Disease Control through our MDHHS colleagues. GCHD continues to seek out Legionella expertise to address this observed increase in disease."

As you're aware, we haven't received a formal report from MDHHS, and haven't received a request to review anything in any formal or informal way since June. When we offered to arrange a call recently, the offer was declined. Of course we are ready to assist if there is a need, but I'm concerned that this statement is misrepresenting CDC's current involvement.

If the county is open to incorporating additional feedback, our communications specialist took a look at this and provided some edits (attached). She has a lot of experience with messaging around Legionnaires' disease outbreaks. Let me know if I should share this with the county directly.

Thanks,
Laurel

Laurel Garrison, MPH
Legionellosis Surveillance & Outbreak Response
NCIRD/DBD/Respiratory Diseases Branch
Centers for Disease Control and Prevention
1600 Clifton Rd., NE MS C-25
Atlanta, GA 30329-4027
404.639.3424
LeeS@cdc.gov

From: Johnson, Mark (EPA) (CDC epa.gov)

Sent: Tuesday, December 01, 2015 10:17 AM
To: Yoder, Jonathan S. (CDC/OID/NCEZID) <jsy9@cdc.gov>; Garrison, Laurel (CDC/OID/NCIRD) <lee5@cdc.gov>; Sarisky, John (CDC/ONDIEH/NCEH) <zse1@cdc.gov>
Cc: Buchanan, Sharunda D. (CDC/ONDIEH/NCEH) <sdb4@cdc.gov>; Blake, Robert G. (CDC/ONDIEH/NCEH) <emn9@cdc.gov>
Subject: FW: Rough Draft Legionnaires Disease Media Release

I realize that there has not been a formal request for support from the MI Dept of Health and Human Services to CDC. However, I wanted to make you aware of this draft press release on the Legionnaires Disease issue in Genesee County, MI. This is being sent mainly FYI, however, it may be useful to know if there were any glaring concerns with the content of this statement that should be communicated.

Mark

Mark D. Johnson, PhD, DABT
Regional Director/Toxicologist
Agency for Toxic Substances and Disease Registry (ATSDR)
77 W. Jackson Blvd.
Chicago, IL 60604
Office: 312-353-3436
Email: mdjohnson@cdc.gov

From: Poy, Thomas
Sent: Tuesday, December 01, 2015 8:37 AM
To: Johnson, Mark <johnson.mark@epa.gov>
Subject: FW: NEEDS IMMEDIATE ATTENTION FW: Rough Draft Legionnaires Disease Media Release

Mark: Genesee County is goint to put out a press release soon about the increase in cases of Legionaires Disease and is looking for comments. Attached is the draft press release.

Tom

Tom Poy
Chief, Ground Water and Drinking Water Branch
USEPA - Region 5
(312) 886-5991

From: Lytle, Darren
Sent: Tuesday, December 01, 2015 5:53 AM
To: Kaplan, Robert <kaplan.robert@epa.gov>
Cc: Schock, Michael <Schock.Michael@epa.gov>; Kempic, Jeffrey <Kempic.Jeffrey@epa.gov>; Schock, Michael <Schock.Michael@epa.gov>; Poy, Thomas <poy.thomas@epa.gov>; Deltoral, Miguel <deltoral.miguel@epa.gov>; Henry, Timothy <henry.timothy@epa.gov>
Subject: NEEDS IMMEDIATE ATTENTION FW: Rough Draft Legionnaires Disease Media Release

Bob (and task force),

I have been trying to get to the bottom of reports of increases in reported cases of Legionnaires Disease in Genessee County and finally reached the correct people. They shared some data that is very concerning and although they can't pinpoint the exact source of Legionella, drinking water can't be ruled out. Large increases in cases (my understanding is there were associated deaths) started shortly after the change in source water and all of the DS problems. They County needs to put out a press release regarding their findings and are obviously very concerned with how the public will react given all that has happened in Flint. They asked me to look at a draft of the release and I suggested I take it to the Task Force (they obviously agreed). The attached draft is short and I think they need a very quick turnaround (I will ask). Is it safe to say we can provide a quick review?

On a different topic, were there any plans/discussion of the task force meeting in Flint next week? Mike and I had planned a trip up there because Flint's technical advisory group was supposed to meet. That meeting has been cancelled but we felt the need to still travel up there to meet with various groups. The Genessee County group would like to meet on Tuesday afternoon next week to go over their study.

Darren

Darren A. Lytle, Ph.D., P.E.
Branch Chief (Acting)
U.S. Environmental Protection Agency
Cincinnati, Ohio 45268
Phone: (513) 569-7432
Fax: (513) 487-2543
email: lytle.darren@epa.gov

From: Cupal, Suzanne [mailto:scupal@gchd.us]
Sent: Monday, November 30, 2015 4:17 PM
To: Lytle, Darren <Lytle.Darren@epa.gov>
Cc: Valacak, Mark <MVALACAK@gchd.us>; Henry, James <jhenry@gchd.us>
Subject: Rough Draft Legionnaires Disease Media Release

Darren-

The attached is a really rough draft of the media release. We would appreciate feedback from the EPA task force.

Thank you for your assistance.

Suzanne

Suzanne Cupal, M.P.H.
Public Health Supervisor
Genesee County Health Department
630 S. Saginaw Street
Suite 4
Flint, MI 48502
(810) 768-7970
scupal@gchd.us

Fiedler, Jay (DHHS)

From:	Bohm, Susan (DCH)
Sent:	Friday, October 31, 2014 8:15 AM
To:	Henry, James
Cc:	Johnson, Shannon (DHHS); Fiedler, Jay (DHHS)
Subject:	Re: Legionnaire's Disease Cluster in Flint area

Thanks for the update, Jim. I have cc'd our epidemiologist for Legionnaires' disease Shannon Johnson, and our Section Manager, Jay Fiedler.

Susan

Sent from my iPhone

On Oct 27, 2014, at 4:13 PM, Henry, James <jhenry@gchd.us> wrote:

> Good afternoon Susan
>
> Mark Valacak recommended that I be the contact person for the County. Please feel free to forward Liane my information.
>
> The Flint DPW has assured us that water leaving the plant is safe and meets all the Safe Drinking Water Act standards. The DPW primarily has challenges with the aging distribution system. The use of the Flint River and recent boil water advisories has received a lot of attention from the local media and community.
>
> I am meeting with the Flint DPW and McLaren Hosp Admin this Thursday, Oct 30. Many of our confirmed legionella cases had been admitted to McLaren Hosp prior to being diagnosed. We have nothing conclusive at this point and are still gathering information.
>
> Please let me know if you have any questions, concerns, recommendations, etc...
>
> Thanks
>
> Jim Henry

Jim Henry RS, MBA
Environmental Health Supervisor
Genesee County Health Department www.gchd.us
630 S. Saginaw St., Suite 4
Flint, MI 48502-1540
Phone (810) 257-3618 Fax (810) 257-3125

E-mail jhenry@gchd.us

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For a copy of the Health Department's Notice of Information Practices, contact the Health Department or visit the Health Department's website at http://www.cchd.us/

Fiedler, Jay (DHHS)

From:	Bohm, Susan (DCH)
Sent:	Friday, May 01, 2015 5:15 PM
To:	'Cupal, Suzanne' (scupal@gchd.us); Henry, James
Cc:	Fiedler, Jay (DHHS); Johnson, Shannon (DHHS)
Subject:	RE: Follow-up Information

Hi Suzanne & Jim,

Thanks for forwarding your response plans for future Legionella cases. Although we didn't discuss this, in addition to the steps below, now that the weather is warming up, sending out a low-level HAN to all Genesee providers would be a good way to make sure providers are on alert to consider legionellosis and to include for them the MDHHS Legionellosis Guidance for Clinicians. Providers need to be aware that a culture specimen should be collected at the same time as the urine (for the urine antigen test) and prior to the initiation of antibiotics, if at all possible. It's likely too late once we have a positive urine antigen to then go back and try to obtain a culture specimen. We can update the guidance document to include some additional detail about specimen collection and testing to reflect that:

-If a provider orders a urine antigen test on a patient with suspect Legionellosis, a respiratory culture for legionella should be collected at the same time.
    -A bronchoalveolar lavage or tracheal aspirate are the preferred specimens collection methods. If those are not able to be done, a sputum specimen may be used, but the likelihood of recovering the bacteria may be decreased.
-The urine antigen and respiratory cultures should be tested by the hospital laboratory. In the event that a hospital lab is unable to perform a urine antigen or respiratory cultures, specimens may be sent to the state health department laboratory.
-Any clinical specimen remaining from the culture **should be frozen** and stored immediately [this would stay frozen if being sent to CDC].
-If a Legionella isolate grows, a slant or plate should shipped to the state health department laboratory overnight on cold packs. A courier is recommended for plates as they do not travel well.
(If an isolate does not grow, we will need to work with BoL to determine whether the frozen clinical specimen should be shipped to the state lab for testing, or to CDC)

Shannon contacted our lab regarding what the CDC mentioned yesterday about freezing the specimens. For the shipment of isolate slants or plates to BoL, they only need to be sent on cold packs. We believe CDC was talking about the shipment of clinical specimens, which we generally shouldn't need to do because hospital labs are capable of performing respiratory cultures. If it will help, Shannon is willing to create of flowchart to show the steps of clinical specimen collection and testing.

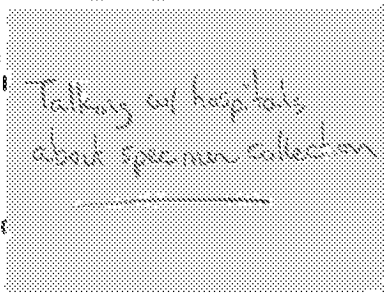
Here's a few comments/suggestions for your response plan in red below. Wishing you both a Legionella-free weekend!

-S

From: Cupal, Suzanne [mailto:scupal@gchd.us]
Sent: Friday, May 01, 2015 11:10 AM
To: Bohm, Susan (DCH)
Cc: Henry, James
Subject: RE: Follow-up Information

Susan-

Based on our conversation with you yesterday, I am forwarding our plan for any future Legio weather months approach.



Once we have a Legionella case identified:

- Enter the case in MDSS within 24 h of notification if not already entered by provider
- Email Regional Epidemiologist with MDSS number
- Call hospital to verify that a respiratory specimen was collected for culture within 24 h of notification
- If Legionella isolate was found, verify that the hospital will send to BOL (see above for more details on this)
- Using the enhanced Legionella Disease Questionnaire, conduct interview as quickly as possible with case or proxy and upload to MDSS record when completed (We would like to review the current Legionella questionnaire with input from our state and CDC colleagues as we examine the current questionnaire data from the investigation so far…so we can make appropriate adjustments – good idea)
- Based on information collected from interview, evaluate with investigation team if environmental samples from the home should be collected. We think we have a solution for the environmental sampling. Our on-site CDC EIS Officer may be willing to assist Jim Henry with the sampling. Logistically it would be difficult for a CDC Epi-Aid team to come in and sample if these cases continue to trickle in.
- Continued analysis of existing data
- Continue conversations with our state and CDC colleagues and other experts that may assist the investigation(s).

As we shared in our conversation yesterday, Shurooq is reviewing the previous 5 years Legionella cases to examine the number of cases that live in the City of Flint vs. other areas. We will also be reviewing syndromic surveillance data for the same time frame for respiratory, skin rash and gastrointestinal illness.

Our concerns moving forward are:

- Collection of clinical samples- based on the comments from the CDC about collection of samples being an art as well as a science, we want to make sure we collect appropriate samples. The CDC has already provided a change to the protocol with the request for frozen samples. [see above]
- Collection of environmental samples- GCHD staff members have not had experience collecting these types of environmental samples – see above.
- Access to information. We have shared our concerns regarding obtaining information to assist our investigation

As always, do not hesitate connecting with us if you need additional information. We want to ensure clear and continual communication as we move forward.

Thank you.

Suzanne

Suzanne Cupal, M.P.H.
Public Health Supervisor
Genesee County Health Department
630 S. Saginaw Street
Suite 4
Flint, MI 48502
(810) 768-7970
scupal@gchd.us

Fiedler, Jay (DCH)

From: Busch, Stephen (DEQ)
Sent: Friday, April 24, 2015 2:40 PM
To: Fiedler, Jay (DCH)
Cc: Johnson, Shannon (DCH)
Subject: Flint Hospital Meetings

Jay,

Just wanted to let you know that my engineer, Mike Prysby, and I have scheduled meetings with the McLaren and Hurley hospitals' facility operations management next Wednesday 4/29 to go over any HACCP programs they may have in place regarding their premise plumbing systems.

We plan to cover all aspects including,

- Team members
- Process flow
- Onsite audits
- Hazard analysis
- Risk characterization
- Critical Control Points
- Monitoring
- Verification
- Documentation/Recordkeeping

I will follow up after the meetings with any notable findings.

Stephen Busch, P.E.
Lansing and Jackson District Supervisor
Office of Drinking Water and Municipal Assistance
MDEQ
517-643-2314

Hurley – No plan, No treatment, No monitoring

McLaren – Monitoring: Sep, Oct, Jan, Feb, Mar, Apr
- continuous treatment system
- DEQ making to talk
- Every six months hyperchlorination
- Testing for bacteria, monitoring Cl residual.
- Will work up them on control plan

Both facilities. Have trouble of keeping

Mc – s/o N/C today. Flowing on Nov.
M/A More consistent monitoring.

Sampling

Wider Mays
Wider Age
Wider Main Breaks

Spreadsheet on breaks 400 breaks last year
4 per day right now.

STATE OF MICHIGAN

RICK SNYDER
GOVERNOR

DEPARTMENT OF HEALTH AND HUMAN SERVICES
LANSING

NICK LYON
DIRECTOR

FOR IMMEDIATE RELEASE
DRAFT, 2016

CONTACT: Jennifer Eisner
(517) 241-2112

MDHHS issues update to 2015 Legionnaires' disease report for Genesee County

LANSING, Mich. – As part of the ongoing investigation into the increase of Legionnaires' disease (LD) in Genesee County, the Michigan Department of Health and Human Services (MDHHS) today issued an updated report for 2015. The report identifies additional cases and deaths identified since the last report, and provides further analysis regarding the investigation.

"To date, 91 cases and 12 deaths have been identified in total for the 2014 and 2015 healthcare-associated outbreaks in Genesee County," said Eden Wells, M.D., Chief Medical Executive with the MDHHS. "We remain vigilant in identifying any potential case associated with the outbreak, and will continue to update information as it becomes available."

Of the additional cases, two had not been appropriately referred to the public health system. The electronic messages generated by the hospital laboratory system were flawed and the healthcare providers failed to report the cases. The third case was reported in a different jurisdiction and there was no epidemiologic information available to link it to the outbreak. All of the new cases were identified by MDHHS personnel during a review of hospital testing data that was forwarded to the department in the past week.

Of the 91 total confirmed cases between June 2014 and November 2015, 31 people, or 34 percent, received city of Flint water to their residence. A total of 26 people, or 29 percent, had no known exposure to a Flint hospital in the two weeks prior to illness, nor were their homes on the Flint water system. Other possible exposures were evaluated and no known community or residential exposures have been identified.

For the May 2015 to October 2015 time period, 46 LD cases and seven deaths have been confirmed in the Genesee County outbreak. Data previously indicated 43 cases and five Legionnaires-associated deaths for 2015. The number of cases for June 2014 through March 2015 time period has remained unchanged with 45 LD cases confirmed, including five associated fatalities.

Legionella is a type of bacteria commonly found in the environment that grows best in warm water, such as hot tubs, cooling towers, potable water systems, and decorative fountains. When people are exposed to the bacteria, it can cause legionellosis, a respiratory disease that can infect the lungs and cause pneumonia. The bacteria can also cause a less serious infection called Pontiac fever. Legionella is not transmitted person to person.

MDHHS has partnered with Wayne State University and continues to work with the Genesee County Health Department (GCHD) and the Centers for Disease Control and Prevention (CDC) on enhanced surveillance which will continue in 2016.

###

October Flint Field Sampling Results

August Sampling Results

		Acanthamoeba polyphaga	***Vermamoeba vermiformis***	*Pseudomonas aeruginosa*	***Mycobacterium* spp.**	*Mycobacterium avium*	***Legionella* spp.**	
Flint Businesses Positive* (n=9)	Water	0	2	0	4	0	2	0
	Biofilm	1	2	0	5	0	1	0
Flint Homes Positive* (n=7)	Water	0	4	0	5	0	5	0
	Biofilm	2	2	0	3	0	1	0
Detroit Water Businesses Positive* (n=4)	Water	0	0	0	2	0	0	0
	Biofilm	0	2	1	3	0	0	0

- *Legionella* spp. in 47% Flint water sites
- High concentrations of 2500 gene copies/mL
- No *L. pneumophila* detected

Legionellosis Public Health Data

- 46 cases reported by 3rd week in November in Genesee
- On pace for 12.5 cases per 100k citizens
- Almost 10 times the national average of 1.3/100k
- African Americans have 50% higher incidence than whites

- Multiple concurrent LD cases in Flint hospitals
- Sources not traceable: no outbreak confirmed

- OPPPs were predicted to be a potential public health issue with the switch to Detroit water

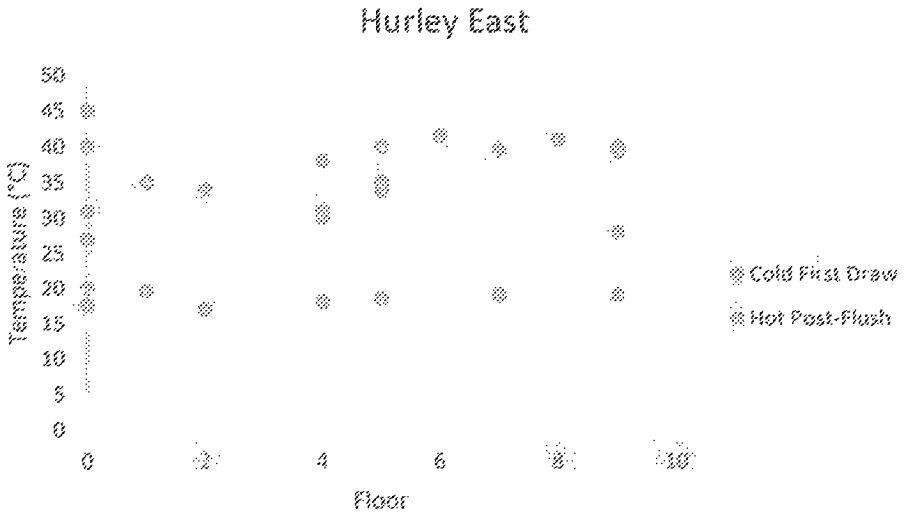
Sampling Regime

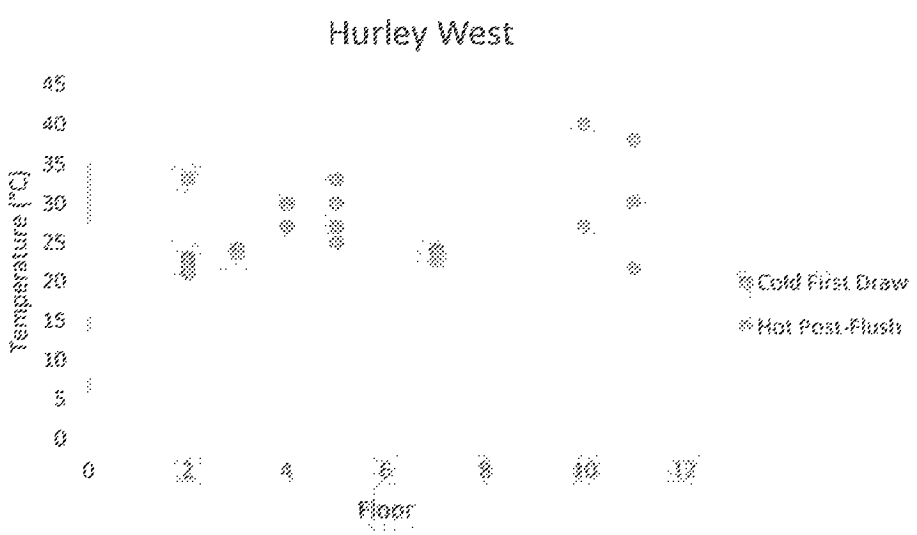
- 62 one liter water samples from public sinks
- Cold first draw followed by hot post-flush
- Sampled afternoon of 10/15 and morning of 10/16

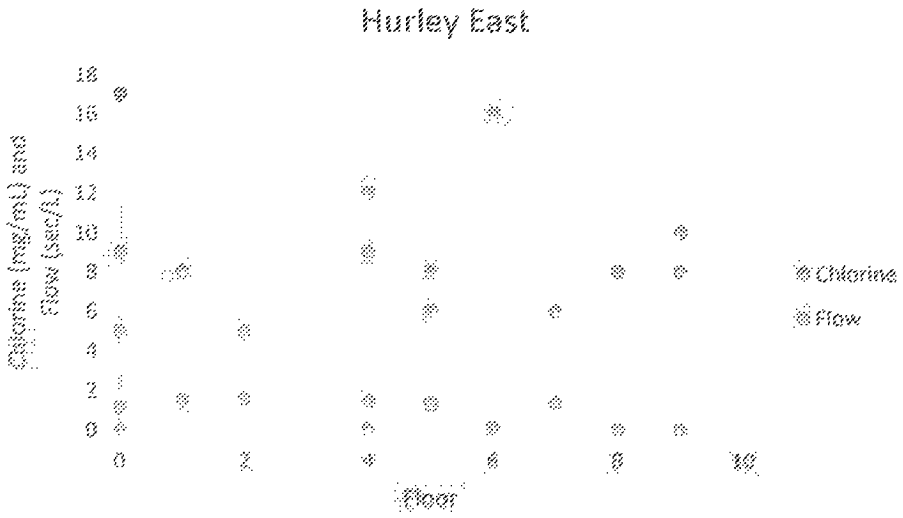
- Tested for wide range of metals on cold samples
- Measured flow, temperature, and chlorine on site
- Performed DNA based analysis for *Legionella* spp. and *L. pneumophila*

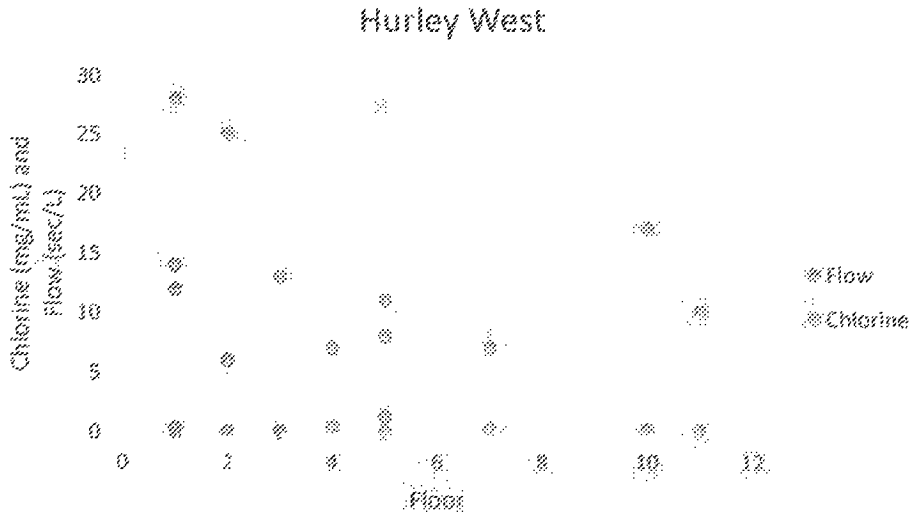
Physical Data

- No elevated levels of metals were detected
- 70% hot water temperature in ideal growth range
- 87% cold water temperature at/near growth range
- 60% taps under ideal chlorine residual
- 0% taps reached scalding temperatures


Hurley East
Temperature (°C)
Floor
Cold First Draw
Hot Post-Flush


Hurley West
Temperature (°C)
Floor
Cold First Draw
Hot Post-Flush


Hurley East
Chlorine (mg/mL) and Flow (ser/L)
Floor
Chlorine
Flow


Hurley West
Chlorine (mg/mL) and Flow (ser/L)
Floor
Flow
Chlorine

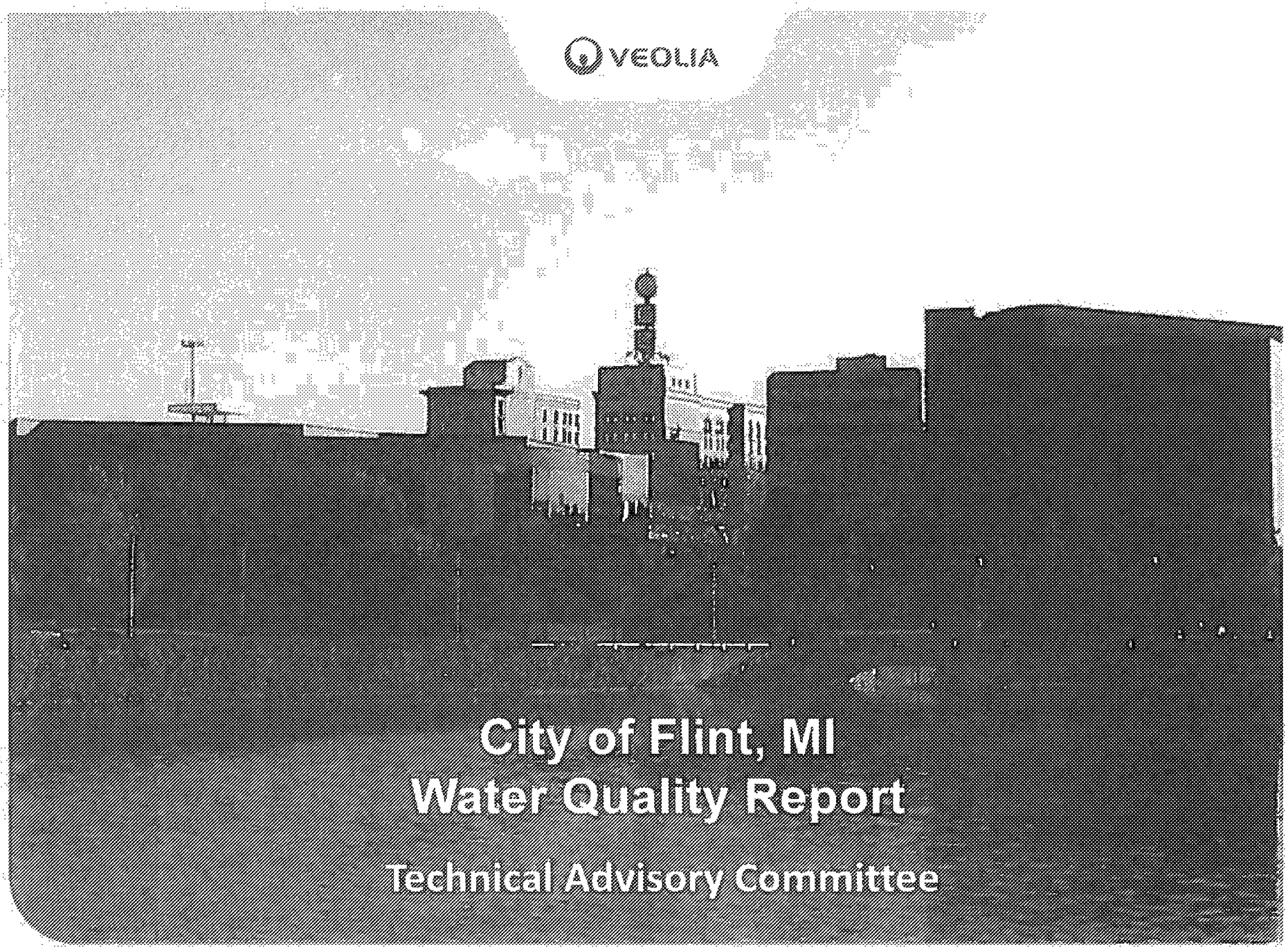
Microbial data

	Legionella	*L. pneumphila*
Hot % (n=29)	97	93
Hot Max Concentration	66018	5408
Cold % (n=30)	77	60
Cold Max Concentration	119028	4237
Combined % (n=59)	86	76
Combined Mean Concentration	14123	1969

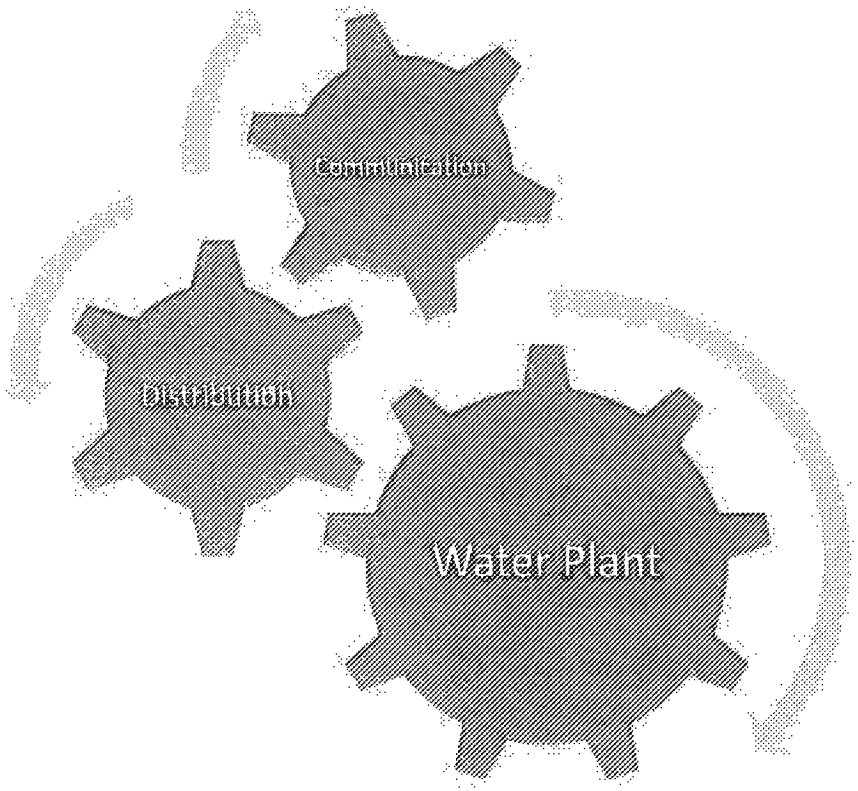
- Concentrations in gene copies/mL
- Samples have yet to be re-tested for assay inhibition
- Number of positives may increase with additional analysis

Summary

- High frequency and concentration of both *Legionella* and *L. pneumophila* measured

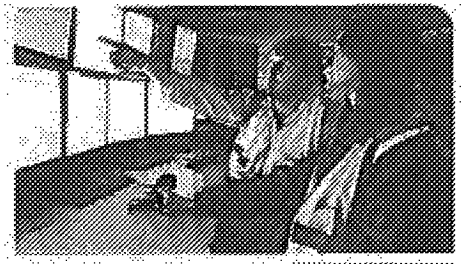

VEOLIA
City of Flint, MI
Water Quality Report
Technical Advisory Committee

Solution Involves Coordination of 3 Activities

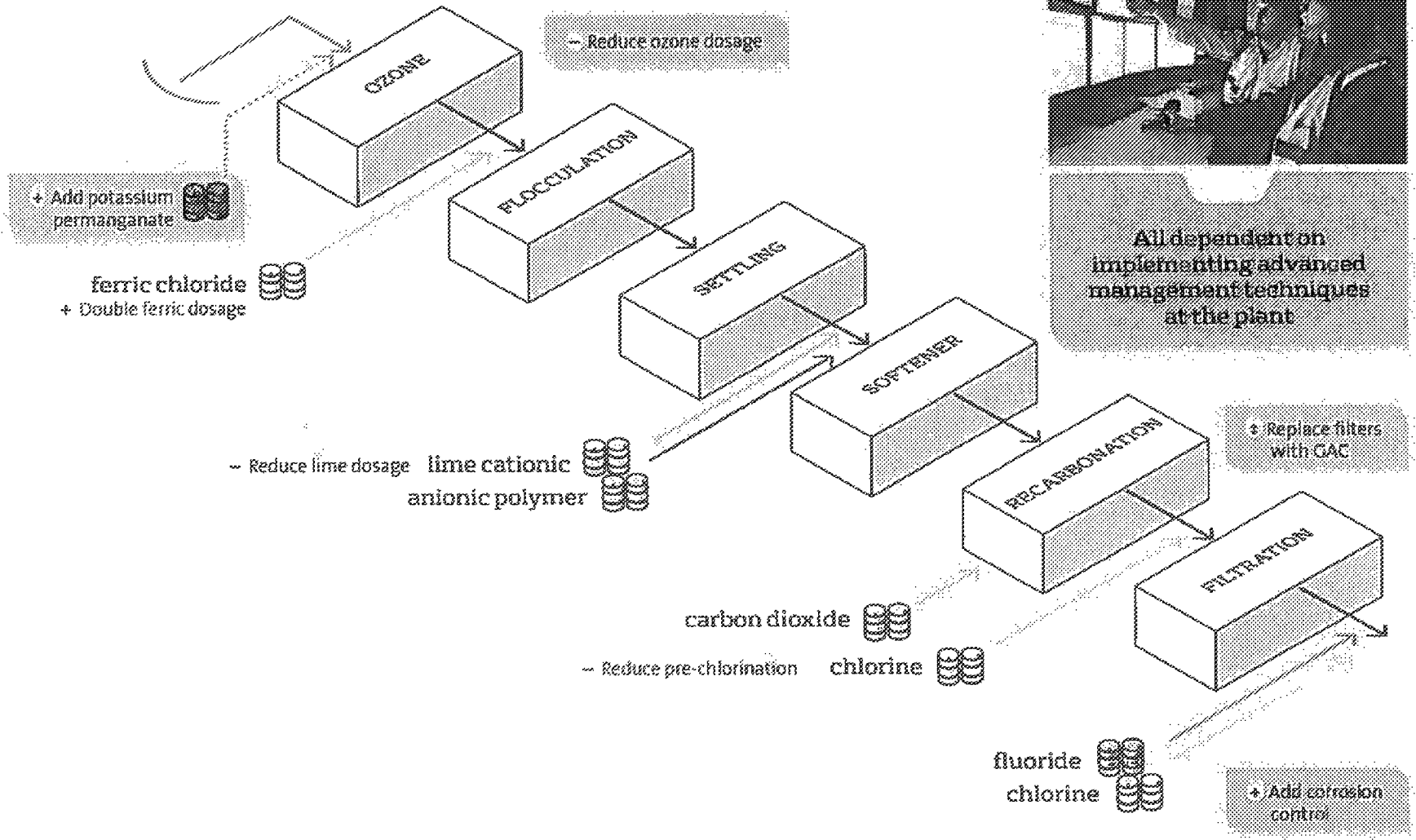


- Water plant improvements
  - *Optimize chemical dosages*
  - *Consider different chemicals*
  - *Install granulated activated carbon*
  - *Complete plant upgrades*
  - *Implement best mgt practices*
- Distribution system improvements
  - *Fix broken valves*
  - *Ask for customer feedback*
  - *Reduce tank storage*
  - *Target line flushing*
  - *Run a hydraulic model*
- Better communication with customers
  - *Engage advisory committees*
  - *More accessible utility*
  - *Make it easy to access information*
  - *Better customer communication*

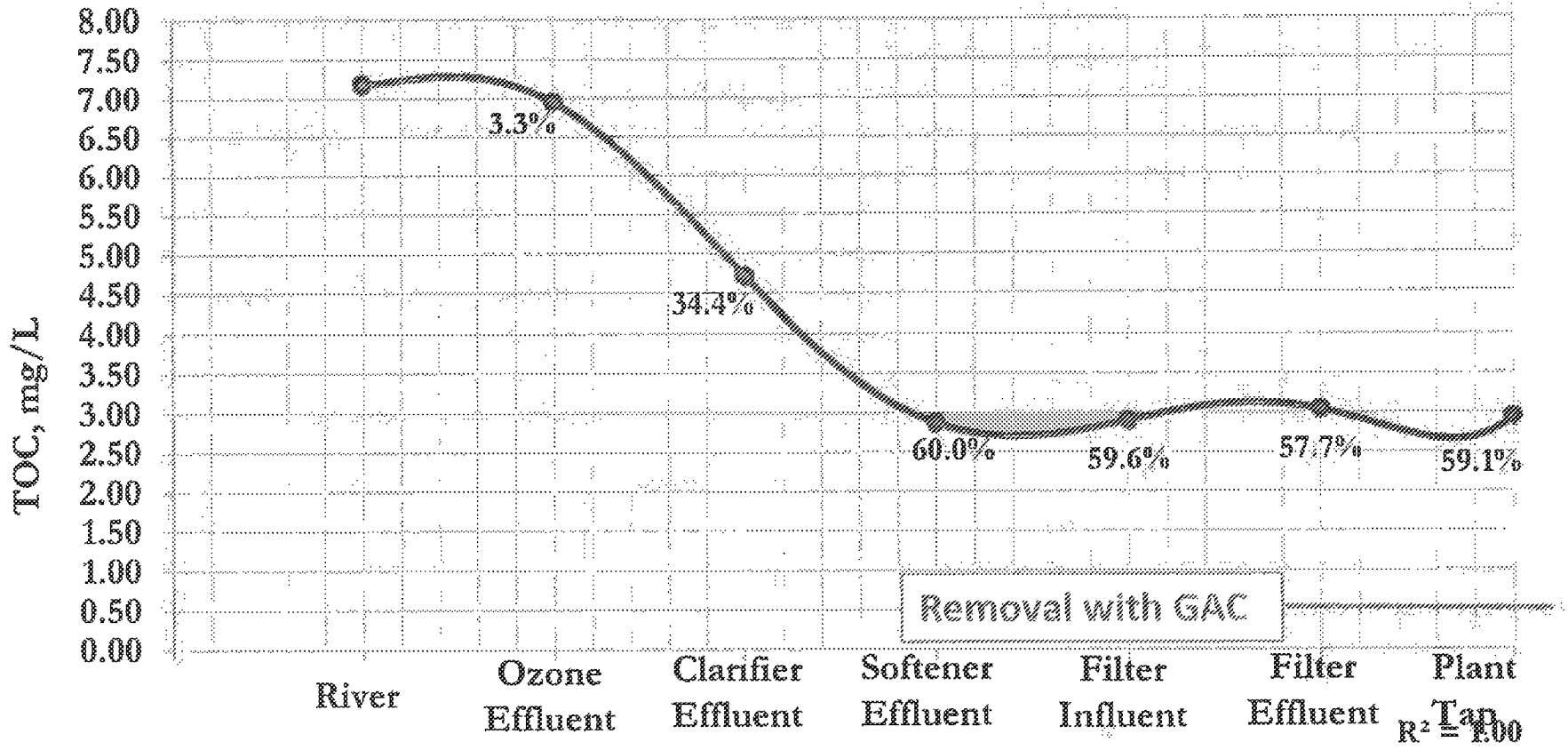
Optimize Plant Processes



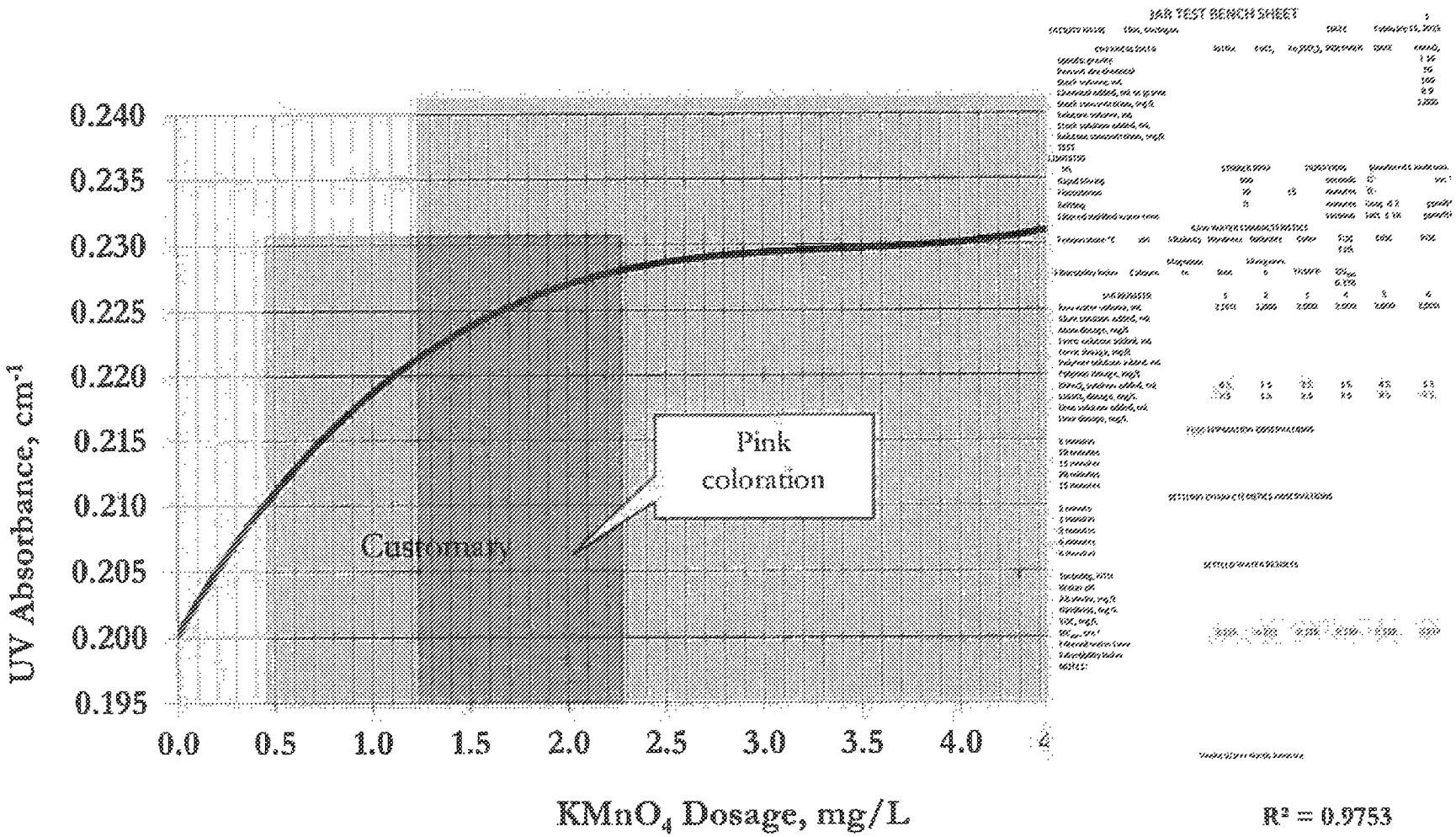
All dependent on implementing advanced management techniques at the plant



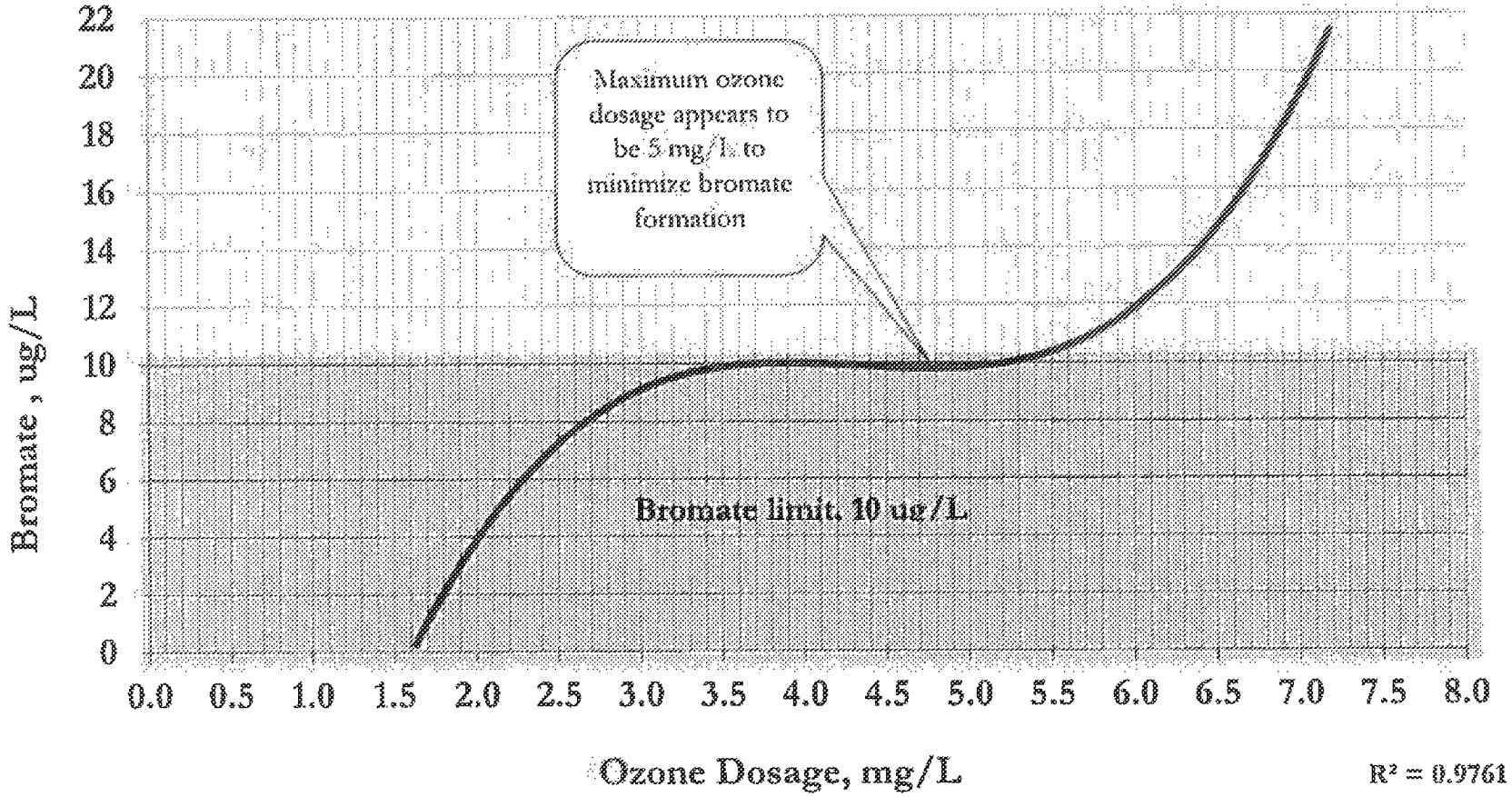
TOC Removal Efficiency Optimizing Current Plant



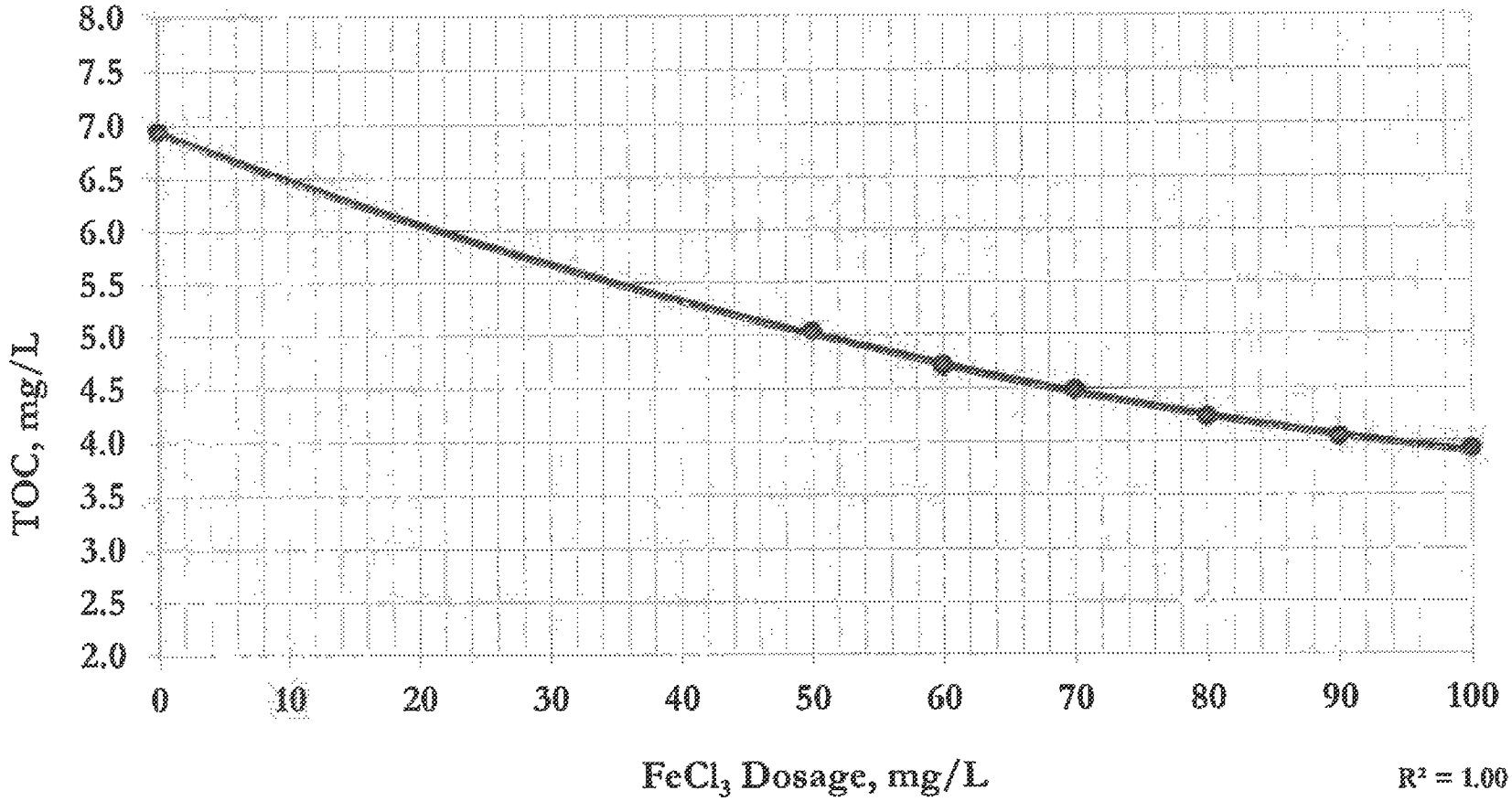
Potassium Permanganate Dosing Graph



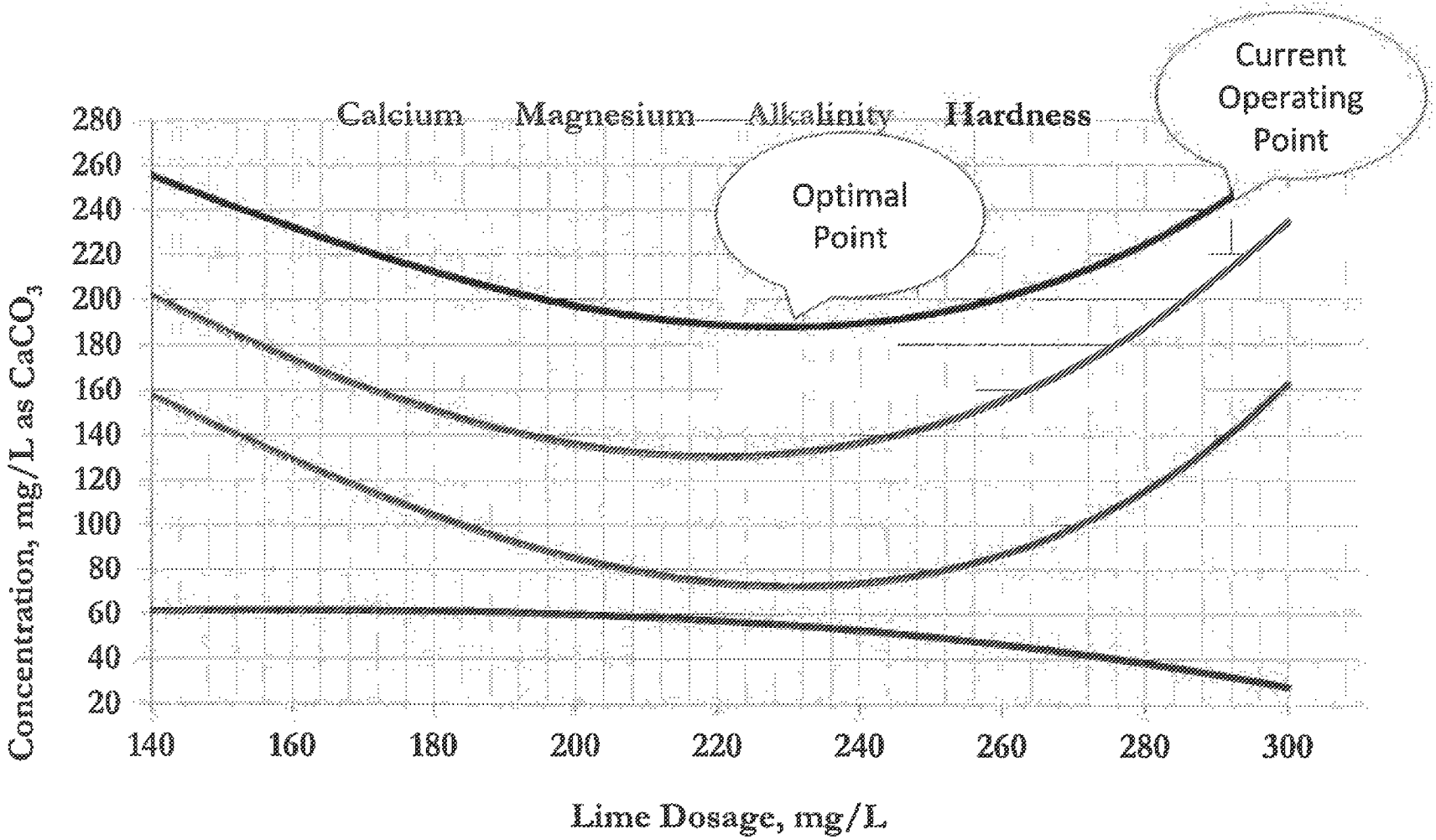
Bromate Dosing Graph



Dosage of Ferric Chloride



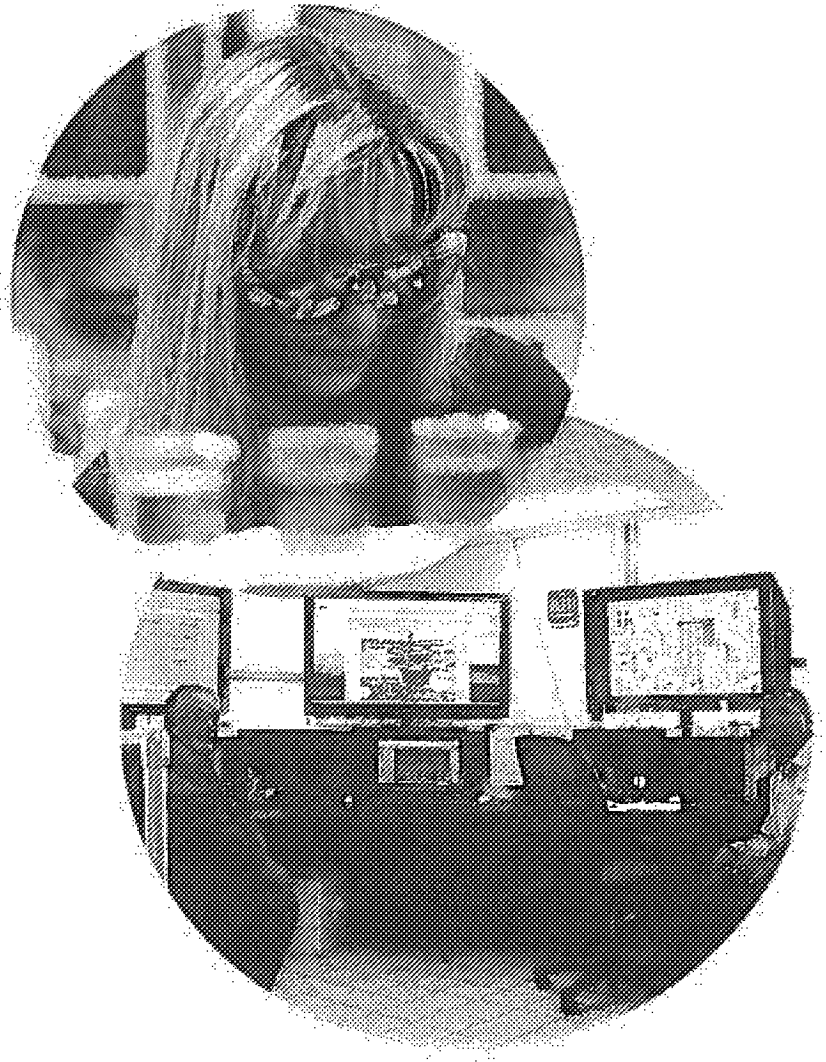
Lime Dosage Graph



Implement Best Management Practices

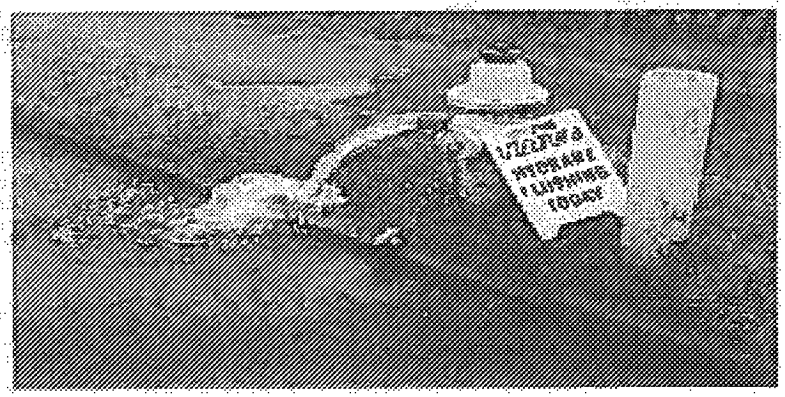
Activities to Help Operators Maintain Good Water Quality

- Process Control Management Plan
- Lab QA/QC Program
- Computerized Maintenance Management System
- Asset Management System
- Training and Certification Program
- Vulnerability Plan

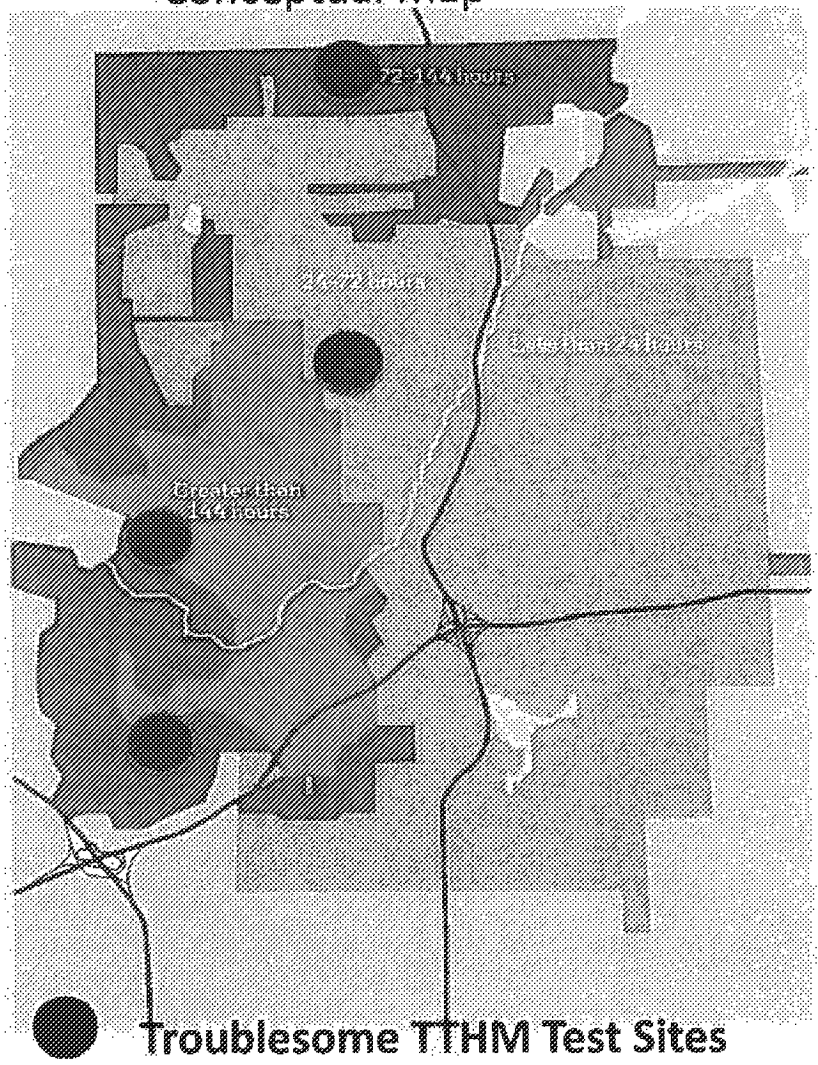


Water Age Map

- Speed up flow of water from plant to homes – 2 weeks plant to house
  - *Find closed valves & open them*
  - *Replace broken valves*
  - *Update hydraulic model*
  - *Reduce system storage*
- Track customer complaints
  - *Test customer water*
  - *Spot flush hydrants to clean areas of stagnant water in the system*



Conceptual Map



Make It Easy to Access Information and People

Develop a proactive customer communication plan

- Create advisory committees to help direct efforts and improve flow of information
- Add additional communication personnel for the utility
- Develop a pro active communication program
- Establish a single point of contact to manage all water quality complaints
- Provide additional customer service training and tools to staff
- Expand neighborhood and community outreach
- Change monthly billing statements from card to envelope with information

VEOLIA

Questions?

	The concentration of a contaminant, which, if exceeded, triggers treatment or other requirements which a water system must follow.
	HAA5 is the total of bromoacetic, chloroacetic, dibromoacetic, dichoroacetic, and trichloroacetic acids. Compliance is based on the total .
	The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.
	The level of contaminant in drinking water below which there is no known or expected risk to health.
	The highest level of disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.
	The level of a drinking water disinfectant below which there is no known or expected risk to health. MRLDG's do not reflect the benefits of the use of disinfectants to control microbial contaminants.
	Measures the cloudiness of water.
	The ppb is equivalent to micrograms per liter. A microgram = 1/1000 milligram.
	The ppm is equivalent to milligrams per liter. A milligram = 1/1000 gram.
	A required process intended to reduce the level of a contaminant in drinking water.
	Total Trihalomethanes is the sum of chloroform, bromodichloromethane, dibromoochloromethane and bromoform. Compliance is based on total.

Department of Utilities

FLINT WATER PLANT

City of Flint
Water Plant & Facilities

2013 Consumers Annual Report on W

The City of Flint Department of Utilities is dedicated to providing residents of the community. The Consumers Annual Report on Water Q about your drinking water. This report includes information about the so a chart summarizing United States Environmental Protection Agency (U table giving explanations of important terms to understand when viewin & Facilities operates and maintains a certified drinking water laboratory federal regulations and is committed to prompt and thorough notificatio for concern about the quality of the drinking water.

& Sewerage Department, and the Michigan Public Health Institute performed
mine the susceptibility of potential contamination. The susceptibility rating
low" to "very high" based primarily on geologic sensitivity, water chemistry,
n source water intake is categorized as having a moderately low susceptibility
ke Huron water treatment plant has historically provided satisfactory treatment
ter standards. If you would like to know more information or a complete copy
er Plant at (810) 787-6537.

safe to drink, the EPA prescribes regulations, which limit the amount of
y the public water systems. The Food and Drug Administration (FDA)
ms in bottled water, which must provide the same protection for public
l water, may reasonably be expected to contain at least small amounts of
minants does not necessarily indicate that water poses a health risk. More
ential health effects can be obtained by calling the EPA's Safe Drinking

(tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs,
he surface of the land or through the ground, it dissolves naturally occurring
material, and can pick up substances resulting from the presence of animals or
may be present in source water include:

ses and bacteria, which may come from sewage treatment plants, septic
ms, and wildlife.

s and metals, which can be naturally-occurring or result from urban storm
water discharges, oil and gas production, mining, or farming.

come from a variety of sources such as agriculture, urban storm water

ding synthetic and volatile organic chemicals, which are by-products of
duction, and can also come from gas stations, urban storm water runoff,

n be naturally occurring or be the result of oil and gas production and

e to contaminants in drinking water than the general population. Immuno-
ancer undergoing chemotherapy, persons who have undergone organ
e immune system disorders, some elderly, and infants can be particularly at
seek advice about drinking water from their health care providers. EPA/CDC
the risk of infection by Cryptosporidium and other microbial contaminants
e Hotline (1-800-426-4791).
n cause serious health problems, especially for pregnant women and young
ily from materials and components associated with service lines and home
of Utilities is responsible for providing high quality drinking water, but cannot
ruding components. When your water has been sitting for several hours, you

Nitrate	08/13/2013	ppm	10	10	0.32	n/a
Barium	6/9/2008	ppm	2	2	0.01	n/a

Disinfection By-Products – Monitoring in Distribution System

Contaminant	Test Date	Units	Health Goal MCLG	Allowed Level MCL	Highest LRAA	Range Detect
Total Trihalomethanes (TTHM)	2013	ppb	n/a	80	37.8	11.5 –
Haloacetic Acids (HAA5)	2013	ppb	n/a	60	17.0	6.0 – 1

Disinfectant Residuals Monitoring in Distribution System

Contaminant	Test Date	Units	Health Goal	Allowed Level	Highest RAA	Range Detec
Disinfectant Total Chlorine Residual	Jan-Dec 2013	ppm	MRDGL 4	MRDL 4	0.81	0.65-9

2013 Turbidity – Monitored every 4 hours at Plant Finished Water Tap

Highest Single Measurement Cannot exceed 1 NTU	Lowest Monthly % of Samples Meeting Turbid Limit of 0.3 NTU (minimum 95%)
0.26 NTU	100%

Turbidity is a measure of the cloudiness of water. We monitor it because it is a good indicator of the

2013 Microbiological Contaminants – Monthly Monitoring in Distribution System

Regulated Contaminant	MCLG	MCL	Highest Numbe Detected
Total Coliform Bacteria	0	Presence of Coliform bacteria > 5% of monthly samples	In one month 1
E.coli or Fecal Coliform Bacteria	0	A routine sample and a repeat sample are total coliform positive, and one is also fecal or *E. coli* positive.	entire year 0

2011 Lead and Copper Monitoring at Customers' Tap

Regulated Contaminant	Test Date	Units	Health Goal MCLG	Action Level AL	90th Percentile Value*	Number of Samples Over AL
Lead	2011	ppb	0	15	< 2.0	0
Copper	2011	ppm	1.3	1.3	0.10	0

*The 90th percentile value means 90 percent of the homes tested have lead and copper levels below value is above the AL additional requirements must be met.

Regulated Contaminant	Treatment Technique
Total Organic Carbon	The Total Organic Carbon (TOC) removal ratio is calculated as the rat

...ol)	
...el	The concentration of a contaminant, which, if exceeded, triggers treatment or other requirements which a water system must follow.
...ids	HAA5 is the total of bromoacetic, chloroacetic, dibromoacetic, dichoroacetic, and trichloroacetic acids. Compliance is based on the total .
...ual Average	
...imum Level	The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.
...um Level Goal	The level of contaminant in drinking water below which there is no known or expected risk to health.
...ligram per liter	A milligram = 1/1000 gram 1 milligram per liter is equal to 1ppm
...fectant Level	The highest level of disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.
...fectant Level Goal	The level of a drinking water disinfectant below which there is no known or expected risk to health. MRLDG's do not reflect the benefits of the use of disinfectants to control microbial contaminants.
...ples	
...ed	
...idity Units	Measures the cloudiness of water.
...ligram per liter	A measure of radioactivity. Picocurie (pCi) means the quantity of radioactive material producing 2.22 nuclear transformations per minute.
...(one billion)	The ppb is equivalent to micrograms per liter. A microgram = 1/1000 milligram.
...(one million)	The ppm is equivalent to milligrams per liter. A milligram = 1/1000 gram.
...Average	
...nique	A required process intended to reduce the level of a contaminant in drinking water.
...thanes	Total Trihalomethanes is the sum of chloroform, bromodichloromethane, dibromoochloromethane and

Department of Utilities

FLINT WATER PLANT

City of Flint
Water Plant & Facilities

2014 Consumers Annual Report on W

The City of Flint Department of Utilities is dedicated to provid the residents of the community. The Consumers Annual Report on W information about your drinking water. This report includes informat health information, a chart summarizing United States Environmenta testing results, and a table giving explanations of important terms to results. The Flint Water Plant & Facilities operates and maintains a c to assure compliance with all state and federal regulations and is cor

...higan Department of Environmental Quality in partnership with the U.S. ...ewerage Department, and the Michigan Public Health Institute performed a ...ine the susceptibility of potential contamination. The susceptibility rating is a ...to "very high" based primarily on geologic sensitivity, water chemistry, and ...water intake is categorized as having a moderately low susceptibility to ...own water treatment plant has historically provided satisfactory treatment of ...ndards. If you would like to know more information or a complete copy of ...out at (810) 787-6537.

...drink, the EPA prescribes regulations, which limit the amount of certain ...water systems. The Food and Drug Administration (FDA) regulations ...ater, which must provide the same protection for public health. Drinking water, ...pected to contain at least small amounts of some contaminants. The presence of ...ese contaminants does not necessarily indicate that the water poses a health risk. More information about contaminants and potential ...EPA's Safe Drinking Water Hotline (800-426-4791).

...king water and bottled water) include rivers, lakes, streams, ponds, reservoirs, ...springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally occurring ...erial, and can pick up substances resulting from the presence of animals or ...may be present in source water include:

...ses and bacteria, which may come from sewage treatment plants, septic ...ems, and wildlife.

...and metals, which can be naturally-occurring or result from urban storm ...wastewater discharges, oil and gas production, mining, or farming.

...come from a variety of sources such as agriculture, urban storm water ...

...luding synthetic and volatile organic chemicals, which are by-products ...production, and can also come from gas stations, urban storm water ...

...be naturally occurring or be the result of oil and gas production and ...

...to contaminants in drinking water than the general population. Immuno-...ancer undergoing chemotherapy, persons who have undergone organ ...immune system disorders, some elderly, and infants can be particularly at ...seek advice about drinking water from their health care providers. EPA/CDC ...the risk of infection by Cryptosporidium and other microbial contaminants ...Hotline (1-800-426-4791).

...use serious health problems, especially for pregnant women and young children. ...vulnerable to lead in drinking water than the general population. It is possible ...than at other homes in the community as a result of materials used in your ...

...ndrate	5/13/14	ppm	...	...	...	...
Nitrate	5/13/14	ppm	10	10	0.31	n/a

Disinfection By-Products – Monitoring in Distribution System Stage 2 Disinfection B						
Regulated Contaminant	Test Date	Unit	Health Goal MCLG	Allowed Level MCL	Highest LRAA	Range o Detectio
Total Trihalomethanes (TTHM)	2014	ppb	n/a	80	33.0	16.0 - 48.(
Haloacetic Acids (HAA5)	2014	ppb	n/a	60	15.8	8.0 - 19.(

Disinfectant Residuals Monitoring in DWSD Distribution System						
Regulated Contaminant	Test Date	Unit	Health Goal MRDGL	Allowed Level MRDL	Highest RAA	Range o Detectio
Total Chlorine Residual	Jan-Dec 2014	ppm	4	4	0.82	0.64-0.9
Regulated Contaminant	Treatment Technique					
Total Organic Carbon (ppm)	The Total Organic Carbon (TOC) removal ratio is calculated as the ratio be actual TOC removal and the TOC removal requirements. The TOC was n each month and because the level was low, there is no requirement for TC					

2014 Turbidity – Monitored every 4 hours at Plant Finished Water Tap	
Highest Single Measurement Cannot exceed 1 NTU	Lowest Monthly % of Samples Meeting Turbidity Limit of 0.3 NTU (minimum 95%)
0.19 NTU	100%
Turbidity is a measure of the cloudiness of water. We monitor it because it is a good indicator of the e	

2014 Microbiological Contaminants – Monthly Monitoring in Distribution System			
Regulated Contaminant	MCLG	MCL	Highest Numb Detected
Total Coliform Bacteria	0	Presence of Coliform bacteria > 5% of monthly samples	0
E.coli Bacteria	0	A routine sample and a repeat sample are total coliform positive, and one is also fecal or E. coli positive.	0

2011 Lead and Copper Monitoring at Customers' Tap						
Regulated Contaminant	Test Date	Unit	Health Goal MCLG	Action Level AL	90th Percentile Value*	Number Sample Over Al
Lead	2011	ppb	0	15	< 2.0	0
Copper	2011	ppm	1.3	1.3	0.10	0

*The 90th percentile value means 90 percent of the homes tested have lead and copper levels below th is above the AL additional requirements must be met.

2014 Radionuclides					
Regulated Contaminant	Test Date	Unit	Health Goal MCLG	Allowed Level MCL	Level Detected
Combined Radium	5/13/14	pCi/l	0	5	0.66 + or - 0.55

City of Flint 2014 Annual Water Quality Report

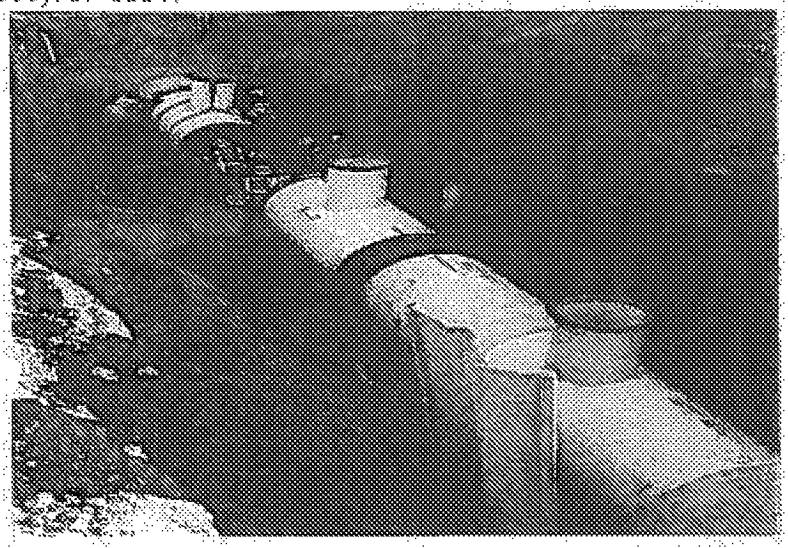
The Consumers Annual Water Quality Report provides important information about your drinking water. This report includes information about the source of the water, health information, charts that summarize regulatory required testing results, and a table giving explanations of important terms to understand when viewing the test results. The City of Flint Department of Utilities is dedicated to providing quality drinking water to the residents of the community. The Flint Water Plant operates and maintains a certified drinking water laboratory to assure compliance with all state and federal regulations, and is committed to prompt and thorough notification to the consumers if there is any reason for concern about the quality of the drinking water. Information about your drinking water is available on the City of Flint web page at www.cityofflint.com or by calling the City of Flint Water Plant at (810) 787-6537. The Safe Drinking Water Hotline at (800) 426-4791 is a resource for health related questions and water quality issues. General drinking water information can also be found on the U.S. Environmental Protection Agency (EPA) web site at www.epa.gov/safewater/.

Customer Service Center
City Hall
1101 S. Saginaw St.
Flint, MI 48502

Water Source

The City of Flint began using the Flint River as a water source in May of 2014. Flint is located roughly in the middle of the Flint River Watershed. The Flint River watershed includes Holloway Reservoir, C.S. Mott Lake, Kearsley Lake, and numerous streams and creeks that drain to these lakes or directly into the Flint River. The Michigan Department of Environmental Quality in partnership with the U.S. Geological Survey, and the City of Flint Utilities Department conducted a source water assessment in February 2004 to determine the susceptibility of potential contamination. The susceptibility rating is a seven-tiered scale ranging from "very low" to "very high" based primarily on geologic sensitivity, water chemistry, and contaminant sources. The Flint River source water intake is categorized as having a very high susceptibility to potential contaminant sources. If you would like to know more information or a complete copy of the report, contact the City of Flint Water Plant at (810)787-6537.

The use of the Flint River as a source water for the City of Flint Water Treatment Plant was a temporary move, driven largely by economics and the financial state of the City. The City of Flint joined the Karegnondi Water Authority (KWA) in 2010. The KWA consists of a group of local communities that decided to support and fund construction of a raw water pipeline to Lake Huron. The KWA will provide the City of Flint Water Treatment Plant with source water from Lake Huron. The KWA pipeline is currently under construction, and is scheduled to be completed by the end of 2016.



KWA pipeline construction

General Information

In order to ensure that tap water is safe to drink, the EPA prescribes regulations, which limit the amount of certain contaminants in water provided by the public water systems. The Food and Drug Administration (FDA) regulations establish limits for contaminants in bottled water, which must provide the same protection for public health. Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the EPA's Safe Drinking Water Hotline (800-426-4791).

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity. Contaminants that may be present in source water include:

- **Microbial contaminants**; such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.
- **Inorganic contaminants**; such as salts and metals, which can be naturally-occurring or result from urban storm water runoff, industrial or domestic wastewater discharges, oil and gas production, mining, or farming.
- **Pesticides and herbicides**; which may come from a variety of sources such as agriculture, urban storm water runoff, and residential uses.
- **Organic chemical contaminants**; including synthetic and volatile organic chemicals, which are by-products of industrial processes and petroleum production, and can also come from gas stations, urban storm water runoff, and septic systems.
- **Radioactive contaminants**; which can be naturally occurring or be the result of oil and gas production and mining activities.

General Information (cont.)

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-comprised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/CDC guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and other microbial contaminants are available from the Safe Drinking Water Hotline (1-800-426-4791).

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Infants and young children are typically more vulnerable to lead in drinking water than the general population. It is possible that the lead levels at your home may be higher than at other homes in the community as a result of materials used in your home's plumbing Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. The City of Flint Department of Utilities is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components. If you are concerned about elevated lead levels in your home's water, you can minimize your potential exposure to lead in your water by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline or at http://www.epa.gov/safewater/lead.

Current Drinking Water Issues

The City of Flint experienced drinking water issues in the summer of 2014. Issues began with areas of the city experiencing "rusty" water. This was largely due to the city distribution system, which contains hundreds of miles of cast iron pipe. As these pipes age and degrade, iron is released, causing the water to exhibit color. Other contributors to this issue include water main breaks and repairs, routine distribution system maintenance, and a source water change which exposed the pipes to a slightly different water chemistry.

The City of Flint received violations from the Michigan Department of Environmental Quality (MDEQ). A violations for total coliforms and E. coli in September, and a corresponding total trihalomethane (TTHM) violation in December. As routine sample site testing in the city distribution system began to detect bacteria, system flushing increased, and chlorine addition at the water treatment plant also increased. The resulting increased chlorine addition then resulted in the higher formation of THM's through the warm weather months.

While facing these issues, the City of Flint took steps to confer with industry professionals and state regulators in regards to treatment plant operation and distribution system operation. In the fall, as water temperatures dropped, and improvements were completed in the distribution system, THM levels were below the maximum contaminant level during routine November monitoring at 7 of the 8 monitoring sites.

Moving Forward

The City of Flint has taken many steps to help correct the underlying issues that resulted in drinking water violations. Water treatment plant and distribution system corrective actions that were taken or are currently in progress include:

- Limiting the use of storage reservoirs during the warm weather months.
  Warm water temperatures and water age are large contributors to the formation of THM's.

- Optimizing ozone pretreatment by updating control programming along with cleaning and inspection of the ozone generators. Ozone is a powerful oxidant that provides a level of disinfection along with taste and odor control.

Moving Forward (cont.)

- Currently finalizing the installation of granular activated carbon (GAC) to the filtration process, which should be complete by the end of July 2015. GAC will reduce THM's by removing the chemical precursors that react with chlorine to form the THM's.

- Increased water main flushing frequency in an effort to alleviate stagnant water, and reduce water age in the distribution system.

- Update of distribution system water hydraulic model, to determine possible problem areas.

- Repaired and replaced several large water main valves, which were inhibiting the designed flow of water through the system.

- Currently finalizing plans for the replacement of a large section of a 24" transmission water main in an area of concern in the distribution system. This project should be complete by the end of 2015.

- Currently completing a distribution system evaluation of 7000 water main valves that control the flow of water throughout the city. This project will be complete in July of 2015 and will provide information to guide decisions with further repairs and future projects.

- Currently working on several upgrades at the water treatment plant in preparation for KWA.

The City of Flint is dedicated to resolving the issues that are facing the water system, and will continue to make positive steps forward as we prepare for the future. The City would like to thank all the residents and customers for their patience and understanding as we face the challenges ahead. The trials and tribulations that we have faced with the switch to the Flint River as a source water will prove to be important as we move ahead as a member of the KWA. Many of the distribution system issues experienced while using the Flint River may have been experienced with any change in source water. As we continue to address the issues, take steps to be proactive, and the transition to the KWA pipeline, we can assure a future of quality drinking water in the City of Flint.

The following pages of this report include the results of 2014 regulatory testing. If you have any questions about this report or other water related concerns please contact the City of Flint Water Plant at (810)787-6537.

2014 Regulated Detected Contaminants

Monitored at Treatment Plant

Inorganic & Organic Chemicals, Metals, and Pesticides						
Regulated Contaminant	Unit of Measure	MCLG	MCL	Highest Level Detected	Range of Detection	Violation
Inorganic Chemicals						
Fluoride	mg/L	4	4	0.88	0.12 – 0.88	No
Nitrate	mg/L	10	10	0.5	ND – 0.5	No
Metals						
Barium	mg/L	2	2	0.03	0.02 – 0.03	No
Selenium	mg/L	0.05	0.05	0.001	ND – 0.001	No
Pesticides						
Atrazine	mg/L	0.03	0.03	0.0003	ND – 0.0003	No
Organics						
Total Xylenes	mg/L	10	10	.0005	ND – 0.0005	No

More than 100 other chemicals were monitored quarterly throughout the year that were not detected. The various classification groups of these chemicals include metals, carbamates, herbicides, pesticides, organics, and radiologicals.

Total Organic Carbon, TOC			
Regulated Contaminant	Required Monthly % Removal	Minimum Monthly % Removal	Monthly % Removal Ranges
Total Organic Carbon	50	53	53 - 68

Finished water and source water samples are collected and analyzed monthly to calculate percent removal. Total organic carbon includes numerous chemicals that are found naturally in surface waters. Certain chemicals found in this group are precursors to the disinfection byproducts trihalomethanes and haloacetic acids.

Turbidity		
Highest Single Measurement (Cannot exceed 1 NTU)	Lowest Monthly % of Samples Meeting Turbidity Limit (0.3 NTU in 95% of samples)	Violation
0.22	100	No

Turbidity is a measure of the apparent cloudiness of water, usually attributed to particulate matter. The turbidity data in the chart above is measured from the water plant tap every 4 hours. Turbidity is monitored throughout each stage of the treatment process in 4 hour intervals. During a final stage of treatment, filtration, turbidity is monitored continuously with in-line meters, and verified every 4 hours in the laboratory.

In 2014, the EPA required the City of Flint and other communities to conduct further testing on unregulated contaminants. Samples were collected at the treatment plant and the maximum residence time location in the distribution system. The monitoring results will be utilized by the EPA to determine if these chemicals should be regulated. The unregulated contaminant monitoring that yielded results are presented in the chart below

Unregulated Contaminant Monitoring			
Regulated Contaminant	Unit of Measure	Highest Level Detected	Range of Detection
Chromium	ug/L	0.40	ND – 0.4
Hexavalent Chromium	ug/L	0.40	0.34 – 0.40
Strontium	ug/L	130	120 – 130
Vanadium	ug/L	0.20	ND – 0.20

2014 Regulated Detected Contaminants

Monitored in Distribution System

Disinfectant Residuals						
Regulated Contaminant	Unit of Measure	MCLG	MCL	Highest Level Detected	Range of Detection	Violation
Total Chlorine Residual	mg/L	4.0	4.0	3.5	0.1 - 3.5	No

Microbiological Contaminants				
Regulated Contaminant	MCLG	MCL	Highest Number detected (in 1 month)	Violation
Total Coliform bacteria	0	The presence of coliform bacteria in ≥ 5% of monthly samples	15	Yes
E. coli Bacteria	0	0	1	Yes

Disinfectant residuals and microbiological contaminants are monitored at 8 locations throughout the city distribution system, and at the 2 drinking water reservoirs and pump stations located out in the distribution system. At least 100 samples are collected and analyzed each month.

Lead & Copper						
Regulated Contaminant	Unit of Measure	MCLG	Action Level AL	90th Percentile Value	Number of samples over AL	Violation
Lead	ug/L	0	15	6	2	No
Copper	mg/L	1.3	1.3	0.11	0	No

Lead and copper monitoring was conducted from June through December 2014 with the collection of 100 samples. Samples were collected by residents from the taps at their residence. Thank you to all who participated in collecting samples.

Disinfection By-Products						
Regulated Contaminant	Unit of Measure	MCLG	MCL	Highest Level Detected	Range of Detection	Violation
Total Trihalomethanes (TTHM)	ug/L	n/a	80	196	33.3 -196.2	Yes
Haloacetic Acids (HAA)	ug/L	n/a	60	64	5 - 64	No
Bromate	ug/L	10	10	23	ND - 23	No

Disinfection by-products occur as a result of the water treatment process. Bromate is formed as a result of using ozone as a treatment additive. Ozone is used to help control taste and odor issues, and as a pre-treatment disinfection. Naturally occurring bromide reacts with Ozone to generate bromate. Bromate is monitored monthly at the treatment plant, and compliance is based on a yearly average.

TTHM's and HAA's are formed as a result of utilizing chlorine in the treatment process. Naturally occurring compounds known as TOC's (total organic carbon) react with chlorine to form TTHM's and HAA's. The temperature and the age of water increase the formation of THM's and HAA's, and as a result, during the warm months of the year is when levels were at their highest. Samples are tested quarterly from 8 sites throughout the distribution system and compliance is based on a running annual average for each individual site.

General Information (cont.)

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While facing these issues, the City of Flint took steps to confer with industry professionals and state regulators in regards to treatment plant operation and distribution system operation. In the fall, as water temperatures dropped, and improvements were completed in the distribution system, THM levels were below the maximum contaminant level during routine November monitoring at 7 of the 8 monitoring sites.

Moving Forward

The City of Flint has taken many steps to help correct the underlying issues that resulted in drinking water violations. Water treatment plant and distribution system corrective actions that were taken or are currently in progress include:

- Limiting the use of storage reservoirs during the warm weather months.
  Warm water temperatures and water age are large contributors to the formation of THM's.

- Optimizing ozone pretreatment by updating control programming along with cleaning and inspection of the ozone generators. Ozone is a powerful oxidant that provides a level of disinfection along with a level of taste and odor control.

Key to the Detected Contaminant Tables		
Symbol	Abbreviation for	Definition/Explanation
>	Greater than	
AL	Action Level	The concentration of a contaminant, which, if exceeded, triggers treatment or other requirements which a water system must follow.
HAA5	Haloacetic Acids	HAA5 is the total of bromoacetic, chloroacetic, dibromoacetic, dichoroacetic, and trichloroacetic acids. Compliance is based on the total .
LRAA	Locational Running Annual Average	
MCL	Maximum Contaminant Level	The highest level of a contaminant that is allowed in water. MCLs are set as close to the MCLG's as feasible using the best available treatment technology.
MCLG	Maximum Contaminant Level Goal	The level of contaminant in drinking water below which there is no known or expected risk to health.
mg/L	Milligrams per Liter	A milligram = 1/1000 gram 1 milligram per liter is equal to 1ppm
MRDL	Maximum Residual Disinfectant Level	The highest level of disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.
MRDLG	Maximum Residual Disinfectant Level Goal	The level of a drinking water disinfectant below which there is no known or expected risk to health. MRLDG's do not reflect the benefits of the use of disinfectants to control microbial contaminants.
n/a	Not Applicable	
ND	Not Detected	
NTU	Nephelometric Turbidity Units	Measures the cloudiness of water.
pCi/L	Picocuries per Liter	A measure of radioactivity. Picocurie (pCi) means the quantity of radioactive material producing 2.22 nuclear transformations per minute.
ppb	Parts Per Billion (one in one billion)	The ppb is equivalent to micrograms per liter. A microgram = 1/1000 milligram.
ppm	Parts Per Million (one in one million)	The ppm is equivalent to milligrams per liter. A milligram = 1/1000 gram.
RAA	Running Annual Average	
TT	Treatment Technique	A required process intended to reduce the level of a contaminant in drinking water.
TTHM	Total Trihalomethanes	Total Trihalomethanes is the sum of chloroform, bromodichloromethane, dibromoochloromethane and bromoform. Compliance is based on total.
ug/L	Micrograms per Liter	A microgram = 1/1,000,000 gram 1 microgram per liter is equal to 1ppb

Water Quality Update

Dear City of Flint Resident:

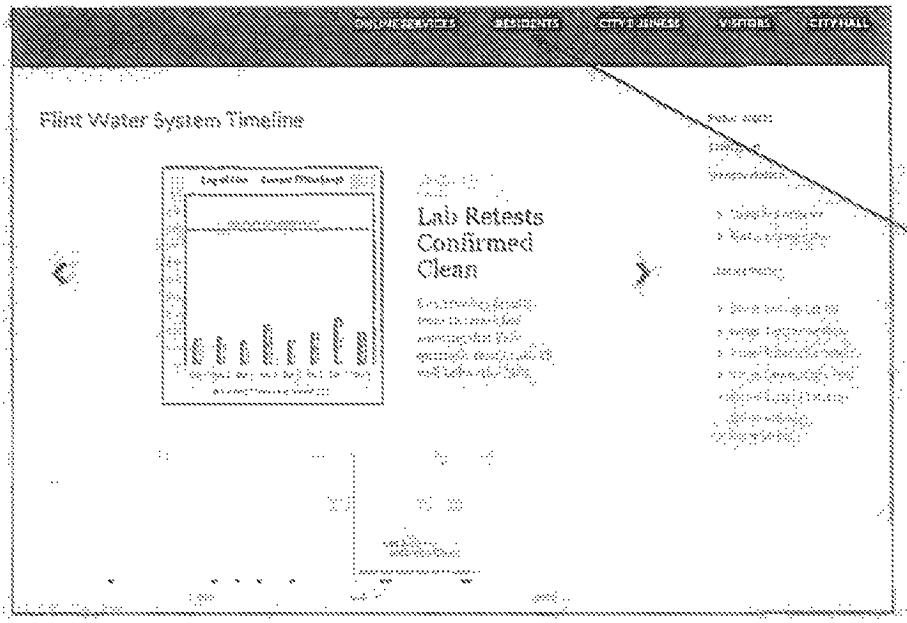
We are pleased to report that City of Flint water is safe and meets U.S. Environmental Protection Agency guidelines. For the second quarter of testing in a row, all eight testing locations in the city have proven to be below the maximum allowable levels for total trihalomethanes (TTHM). While we continue to work on improving aesthetic qualities, such as discoloration or odor, you can be confident that the water provided to you today meets all safety standards. Maintaining safety and quality in our water is a top priority of the City of Flint.

We accomplished this by:

- Upgrading the ozone treatment process at the Water Treatment Plant
- Increasing water main/hydrant flushing to reduce stagnation
- Conducting additional testing of treatment to identify areas of improvement
- Improving water circulation by repairing valves and adjusting reservoir levels

More improvements are being made every day to maintain a healthy system, provide quality water and inform residents of the progress made:

- So far 2100 of the City's 7000 valves have been exercised to determine functionality and if repairs are needed.
- The Granulated Activated Carbon (GAC) filter is on schedule to be installed by mid-July and will have a significant effect on further lowering TTHM.
- A new page has been developed for the City of Flint website designed to keep residents informed of water related stories and progress (shown below).



This page can be found at cityofflint.com under the Residents tab at the top of the page. Under Residents, click on Water to see all information, including the timeline seen here, related to Flint's water progress.

https://www.cityofflint.com/public-works/city-water-system-timeline/

Water Quality Update

The Michigan Department of Environmental Quality (MDEQ) has acknowledged our progress:

> *"We are encouraged by the results from the most recent round of compliance samples collected on May 18, 2015, which again show individual TTHM levels at below the 0.080 mg/L standard at all locations throughout the City's system. Operational Evaluation Reports from December 2014, February 2015, and May 2015 have identified possible causes and corrective measures for the previous elevated TTHM levels, which we encourage the City to continue implementing."*
> *-MDEQ*

Notification is based on four quarters of test results. Because of last year's test results, for the City's *annual* quarterly testing average is not yet below the state's allowable average and the City is required to issue the attached notice ***("Important Information about Your Drinking Water")***. There is currently one testing site in the city that is still above the average due to the high levels it experienced in 2014.

Sample Location	5/21/2014	8/13/2014	11/11/2014	2/17/2015	5/18/2015	LRAA*
Water Treatment Plant Tap	56	85	33	8	26	41.8
1. 3719 Davison Rd. McDonalds	102.4	140.1	58.6	16.2	51.4	67.9
2. 822 S. Dort Hwy. BP Gas Station	75.1	98.2	36.2	19.9	46.1	53.6
3. 3302 S. Dort Hwy. Liquor Palace	102.6	127.1	33.3	16.8	68.6	69.2
4. 3606 Corunna Rd. Taco Bell	79.2	105.1	33.9	18.1	54.7	72
5. 2501 Flushing Rd. University Market	108.6	136.1	33.6	24.5	59.8	88.6
6. 3216 Martin Luther King Ave. Salem Housing	82.2	102.3	50.1	28.5	72.7	65.9
7. 5018 Clio Rd. Rite Aid	88.2	104.4	53.6	19.2	60.5	68.4
8. 6204 N. Saginaw St. North Flint Automotive	86.6	118.7	41.1	14.8	45.2	54.9

* Long Running Annual Average

Average is below Acceptable Level (80ppm) at all but one site

If you have any questions about this report or would like a test done at your home, free of charge, please call us at 810-787-6537.

Maintaining safe water and improving its quality is a top priority for all of us at the City of Flint, and we apologize for the concerns these notices have raised. We have taken many steps to improve the safety and quality of our water supply and will be taking more. Every day work is being done to ensure a well maintained water system for all of our customers. Please track our progress on our website cityofflint.com/public-works/water-quality-concerns/.

IMPORTANT INFORMATION ABOUT YOUR DRINKING WATER

City of Flint Did Not Meet Treatment Requirements

Our water system recently violated a drinking water standard. Although this incident was not an emergency, as our customers, you have a right to know what happened and what we are doing to correct this situation.

We routinely monitor for the presence of drinking water contaminants. Samples were collected for total trihalomethanes (TTHM) analysis from eight locations on a quarterly basis (August 21, November 20 of 2014, and February 17 & May 18 of 2015). The average of the results at ANY of the eight locations must not exceed the maximum contaminant level (MCL) for TTHMs, otherwise our water system exceeds the MCL. The standard for TTHMs is 80 micro grams per liter (µg/L). The location reporting the highest TTHM level was 94 ug/L; thus, our water system exceeds the TTHM MCL.

What should I do?

- There is nothing you need to do unless you have a severely compromised immune system, have an infant, or are elderly. These people may be at increased risk and should seek advice about drinking water from their health care providers.
- You do not need to boil your water or take other corrective actions. If a situation arises where the water is no longer safe to drink, you will be notified within 24 hours.

What does this mean?

This is not an emergency. If it had been an emergency, you would have been notified within 24 hours.

People who drink water containing trihalomethanes in excess of the MCL over many years may experience problems with their liver, kidneys, or central nervous system, and may have an increased risk of getting cancer.

What is being done?

We are currently working on solutions to correct the problem. We anticipate resolving the problem in 2015. Our most recent individual sample results were all less than the 80 µg/L standard, however since compliance is calculated using a locational running annual average (LRAA) of the most recent four quarters, we are still out of compliance with the MCL at one of eight locations.

For more information, please contact Mr. Brent Wright at 810-787-6537, or the Flint Water Plant at 4500 North Dort Highway, Flint, Michigan 48505.

Please share this information with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail.

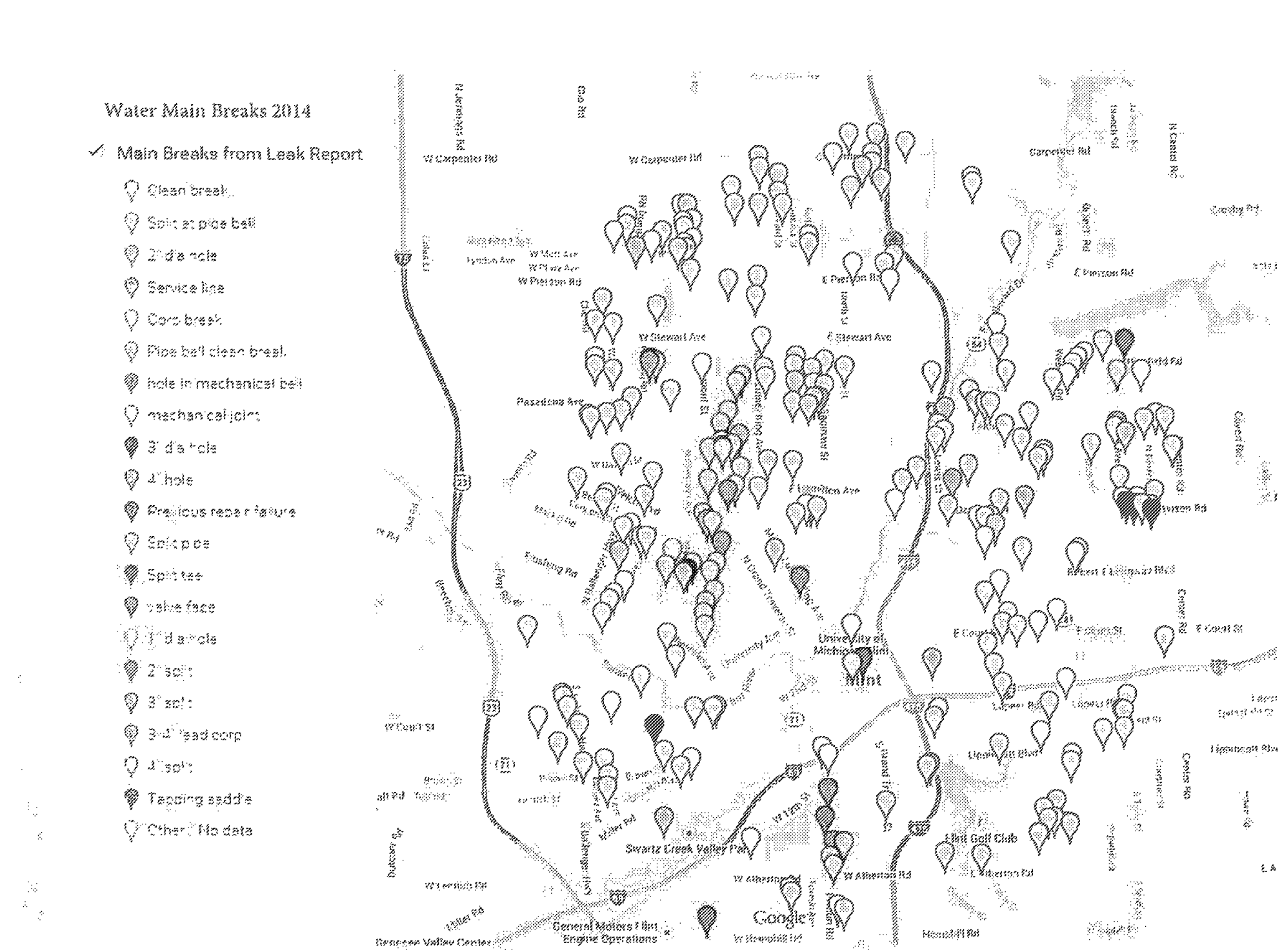
This notice is being sent to you by the City of Flint.

CERTIFICATION: F2/S3 WSSN: 02310

I certify that this water supply has fully complied with the public notification requirements in the Michigan Safe Drinking Water Act, 1976 PA 399, as amended, and the administrative rules.

Signature	Title	Date Distributed
	Plant Supervisor	7-1-15

Reminder to water supplier: This notice/certification must be sent to the Department of Environmental Quality.


Water Main Breaks 2014
Main Breaks from Leak Report
Clean break
Split at pipe bell
2" diameter hole
Service line
Corp break
Pipe bell clean break
hole in mechanical bell
mechanical joint
3" diameter hole
4" hole
Previous repair failure
Split pipe
Split tee
valve face
1" diameter hole
2" split
3" split
3-4" lead corp
4" split
Tapping saddle
Other / No data
Swartz Creek Valley Park
General Motors Flint Engine Operations
University of Michigan-Flint
Flint
Flint Golf Club
Google

CITY OF FLINT
OFFICE OF EMERGENCY MANAGER
DARNELL EARLEY
ICMA-CM, MPA

Jason Lorenz
Public Information Officer
(810) 237-2039
jlorenz@cityofflint.com

For Immediate Release

City of Flint Boil Water Advisory Still in Effect for Area Affected by Discovery of Abnormal Water Sample

Flint, Michigan – August 18, 2014 – The City of Flint's Utilities Department has received word today from the Department of Environmental Quality that the boil water advisory issued for a small portion of the city is still in effect although additional testing has shown no signs of E-coli or fecal coliform bacteria in the water. Testing over the last 48 hours has shown that the water tests negative for the presence of fecal coliform bacteria and E-coli, but an abnormal test result triggered the advisory. It is believed that a sampling error is to blame for the abnormal test; however, as a precaution, the advisory will remain in effect until the next citywide sampling has been completed. The next round of routine testing will take place on Tuesday, August 19, 2014 with the possibility that the advisory could be lifted as early as Wednesday, August 20, 2014.

Testing of the drinking water is a part of the routine process for ensuring the quality and safety of the system which happens weekly at nine different sites around the city. Drinking water contamination due to E-coli or coliform bacteria is very rare due to the fact that the bacteria cannot survive in the water for very long. The colder temperature

–CONTINUE–

CITY OF FLINT
OFFICE OF EMERGENCY MANAGER
DARNELL EARLEY
ICMA-CM, MPA

of water in the system coupled with the regular blending of chlorine into the water makes for a hostile environment for these kinds of bacteria. The Flint Water Treatment Plant works diligently to provide water of the highest quality to everyone in the city.

--END--

City Hall
1101 S. Saginaw Street - Flint, Michigan 48502
810-766-7346 FAX: 810-766-7218 www.cityofflint.com

CITY OF FLINT
OFFICE OF EMERGENCY MANAGER
DARNELL EARLEY
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Jason Lorenz
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For Immediate Release

City of Flint Boil Water Advisory in Effect for Area Affected Due to Abnormal Water Sample

Flint, Michigan – September 5, 2014 – The City of Flint's Utilities Department in conjunction with the Department of Environmental Quality has issued a boil water advisory for a portion of the city. The boil water advisory is in effect for the area bordered by Dayton Street on the north, DuPont Street on the east, the Flint River on the south, and by Lavelle Road (to the Flint River) on the west. Testing over the last 48 hours has shown that the water in the area above tests positive for the presence of total coliform bacteria. Residents in the area should continue to boil water or use bottled water for drinking, bathing, making ice, brushing teeth, washing dishes, and preparing food until further notice. Boiling the water kills bacteria or other harmful organisms.

Total coliform bacteria are generally not harmful themselves. Coliforms are bacteria which are naturally present in the environment and are used as an indicator that other, potentially-harmful, bacteria *may be present*. Usually, coliforms are a sign that there could be a problem with the treatment or distribution system (pipes).

–CONTINUE–

CITY OF FLINT
OFFICE OF EMERGENCY MANAGER
DARNELL EARLEY
ICMA-CM, MPA

Whenever we detect coliform bacteria in any sample, we do follow-up testing to see if other bacteria of greater concern, such as fecal coliform or E. coli, are present. We did not find any of these bacteria in our subsequent testing. If we had, we would have notified you immediately. However, we are still finding coliforms in the drinking water.

The City of Flint Utilities Department will be flushing the system in that part of the city and increasing the chlorine added to water in the area. The City anticipates that the problem will be resolved within the next three days, which is the minimum amount of time for a boil water notice. All water testing results at the City of Flint Water Treatment Plant have shown the City's drinking water meets all Safe Water Drinking Standards. Testing of the drinking water is a part of the routine process for ensuring the quality and safety of the system which happens weekly at ten different sites around the city. Anyone with questions about the advisory or any other water issues should call 810-787-6537.

--END--

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1101 S. Saginaw Street - Flint, Michigan 48502
810-766-7346 FAX: 810-766-7218 www.cityofflint.com

Jason Kerr

STANDARD

ASHRAE

ANSI/ASHRAE Standard 188-2015

Legionellosis: Risk Management for Building Water Systems

Approved by the ASHRAE Standards Committee on May 27, 2015; by the ASHRAE Board of Directors on June 4, 2015; and by the American National Standards Institute on June 26, 2015.

This Standard is under continuous maintenance by a Standing Standard Project Committee (SSPC) for which the Standards Committee has established a documented program for regular publication of addenda or revisions, including procedures for timely, documented, consensus action on requests for change to any part of the Standard. The change submittal form, instructions, and deadlines may be obtained in electronic form from the ASHRAE website (www.ashrae.org) or in paper form from the Senior Manager of Standards. The latest edition of an ASHRAE Standard may be purchased from the ASHRAE website (www.ashrae.org) or from ASHRAE Customer Service, 1791 Tullie Circle, NE, Atlanta, GA 30329-2305. E-mail: orders@ashrae.org. Fax: 678-539-2129. Telephone: 404-636-8400 (worldwide), or toll free 1-800-527-4723 (for orders in US and Canada). For reprint permission, go to www.ashrae.org/permissions.

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CONTENTS

ANSI/ASHRAE Standard 188-2015
Legionellosis: Risk Management for Building Water Systems

SECTION PAGE

Foreword 2

1 Purpose 2

2 Scope 2

3 Definitions 2

4 Compliance 3

5 Building Survey 4

6 General Requirements 4

7 Requirements for Building Water Systems 6

8 Requirements for Designing Building Water Systems 10

9 References 11

Normative Annex A: Health Care Facilities 12

Informative Annex B: Bibliography 15

Informative Annex C: Guidance if Legionella Testing is Utilized 16

NOTE

Approved addenda, errata, or interpretations for this standard can be downloaded free of charge from the ASHRAE Web site at www.ashrae.org/technology.

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FOREWORD

The purpose of ASHRAE Standard 188 is to establish minimum legionellosis risk management requirements for building water systems.

"Legionellosis" refers to two distinct clinical illnesses. When the bacterium Legionella causes pneumonia, the disease is referred to as "Legionnaires' disease" (LD). The Centers for Disease Control and Prevention (CDC) estimates that each year there are between 8000 and 18,000 cases of LD in the United States and that more than 10% of these cases are fatal. Legionella can also cause a less-severe influenza-like illness known as "Pontiac fever." Most cases of legionellosis are the result of exposure to Legionella associated with building water systems.

The presence of Legionella bacteria in building water systems is not in itself sufficient to cause LD. Other necessary factors include environmental conditions that promote the growth of Legionella, a means of transmitting the bacteria to people in the building (e.g., aerosol generation), and exposure of susceptible persons to colonized water that is inhaled or aspirated into the lungs. Legionella bacteria are not transmitted person-to-person or from normal (nonaspirated) ingestion of contaminated water. Susceptible persons at high risk for legionellosis include but are not limited to the elderly, dialysis patients, persons who smoke, and persons with underlying medical conditions that weaken the immune system.

This standard is intended for use by owners and managers of human-occupied buildings and those involved in the design, construction, installation, commissioning, operation, maintenance, and service of centralized building water systems and components.

Standard 188 consists of numbered normative sections followed by normative and informative annexes. The normative sections and normative annex specify the requirements to comply with this standard. The informative annexes and informative bibliography are provided for guidance that may be helpful for a given building water system. Building water systems vary substantially in their design and their capability for transmission of Legionella. Scientific evidence is either lacking or inconclusive in certain aspects of Legionella control. Therefore, the informative annexes and informative bibliography to this document provide suggestions, recommendations, and references to guidance.

ASHRAE Standing Standard Project Committee (SSPC) 188 has devoted a considerable amount of time and thought to resolving the concerns of affected and interested parties. The committee thanks everyone who participated in the development of the standard, especially those who made public review comments.

Because changes to improve the standard are anticipated, Standard 188 is now on continuous maintenance, permitting it to be updated through the publication of approved addenda. The planned schedule for republication with approved addenda and errata is anticipated to be every third year.

1. PURPOSE

The purpose of this standard is to establish minimum *Legionellosis* risk management requirements for *building water systems*.

2. SCOPE

2.1 This standard provides minimum *legionellosis* risk management requirements for the design, construction, commissioning, operation, maintenance, repair, replacement, and expansion of new and existing buildings and their associated (potable and *nonpotable*) water systems and components.

2.2 This standard applies to human-occupied commercial, institutional, multiunit residential, and industrial buildings. This standard does not include single-family residential buildings. Only where specifically noted in this standard shall certain *building water systems* or parts of *building water systems* be exempt.

2.3 This standard is intended for use by owners and managers of human-occupied buildings, excluding single-family residential buildings. This standard is also intended for those involved in the design, construction, installation, commissioning, operation, maintenance, and service of *centralized building water systems* and components.

3. DEFINITIONS

analysis of building water systems: the systematic evaluation of potentially *hazardous conditions* associated with each step in the *process flow diagrams*.

at-risk: any person who is more susceptible than the general population to developing *legionellosis* because of age, health, medication, occupation, or smoking.

authority having jurisdiction (AHJ): an organization, office, or individual responsible for enforcing the requirements of this standard.

beneficial occupancy: stage of construction when all or part of a building is to be occupied for the purpose for which it was constructed, whether before or after completion.

building water systems: potable and *nonpotable water systems* in the building or on the site.

centralized building water system: any system that distributes water to multiple uses or multiple locations within the building or site.

control: to manage the conditions of an operation in order to maintain compliance with established criteria.

control location: a point where a physical, mechanical, operational, or chemical *control measure* is required.

control limit: a maximum value, a minimum value, or a range of values to which a chemical or physical parameter associated

with a *control measure* must be monitored and maintained in order to reduce the occurrence of a *hazardous condition* to an acceptable level.

control measure: a *disinfectant*, heating, cooling, filtering, flushing, or other means, methods, or procedures used to maintain the physical or chemical conditions of water to within *control limits*.

corrective action: action to be taken to return control values to within established limits when *monitoring* or measurement indicates the control values are outside the established *control limits*.

designee: the individual designated by the building owner to meet the requirements placed on the owner by the standard.

disinfectant: chemical agent or physical treatments used to kill or inactivate pathogens.

disinfection: the process of killing or inactivating pathogens.

disinfectant residual: the net amount of a chemical *disinfectant* remaining in treated water after chemical demand exerted by the water is satisfied.

hazard: Legionella bacteria in a *building water system* that, in the absence of *control*, can cause harm to humans.

hazardous condition: a condition that contributes to the potential for harmful human exposure to *Legionella*.

HVAC&R: heating, ventilating, air conditioning, and refrigeration.

Immunocompromised: a condition describing an individual who has increased susceptibility to infections due to existing human disease, medication regimens, or other types of medical treatment. (See *at-risk*.)

Legionella: the name of the genus of bacteria that was subsequently identified as the causative pathogen associated with the 1976 outbreak of disease at the American Legion convention in Philadelphia. *Legionella* are common aquatic bacteria found in natural and *building water systems*, as well as in some soils.

legionellosis: the term used to describe Legionnaires' disease, Pontiac fever, and any illness caused by exposure to *Legionella* bacteria.

monitoring: conducting a planned sequence of observations or measurements of the physical and chemical characteristics of *control measures*.

multiple housing units: a classification of housing where multiple separate housing units for residential and commercial inhabitants are contained within one building or several buildings within one complex.

nonpotable: water that is not safe for drinking or for personal or culinary use and that has the potential to cause harmful human exposure to *Legionella*.

process flow diagram: a step-by-step drawing of a *building water system* that includes the location of all water processing steps—including but not limited to conditioning, storing, heating, cooling, recirculation, and distribution—that are part of the *building water systems*.

potable-water system: a building water distribution system that provides hot or cold water intended for direct and indirect human contact or consumption.

Program: the *water management program*.

Program Team: the group or individual designated by the building owner or *designee* to be responsible for developing, implementing, and maintaining the *Program*.

risk: the potential for harm to humans resulting from exposure to *Legionella*.

risk management: systematic practices to reduce *risk*.

testing: conducting a planned sequence of observations or measurements of physical, chemical, or microbial characteristics of water to assess whether conditions throughout *building water systems* meet the goals set by the *Program Team*.

validation: initial and ongoing confirmation that the *Program*, when implemented as designed, effectively controls the *hazardous conditions* throughout the *building water systems*.

verification: initial and ongoing confirmation that the *Program* is being implemented as designed.

water management program (program): the risk management plan for the prevention and *control* of *legionellosis* associated with *building water systems*, including documentation of the plan's implementation and operation.

water service disruption: planned or unplanned events that reduce water delivery pressure below 20 psi (140 kPa) and that are caused by, but not limited to, new construction tie-ins; replacement of valves, hydrants, or meters; pumping failures; pipeline breaks; and other system repairs or emergency conditions.

water use end points: the points at which water exits from all potable and *nonpotable building water systems*, fixtures, and equipment.

4. COMPLIANCE

The results of each Section 4 compliance determination and the associated building survey in Section 5 shall be documented and shall be available for review by the *authority having jurisdiction (AHJ)*.

4.1 Building Designer Requirements

4.1.1 Survey each new building design and its water systems to determine if the design contains any of the devices or factors described in Section 5 that relate to *legionellosis*. If the building and associated property has

a. any of the *building water systems* in Section 5.1, then all of those *building water systems* shall comply with all applicable requirements of Section 8 of this standard.
b. any of the factors listed in Section 5.2, then the new building design shall comply with the requirements of Section 8 of this standard.

4.2 Building Owner Requirements

4.2.1 The building owner shall survey each existing building, new building, and any renovation, addition, or modification to an existing building and its water systems as described

in Section 5. The survey and conformance with the compliance requirements of Section 4 must occur prior to occupancy of a new building and before construction begins on renovations, additions, or modifications to existing buildings. If the building and associated property has

a. any of the *building water systems* listed in Section 5.1, then all of those *building water systems* shall comply with the requirements of Section 6 and all applicable requirements of Section 7 of this standard.

b. any of the factors listed in Section 5.2, then all potable *building water systems* and all *building water systems* listed in Section 5.1 shall comply with the requirements of Sections 6 and all applicable requirements of Section 7 of this standard.

4.2.2 The building owner shall require the designer of any new building, and any renovation, addition, or modification to an existing building, to follow the requirements of Section 4.1 for the provided design.

4.2.3 The building owner shall conduct and document the compliance determination in Section 4 of this standard at least once per year and any time renovations, additions, or modifications are made to the building.

4.3 Health Care Facility Requirements

4.3.1 Health care facilities that do not meet all of the qualifications of Section 4.3.2 shall comply with the requirements in Sections 4.2, 6, and 7.

4.3.2 Health care facilities that meet all of the following qualifications shall comply with either the requirements in Sections 4.2, 6, and 7 or the requirements in Normative Annex A, "Health Care Facilities":

a. The health care facility is accredited by a regional, national, or international accrediting agency or by the *authority having jurisdiction (AHJ)* over the health care facility Infection Prevention and Control (IC) activities.

b. The health care facility IC program has an infection preventionist that is certified in infection prevention control (CIC) by the Certification Board of Infection Control and Epidemiology (CBIC) or other regional, national, or international certifying body, or the health care facility has an epidemiologist with a minimum of a master's degree or equivalent.

5. BUILDING SURVEY

5.1 The building shall be surveyed to determine whether it has one or more

a. open- and closed-circuit cooling towers or evaporative condensers that provide cooling and/or refrigeration for the *HVAC&R* system or other systems or devices in the building;

b. whirlpools or spas, either in the building or on the site; or

c. ornamental fountains, misters, atomizers, air washes, humidifiers, or other *nonpotable* water systems or devices that release water aerosols in the building or on the site.

5.2 The building shall be surveyed to determine whether it is characterized by one or more of the following factors that relate to *legionellosis*:

a. It includes *multiple housing units* with one or more centralized potable water-heater systems.

b. It is more than 10 stories high (including any levels that are below grade).

c. It is a health care facility where patient stays exceed 24 hours.

d. It is a building containing one or more areas for the purpose of housing or treating occupants receiving treatment for burns, chemotherapy for cancer, or solid organ transplantation or bone marrow transplantation.

e. It is a building containing one or more areas for the purpose of housing or treating occupants that are *immunocompromised*, *at-risk*, are taking drugs that weaken the immune system, have renal disease, have diabetes, or have chronic lung disease.

f. It is a building identified by the *owner* or *designee* as being for the purpose of housing occupants over the age of 65 years.

6. GENERAL REQUIREMENTS

Required compliance with this section shall be determined by Section 4.

6.1 Principles of a *Water Management Program*. A *Program* utilizing the risk management principles in the following subsections shall be used to reduce the risk of *legionellosis* associated with *building water systems*.

6.1.1 *Analysis of Building Water Systems*. Conduct a systematic analysis of *hazardous conditions* in the *building water systems*.

6.1.2 *Control Locations*. Determine the locations in the system where *control measures* are required.

6.1.3 *Control Limits*. For each *control measure* at each *control location* established in Section 6.1.2, determine the limits including but not limited to a maximum value, a minimum value, or a range of values within which a chemical or physical parameter must be monitored and maintained in order to reduce *hazardous conditions* to an acceptable level.

6.1.4 *Monitoring*. Establish a system for *monitoring* the parameters associated with the *control limits* established in Section 6.1.3.

6.1.5 *Corrective Actions*. Establish the *corrective actions* to be taken when *monitoring* indicates that the *control* parameters are outside of the established *control limits*.

6.1.6 Confirm *Program* Implementation. Establish procedures to confirm that all of the *Program* elements are being implemented as designed.

6.1.7 Documentation and Recordkeeping. Establish documentation concerning all procedures, and maintain records appropriate to these principles and their application.

6.2 *Program* Development. When the building survey required by Sections 4 and 5 indicates the presence of one or more of the *building water systems* listed in Section 5.1 but none of the factors listed in Section 5.2, a program shall be

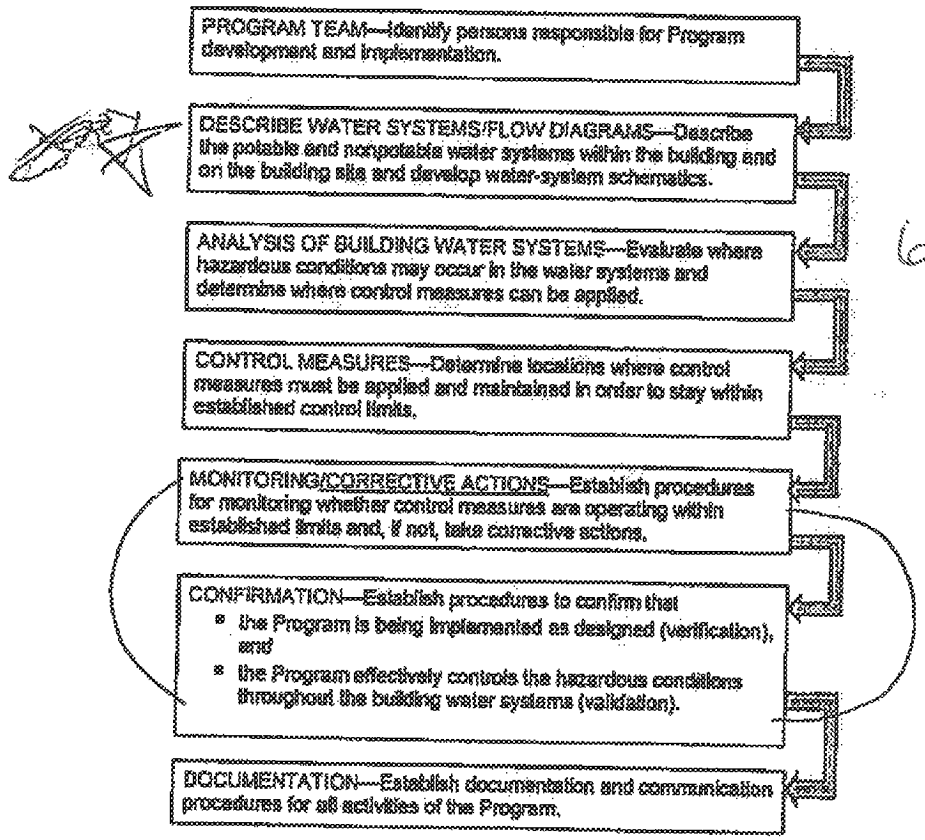

FIGURE 1 Elements of a water management program.

implemented to manage the risk of *legionellosis* for those *building water systems* listed in Section 5.1. When the building survey required by Sections 4 and 5 indicates the presence of one or more of the factors listed in Section 5.2, a *Program* shall be implemented to manage the risk of *legionellosis* for *potable building water systems* and for *building water systems* listed in Section 5.1. A summary of the program development steps are represented in Figure 1. The *Program* shall be detailed in a plan that embodies all of the principles described in Section 6.1 and shall include the elements described in the following subsections.

6.2.1 *Program Team.* Identify the persons on the *Program Team* responsible for developing and implementing the *Program* and the tasks for which they are responsible. The *Program Team* shall include one or more individuals selected from the following: the building owner or *designee*, employees, suppliers, consultants, or other individual or individuals to whom the building owner has delegated authority and responsibility for the actions required by the *Program*. The *Program Team* can delegate *Program* tasks to subgroups. The *Program Team* shall have knowledge of the *building water system* design and water management as it relates to *legionellosis* that can be obtained through informative documents, such as ASHRAE Guideline 12, *Minimizing the Risk of Legionellosis Associated with Building Water Systems*.

6.2.2 Describe the *Building Water Systems.* The *Program Team* shall identify and describe the *potable* and *nonpotable water systems* within the building and on the building site, including (at a minimum)

a. the locations of end-point uses of *potable* and *nonpotable water systems*,
b. the location of water processing equipment and components, and
c. how water is received and processed (conditioned, stored, heated, cooled, recirculated, and delivered to end-point uses).

6.2.3 *Process Flow Diagrams.* The information from Section 6.2.2 must be graphically described in step-by-step *process flow diagrams*. The *process flow diagrams* shall have sufficient detail to enable the identification, analysis, and management of the *risk* of *legionellosis* throughout the *building water systems*. The *Program Team* shall confirm that the *process flow diagrams* are representative of the systems as built.

6.2.4 *Analysis of Building Water Systems.* The *Program Team* shall use the *process flow diagrams* in Section 6.2.3 to

evaluate where *hazardous conditions* may occur in the *building water systems* and determine where *control measures* can be applied to *control* potentially hazardous system conditions. The analysis shall also take into consideration the vulnerability of occupants and shall include the *building water systems* identified in Section 5.1. The analysis shall include provisions to respond to water service disruptions.

6.2.5 *Control Measures.* Based on the results of the *analysis of building water systems* in Section 6.2.4, the *Program Team* shall determine the *control measures* to be maintained. *Control measures* shall include preplanning of physical design and equipment siting. *Control measures* shall include treatment methods, technical and physical processes, and procedures and activities or actions that monitor or maintain the physical or chemical conditions of water to within established *control limits*.

a. *Control Locations.* The *Program Team* shall determine the locations in the *building water system* where *control measures* are required.
b. *Control Limits.* The *Program Team* shall determine a maximum value, minimum value, or range of values to which a chemical or physical parameter must be maintained.

6.2.6 *Monitoring.* The *Program Team* shall establish a system for *monitoring* whether the measured physical and chemical characteristics of *control measures* are within the *control limits*. The system shall include the means, methods, and frequency for *monitoring* activities.

6.2.7 *Corrective Actions.* For each *control location*, the *Program Team* shall establish procedures for *corrective actions* to be taken when *monitoring* shows that *control measures* are outside of established *control limits*, shall identify the person responsible for taking the *corrective action*, shall identify the required response time for taking the *corrective action*, and shall identify all persons to be notified.

6.2.8 *Program* Confirmation. The *Program Team* shall establish procedures to confirm, both initially and on an ongoing basis, that the *Program* is being implemented as designed (*verification*). The *Program Team* shall establish procedures to confirm, both initially and on an ongoing basis, that the *Program*, when implemented as designed, effectively controls the *hazardous conditions* throughout the *building water systems* (*validation*). The *Program Team* shall determine whether *testing* for *Legionella* shall be performed and if so how test results will be used to *validate* the *Program*. If the *Program Team* determines that *testing* is to be performed, the *testing* approach, including sampling frequency, number of samples, locations, sampling methods, and test methods, shall be specified and documented. The *Program Team* shall include consideration of the following as part of the determination of whether to test for *Legionella*:

a. *Program control limits* are not maintained in *building water systems*, including in water systems with supplemental *disinfection*.
b. A health care facility provides in-patient services to *at-risk* or *immunocompromised* populations.
c. A prior history of *legionellosis* is associated with the *building water system*.

6.2.9 Documentation and Communication. The *Program Team* shall establish documentation and communication procedures for all activities of the *Program*. The *Program Team* is responsible for all water systems and for communication and coordination among subgroups covering different portions of the *building water system* and associated equipment. A master document providing the location of all *Program* documents shall be maintained.

7. REQUIREMENTS FOR BUILDING WATER SYSTEMS

All water treatments implemented in connection with this standard shall be applied in conformance with, and shall comply with, all applicable national, regional, and local regulations.

Informative Note: Recommendations and guidance on the design, maintenance, and operation of *building water systems* are provided in ASHRAE Guideline 12, *Minimizing the Risk of Legionellosis Associated with Building Water Systems*.

Required compliance with the following sections shall be determined by Section 4.

a. Section 7.1, "Potable Water Systems"
b. Section 7.2, "Cooling Towers and Evaporative Condensers"
c. Section 7.3, "Whirlpool Spas"
d. Section 7.4, "Ornamental Fountains and Other Water Features"
e. Section 7.5, "Aerosol-Generating Misters, Atomizers, Air Washers, and Humidifiers"

7.1 *Potable Water Systems.* This section describes the preventive measures required for *potable water systems*. The program documents shall include identification of the responsible persons for every step of each *Program* requirement.

Informative Note: Recommendations and guidance on the design, maintenance, and operation of *building water systems* are provided in ASHRAE Guideline 12, *Minimizing the Risk of Legionellosis Associated with Building Water Systems*.

7.1.1 System Start-Up and Shutdown. The *Program* documents shall include procedures for

a. flushing and *disinfection* before commissioning any new system;
b. shutdown, including any draining, purging, cleaning treatment, and *control* settings;
c. any unplanned loss of operating energy, loss of water treatment chemicals, or system component repair or replacement;
d. restarting safely from a drained shutdown condition and from an undrained shutdown condition;
e. *monitoring* and treatment following water supply interruptions or breaks in water supply piping; and
f. reestablishing required temperatures throughout the hot water distribution system.

7.1.2 System Maintenance. The *Program* documents shall include procedures for

a. inspection of, and inspection schedule for, water-containing vessels and system components;
b. flushing or mixing of stagnant or low-flow areas;
c. maintenance and *monitoring* procedures based on equipment manufacturers' recommendations for cleaning, *dis-*

infection, replacement of system components, and other treatments that the *Program Team* decides are necessary for the following:

1. Hot water and cold water storage tanks
2. Ice machines
3. Water-hammer arrestors
4. Expansion tanks
5. Water filters
6. Shower heads and hoses
7. Electronic faucets
8. Aerators
9. Faucet flow restrictors
10. Nonsteam aerosol-generating humidifiers
11. Water heaters
12. Infrequently used equipment, including eyewash stations and showers
13. Other equipment identified by the *Program Team*;

d. maintaining and storing instructions and forms for inspection notes and a *corrective action* log; and

e. maintaining and storing component and equipment operating manuals.

7.1.3 Water Treatment. The *Program* documents shall include

a. *monitoring* method and schedule for temperature measurement in the hot water and cold water system;

b. *monitoring* method and schedule for measuring the chemical *disinfectant residual* or physical parameters in the hot water and cold water system;

c. procedures to address water supply interruptions or breaks in water supply piping;

d. procedures and schedule for maintaining water treatment system *disinfectants*; and

e. water treatment products, the procedures for their application, and confirmation that the products comply with applicable regulations.

7.1.4 Contingency Response Plan. For both hot water and cold water systems, the *Program* documents shall include

a. procedures to be followed if there are known or suspected cases of *legionellosis* associated with the use of *potable* water from the *building water systems*;

b. directives issued by national, regional, and local health department authorities;

c. if the *Program Team* determines testing for *Legionella* shall be performed, the procedures shall include criteria for when and where the tests shall be performed;

d. procedures for emergency *disinfection*; and

e. procedures for other actions identified as necessary by the *Program Team* to prevent exposure to contaminated water.

7.2 Cooling Towers and Evaporative Condensers. This section describes the preventive measures required for cooling towers and evaporative condensers that provide cooling and/or refrigeration for the *HVAC&R* system or for other devices or systems in the building. The *Program* documents shall include identification of the responsible persons for every step of each *Program* requirement.

Informative Note: Recommendations and guidance on the design, maintenance, and operation of *building water systems* are provided in ASHRAE Guideline 12, *Minimizing the Risk of Legionellosis Associated with Building Water Systems*.

7.2.1 Equipment Siting. Prior to the beginning of construction of new or replacement open-circuit cooling towers, closed-circuit cooling towers, or evaporative condensers, drawings shall be reviewed and the following items shall be addressed:

a. Potential contamination from building systems or facility processes to be drawn into the equipment

b. Potential for equipment to discharge into occupied spaces, trafficable areas, pedestrian thoroughfares, outdoor air intakes, and building openings

c. Potential for equipment siting that inhibits access to the equipment for the required maintenance and inspection consistent with the manufacturer's instructions and guidelines

7.2.2 New-System Start-Up. The *Program* document shall include procedures for cleaning steps that are part of commissioning of the cooling system. The *Program* document shall also include procedures for management and *control* means of ensuring that ongoing water treatment is initiated immediately once the system is charged with water.

7.2.3 System Maintenance. The *Program* documents shall include

a. a schedule for inspection of general system cleanliness, of drift eliminator condition and fill material condition, and of water distribution system operation;

b. requirements and schedule for basin or remote sump cleaning and purging of stagnant or low-flow zones; and

c. documentation requirements.

7.2.4 Water Treatment. The *Program* documents shall include the water treatment requirements to *control* microbiological activity, scale, and corrosion and shall also

a. specify all equipment and chemicals used for the purpose of treating the open recirculating loop;

b. include the minimum required schedule for inspection, maintenance and *monitoring*, and a *corrective actions* plan; and

c. identify the minimum requirements for documenting system water treatment.

7.2.5 Shutdown and Start-Up. The *Program* documents shall include start-up and shutdown requirements to manage *hazardous conditions* associated with operation of fans during untreated water conditions and procedures for

a. shutdown that includes all chemical pretreatment steps, pump cycling protocols, and procedures for system drainage for shutdown periods longer than the duration specified by the *Program Team*;

b. start-up from a drained system; and

c. start-up from an undrained (stagnant) system that exceeds the number of idle days specified by the *Program Team*.

7.2.6 *Disinfection* of Cooling Towers and Evaporative Condensers. The *Program* documents shall include proce-

dures and identify the responsible person for initiating the process for

a. remedial *disinfection* while in operation, including the conditions that require its application, and
b. emergency *disinfection*, including the conditions that require its application.

7.2.7 Location of Cooling Tower Makeup Valve. The *Program* documents shall include requirements for the location of cooling tower makeup valves and for maintaining compliance with all applicable local, regional, and national codes and regulations for air gaps and backflow preventers and for the height of the discharge outlets and makeup valve over the rim of the overflow in the cooling tower or evaporative condenser cold water basins. If no such codes and regulations exist for the location, then the *Program* shall include requirements for maintaining compliance with ASME/ANSI A112.1.2 [1] for air gaps and for maintaining compliance with codes and regulations applicable to other locations, selected by the owner or *designee*, for backflow preventers and for the height of the discharge outlets and makeup valve over the rim of the outflow in the cooling tower or evaporative condenser cold water basins.

7.2.8 Contingency Response Plan. The *Program* documents shall include

a. procedures to be followed if there are known or suspected cases of *legionellosis* associated with the use of cooling towers and evaporative condensers;
b. directions issued by national, regional, and local health department authorities;
c. if the *Program Team* determines testing for *Legionella* or other pathogens shall be performed, procedures shall include criteria for when and where the tests shall be performed, proper sampling procedures, and the interpretation of test results;
d. procedures for emergency *disinfection*;
e. procedures for other actions identified by the *Program Team* to prevent exposure to contaminated water.

7.3 Whirlpool Spas. This section describes the preventative measures required for public whirlpool spas. The *Program* documents shall include identification of the responsible persons for every step of each *Program* requirement.

Informative Note: Recommendations and guidance on the design, maintenance, and operation of *building water systems* are provided in ASHRAE Guideline 12, *Minimizing the Risk of Legionellosis Associated with Building Water Systems*.

7.3.1 General. Public whirlpool spas and their operation shall comply with national, regional, and local codes.

7.3.2 Bather-Related Requirements. The *Program* documents shall include the

a. allowable bather load for each whirlpool spa,
b. the procedures for posting and enforcing the allowable bather load for each whirlpool spa, and
c. the procedures for posting a notice to bathers of the increased health *risk* related to use of whirlpool spas by individuals who are *at-risk* or *immunocompromised* or who have chronic lung disease.

7.3.3 Filter Operation and Maintenance. The *Program* documents shall include procedures for filtration of whirlpool spa water.

7.3.3.1 Cartridge (Canister) Filters. The *Program* documents shall include procedures and schedules for inspection and replacement of cartridge-type filters, pressure gages, valves, and related equipment.

7.3.3.2 Granular Filters. The *Program* documents shall include procedures and schedules for backwashing, inspection, and replacement of granular-type filters, pressure gages, valves, and related equipment.

7.3.4 Water Quality, *Disinfection*, and *Monitoring*. The *Program* documents shall include procedures for

a. the scheduled changing of whirlpool spa water;
b. maintaining the pH of the water within the range specified by local, regional, and national codes and regulations;
c. maintaining *disinfectant* levels, the products to be applied, and requirements to follow *disinfectant* label directions;
d. shock *disinfection* of the whirlpool spa at the end of each day by achieving the *disinfectant residual* and minimum circulation time recommended by the *disinfectant* manufacturer;
e. maintenance of the *disinfection* system in accordance with the manufacturer's instructions;
f. a measurement schedule and logbook of all residual *disinfectant* measurements;
g. recording *corrective actions* in logbooks; and
h. recording operations in logbooks maintained for the periods specified in local, regional, and national codes and regulations and for at least 12 months and retained for at least an additional 12 months.

7.3.5 Microbiology. The *Program* documents shall include procedures for the microbiological standards required by local, regional, and national health departments that are to be achieved by public whirlpool spas.

7.3.5.1 Microbiological Testing. The *Program* documents shall include procedures for

a. monthly or more frequent *testing* of spa water for indicator organisms and pathogens identified by the *Program* microbiological standards;
b. maintaining the total heterotrophic aerobic bacteria colony count at or below the maximum level specified by local, regional, and national codes and regulations or ≤200 CFU/mL if no codes or regulations apply;
c. maintaining the levels of indicator organisms at or below the standard threshold;
d. when and where tests shall be performed, proper sampling procedures, and the interpretation of test results should the *Program Team* determine that *testing* for *Legionella* or other pathogens is required;
e. responding to unsatisfactory test results, including *disinfection* record review and repetition of microbiological tests.

7.3.5.2 When Contamination Is Discovered. The *Program* documents shall include procedures to be followed if there is evidence of feces, vomiting, or other gross contamination and shall include procedures for immediately taking

the spa out of use for spa cleaning, for *disinfection* of the entire spa system, and for restoring the spa to service.

7.3.5.3 Contingency Response Plan. The *Program* documents shall include

a. procedures to be followed if there are known or suspected cases of *legionellosis* associated with the use of whirlpool spas;
b. directions issued by national, regional, and local health department authorities;
c. if the *Program Team* determines testing for *Legionella* shall be performed, procedures shall include criteria for when and where the tests shall be performed, proper sampling procedures, and the interpretation of test results;
d. procedures for emergency *disinfection*; and
e. procedures for other actions identified by the *Program Team* to prevent exposure to contaminated water.

7.3.6 Operating Manuals. The *Program* documents shall include procedures for regularly updating all operating manuals for filters, pumps, and *disinfection* equipment and for maintaining them at a secure location accessible to maintenance personnel.

7.4 Ornamental Fountains and Other Water Features. This section describes the preventative measures required for ornamental fountains and other water features that release water aerosols in the building or on the site. The *Program* documents shall include identification of the responsible persons for every step of each *Program* requirement.

Informative Note: Recommendations and guidance on the design, maintenance, and operation of *building water systems* are provided in ASHRAE Guideline 12, *Minimizing the Risk of Legionellosis Associated with Building Water Systems*.

7.4.1 Equipment Siting. Prior to beginning construction of an ornamental fountain or other water feature, drawings shall be reviewed and the following items shall be addressed:

a. Potential organic contamination from adjacent sources
b. Inadequate drains and stagnant areas
c. Inadequate access to pumps, filters, tanks, and treatment equipment
d. External heat sources and inadequate airflow that increase the temperature and thereby increase the *risk* of exposure to *Legionella*

7.4.2 Operation. The *Program* documents shall include a description of the procedures for

a. draining, cleaning all components, disinfecting, and refilling if the water feature is not in operation for periods that exceed the number of idle days specified by the *Program Team*;
b. confirming submerged lights will not operate unless the circulating pump is running; and
c. confirming circulating pumps are running.

7.4.3 Maintenance. The *Program* documents shall include procedures for regular cleaning; for cleaning the visible buildup of dirt, organic matter, or other debris; and for maintaining pumps and filters as recommended by the manufacturer.

7.4.4 Water Treatment. The *Program* documents shall include procedures for

a. the weekly cleaning, *disinfection* of equipment and components, and replacement of water in systems with total water volume <5 gal (20 L) or for the periodic use of a *disinfectant*, the products to be applied, and a requirement to follow *disinfectant* manufacturer's directions;
b. the periodic use of a *disinfectant*, the products to be applied, and a requirement to follow *disinfectant* manufacturer's directions for systems ≥5 gal (20 L); and
c. maintaining water temperature within the *control limits* in the *Program*.

7.4.5 Contingency Response Plan. The *Program* documents shall include

a. procedures to be followed if there are known or suspected *legionellosis* health problems associated with the use of decorative fountains and other water features in building systems;
b. directions issued by national, regional, and local health department authorities;
c. procedures that include criteria for when and where tests shall be performed if the *Program Team* determines that *testing* for *Legionella* shall be performed;
d. procedures for emergency *disinfection*; and
e. procedures for other actions identified by the *Program Team* to prevent exposure to contaminated water.

7.5 Aerosol-Generating Misters, Atomizers, Air Washers, and Humidifiers. This section describes the preventative measures required for misters, atomizers, air washers, and humidifiers that cool or humidify by generating small water droplets discharged into the air. The program documents shall include identification of the responsible persons for every step of each *Program* requirement.

Informative Note: Recommendations and guidance on the design, maintenance, and operation of *building water systems* are provided in ASHRAE Guideline 12, *Minimizing the Risk of Legionellosis Associated with Building Water Systems*.

7.5.1 Equipment Siting. Prior to beginning construction for installation of new or replacement aerosol-generating misters, atomizers, air washers, or humidifiers, drawings shall be reviewed and the following items addressed:

a. Potential contamination from sources that can be drawn into the system
b. Inadequate access to pumps, filters, and treatment equipment for maintenance and inspection
c. External heat sources and inadequate airflow that increase the temperature and thereby the *risk* of exposure to *Legionella*

7.5.2 New-System Start-Up. The *Program* documents shall have procedures for cleaning that is required when commissioning misters, atomizers, air washers, and humidifiers.

7.5.3 System Maintenance. The *Program* documents shall include procedures for

a. a maintenance schedule and instructions for maintaining air-washer mist eliminators, evaporative cooler/humidifier media, spray nozzles, water distribution system operation,

and other equipment and components identified by the *Program Team*;

b. a maintenance schedule and instructions for cleaning basins and remote sumps and for cleaning and purging stagnant and low-flow zones; and

c. maintenance procedure documentation, inspection notes, and *corrective actions*.

7.5.4 Water Treatment. When water treatment is used, the *Program* documents shall have procedures for

a. all equipment and chemicals used for the purpose of treating the open recirculating loop,

b. an inspection and maintenance schedule for the water treatment equipment, and

c. the schedule for all *monitoring* required by the water treatment program.

7.5.5 System Shutdown and Start-Up. The *Program* documents shall have procedures for

a. system shutdown, including any required chemical pretreatment or pump cycling, and procedures for shutdown periods that exceed the number of idle days specified by the *Program Team*;

b. system start-up from a drained condition; and

c. system start-up from an undrained (stagnant) condition that exceeds the number of idle days specified by the *Program Team*.

7.5.6 *Disinfection*. The *Program* documents shall have procedures for remedial on-line *disinfection* and the conditions requiring its application and for emergency *disinfection* and the conditions requiring its application.

7.5.7 Contingency Response Plan. The *Program* documents shall include

a. procedures to be followed if there are known or suspected cases of *legionellosis* associated with the use of aerosol-generating misters, atomizers, air washers, and humidifiers;

b. directions issued by national, regional, and local health department authorities;

c. procedures that include criteria for when and where the tests shall be performed if the *Program Team* determines that *testing* for *Legionella* shall be performed;

d. procedures for emergency *disinfection*; and

e. procedures for other actions identified by the *Program Team* to prevent exposure to contaminated water.

8. REQUIREMENTS FOR DESIGNING BUILDING WATER SYSTEMS

8.1 General. When designing for new construction, renovations, refurbishment, replacement, or repurposing of a facility, the following shall be documented

a. A system overview and intended mode of system operation

b. Documentation and design compliance to address *hazardous conditions* for each of the following:

1. Schematic diagrams of water systems
2. *Monitoring* and control diagrams of water systems
3. Local, regional, and national code compliance
4. Locations of the following points: makeup, flush, sampling, temperature monitoring, and drain
5. Locations of outdoor air intakes
6. Building water equipment
7. Commissioning
8. Operating instructions and procedures
9. Maintenance schedules, frequencies, and procedures
10. No-flow and low-flow portions of the piping and *building water systems*
11. Impact of heat loss from hot water or heat gain by cold water in piping and water system components
12. Possible cross connections between potable and *non-potable* water
13. Inadequate access to water expansion tanks, water-hammer arrestors, water storage tanks, water heaters, and other equipment and components containing water

8.2 Final Installation Documents

8.2.1 Drawings and documents of the actual installation shall be provided to the building owner or *designee* and shall include

a. the location of each piece of equipment associated with the *building water systems*;

b. a drawing of the water distribution piping system, including system materials, pipe sizes, design flow rates, design temperatures, temperature *monitoring* points necessary to confirm design temperatures throughout the system, fill provisions, blow-down provisions, makeup provisions, sampling points, treatment points, and drain provisions;

c. the location of all outdoor air intakes;

d. size and options for each piece of water system equipment;

e. applicable control system wiring diagrams, schematics, equipment and component locations, calibration information, and operational sequences;

f. material specifications for all *building water system* components;

g. material specifications for all water systems insulation;

h. safety data sheets (SDS) for applicable materials used for *building water system* treatment, cleaning, flushing, disinfecting, and sealing;

i. installation requirements for all equipment;

j. start-up requirements for all equipment;

k. operational requirements for all equipment and systems; and

l. maintenance procedures for all equipment and water systems, including required actions, frequencies, and durations.

8.3 Balancing. All water systems shall be balanced, and a balance report for all water systems shall be provided to the building owner or *designee*.

8.4 Commissioning. Detailed instructions for commissioning of all *building water systems* shall be provided by the designer in the plans and specifications. Commissioning shall include the following:

a. Procedures for flushing and *disinfection*

1. Procedures shall meet the requirements of AWWA C651 [2] or AWWA C652 [3] or comply with all applicable national, regional, and local regulations.

2. *Disinfection* and flushing shall be completed within three weeks prior to whole or partial *beneficial occupancy*.
   i. If *beneficial occupancy* of any part of the building is delayed more than two weeks but less than four weeks after *disinfection*, flushing of all fixtures shall again be completed.
   ii. If *beneficial occupancy* of any part of the building is delayed four weeks or more after *disinfection*, the need for *disinfection* and/or flushing for unoccupied areas shall be determined by a *risk* assessment conducted by the water *Program Team*.

b. Confirmation that *building water system* performance meets design performance parameters documented in Sections 8.2.1 and 8.3

9. REFERENCES

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(This is a normative annex and is part of this standard.)

NORMATIVE ANNEX A
HEALTH CARE FACILITIES

These requirements are only applicable to health care facilities meeting the qualifications of Section 4.3.2.

A1. SUPPLEMENTAL DEFINITIONS FOR TERMS USED IN ANNEX A

legionellosis risk management plan: the documents that contain all information pertaining to the development and implementation of the *legionellosis* risk management activities of a health care facility.

Designated Team: the interdisciplinary group with the authority and responsibility for developing and implementing a *legionellosis risk management plan*.

water system flow diagram: a step-by-step drawing of a *building water system* that includes all water processing steps and identifies areas of the health care facility designated for specialized care.

A2. DESIGNATED TEAM

A2.1 Senior organizational leadership shall select the individual responsible for leading the *Designated Team* from the group responsible for compliance with physical environment accreditation standards. The membership of the *Designated Team* shall include but is not limited to

a. a person with senior organizational leadership authority to make command decisions about water restrictions or other response measures;
b. a member of the facilities management staff familiar with the *building water systems*; and
c. a member of the health care facility Infection Prevention and Control (IC) program who is an infection preventionist certified in infection control (CIC) by the Certification Board of Infection Control and Epidemiology (CBIC) or by an equivalent regional, national, or international body, or who is an epidemiologist with a minimum of a master's degree or equivalent.

A2.2 The *Designated Team* is responsible for developing, implementing, and documenting all applicable requirements of Annex A and any other activities assigned by senior organizational leadership or their *designee*.

A3. WATER SYSTEM FLOW DIAGRAM

A3.1 The *building water systems* shall be graphically represented in *water system flow diagrams* that include

a. all water supply sources;
b. all water supply service entrances;
c. all water treatment systems and *control measures*, including *disinfection* and filtration;
d. all water processing steps, including but not limited to receiving, conditioning, storing, heating, cooling, recirculating, and distributing;
e. all areas where *hazardous conditions* may contribute to the potential for *Legionella* amplification, including but not limited to
    1. all clinical support areas, including dietary and central sterile, and
    2. all patient care areas, including dialysis, respiratory therapy, and hydrotherapy;
f. all *water use end points*, including
    1. cooling towers,
    2. open water features,
    3. spas and whirlpools,
    4. pools,
    5. ice machines, and
    6. humidifiers; and
g. other points determined by the *Designated Team*.

A4. RISK MANAGEMENT PLAN

A4.1 The *legionellosis risk management plan* must be contained within one or more documents. These documents are allowed to contain information that is not part of the *legionellosis risk management plan*, and a master document providing the location of all plan documents shall be maintained. The *legionellosis risk management plan* shall include, without being limited to,

a. the name, title, and contact information for the *Designated Team* leader and the role and contact information for other *Designated Team* members;
b. the *water system flow diagrams*;
c. the systematic evaluation of physical and chemical conditions associated with each step in the *water system flow diagrams* to determine where *hazardous conditions* can occur in the *building water systems* and where *control measures* may be applied;
d. identification of areas with higher probability of infection throughout the facility based on the intended use of water-based processes and the relative vulnerability of patients to *legionellosis* in areas designated for specialized care;
e. an evaluation of the results of Sections A4.1(c) and A4.1(d) to estimate the likelihood of *legionellosis*;
f. the procedures required for prevention and *control* of *legionellosis* associated with the health care facility's *building water systems*, including
    1. identification of the *control locations*,
    2. determination of the *control limits*,
    3. development of *monitoring* procedures, and
    4. determination of *corrective actions*;
g. assignment of responsibility for each action required by the *legionellosis risk management plan*;
h. documentation of all aspects of the *legionellosis risk management plan*, including development, implementation, *verification*, and *validation*;
i. disease prevention responses to elevated *risk* through *monitoring* of disease surveillance, including but not limited to
    1. notification of relevant IC, Environment of Care (EC)/ facilities management, and provider staff of any test results that indicate elevated potential for *Legionella* amplification, transmission or infection;

2. procedures to be implemented when *monitoring* of *control measures* indicates deviation from *control limits*; and

3. a determination if, when, where, and how environmental *testing* for *Legionella* is to be performed;

j. actions to be taken if the IC department identifies probable or confirmed *legionellosis* cases; the actions shall

1. follow established IC processes, including compliance with most recent requirements of the U.S. Centers for Disease Control and Prevention (CDC) or other regional or national authority;

2. include implementation of remediation actions as necessary;

3. include evaluation of the *legionellosis risk management plan* and any necessary changes; and

k. procedures established by the *Designated Team* to confirm initially and on an ongoing basis that the *legionellosis risk management plan* is implemented as designed (*verification*) and that, when implemented as designed, the *legionellosis risk management plan* effectively *controls* the *hazardous conditions* throughout the *building water systems* (*validation*).

A5. EXISTING BUILDINGS, NEW CONSTRUCTION, AND RENOVATIONS

A5.1 Existing Buildings. The *Designated Team* shall conduct an evaluation and estimate of the likelihood of *legionellosis* as specified in Section A4.1(e) at least once per year for each existing building. Based on the results of this evaluation and estimate, the *Designated Team* shall modify the *legionellosis risk management plan* as necessary. This process shall be repeated for all affected areas

a. whenever a building or portion of a building is changed such that one or more water system is affected;

b. whenever major maintenance to a *building water system* is performed, including replacing tanks, pumps, heat exchangers, and distribution piping; and

c. whenever there is a *water service disruption* from the supplier to the building.

A5.2 For new construction and renovations, the *Designated Team* shall review the scope of work and determine the *risk* associated with the project, and the senior organizational leadership or their *designee* shall require the building designer and builder

a. to work cooperatively with the *Designated Team* to conduct an evaluation and estimate of the likelihood of *legionellosis* for the project as specified in Section A4.1.5; based on the results of this evaluation and estimate, the *Designated Team* shall modify the *legionellosis risk management plan* as necessary for the project (1) during the early planning, (2) during each phase of design and construction, and (3) during commissioning;

b. to work cooperatively with the *Designated Team* to comply with all applicable portions of Section 9;

c. to provide timely documented reports to the *Designated Team* confirming compliance with the *legionellosis risk management plan*; and

d. to provide a commissioning plan.

A6. BUILDING WATER SYSTEM PROCEDURES

A6.1 The *legionellosis risk management plan* shall include procedures for the following *building water systems* or shall include a determination and rationale by the *Designated Team* for any procedures that are not required:

a. *Potable water systems*

1. Systems start-up and shutdown. The *legionellosis risk management plan* documents shall include procedures for

i. flushing and *disinfection* before commissioning any new system;

ii. shutdown, including any draining, purging, cleaning treatment, and *control* settings;

iii. any unplanned loss of operating energy, loss of water treatment chemicals, or system component repair or replacement;

iv. restarting safely from a drained shutdown condition and from an undrained (stagnant) shutdown condition;

v. *monitoring* and treatment following water supply interruptions or breaks in water supply piping; and

vi. reestablishing required temperatures throughout the hot water distribution system.

2. System maintenance. The *legionellosis risk management plan* documents shall include procedures for

i. inspection and the inspection schedule for water-containing vessels and system components;

ii. flushing or mixing of stagnant or low-flow areas;

iii. maintenance and *monitoring* procedures based on equipment manufacturers' recommendations for cleaning, *disinfection*, replacement of system components, and other treatments the *Designated Team* decides are necessary for

(a) hot water and cold water storage tanks;
(b) ice machines;
(c) water-hammer arrestors;
(d) expansion tanks;
(e) water filters;
(f) shower heads and hoses;
(g) electronic faucets;
(h) aerators;
(i) faucet flow restrictors;
(j) nonsteam aerosol-generating humidifiers,
(k) water heaters;
(l) infrequently used equipment, including eyewash stations and showers;
(m) other equipment identified by the *Designated Team*;
(n) maintaining and storing instructions and forms for inspection notes and a correction action log; and
(o) maintaining and storing component and equipment operating manuals.

3. Water treatment. The *legionellosis risk management plan* documents shall include
   i. *monitoring* method and schedule for temperature measurement in the hot water and cold water systems;
   ii. *monitoring* method and schedule for measuring the chemical *disinfectant residual* or physical parameters in the hot water and cold water system;
   iii. procedures to address water supply interruptions or breaks in water supply piping;
   iv. procedures and schedule for maintaining water treatment system *disinfectants*; and
   v. water treatment products, the procedures for their application, and confirmation that the products comply with applicable regulations.

b. Cooling towers and evaporative condensers. This section describes the preventive measures required for cooling towers and evaporative condensers that provide cooling and/or refrigeration for the *HVAC&R* systems or for other devices or systems in the building. The *legionellosis risk management plan* documents shall include identification of the responsible persons for every step of each *legionellosis risk management plan* requirement.
   1. System maintenance. The *legionellosis risk management plan* documents shall include
      i. a schedule for inspections of general system cleanliness, drift eliminator condition, condition of fill material, and water distribution system operation;
      ii. requirements and the schedule for basin or remote sump cleaning and purging of stagnant or low-flow zones; and
      iii. documentation requirements.
   2. Water treatment. The *legionellosis risk management plan* documents shall include the water treatment requirements to *control* microbiological activity, scale, and corrosion and shall also
      i. specify all equipment and chemicals used for the purpose of treating the open recirculating loop;
      ii. include the minimum required schedule for inspection, maintenance, and *monitoring* and a *corrective actions* plan; and
      iii. identify the minimum requirements for documenting system water treatment.
   3. Shutdown and start-up. The *legionellosis risk management plan* documents shall include start-up and shutdown requirements to manage *hazardous conditions* associated with operation of fans during untreated water conditions and procedures for
      i. shutdown that include all chemical pretreatment steps, pump cycling protocols, and procedures for system drainage for shutdown periods longer than the duration specified by the *Designated Team*;
      ii. start-up from a drained system; and
      iii. start-up from an undrained (stagnant) system that exceeds the number of idle days specified by the *Designated Team*.
   4. *Disinfection* of cooling towers and evaporative condensers. The *legionellosis risk management plan* documents shall include procedures and identify the person responsible for initiating the process for
      i. remedial *disinfection* while in operation, including the conditions that require its application; and
      ii. emergency *disinfection*, including the conditions that require its application.
   5. Location of cooling tower makeup valve. The *legionellosis risk management plan* documents shall include requirements for the location of cooling tower makeup valves and for maintaining compliance with all applicable local, regional, and national codes and regulations for air gaps and backflow preventers and for the height of the discharge outlets and makeup valve over the rim of the overflow in the cooling tower or evaporative condenser cold water basins. If no such codes and regulations exist for the location, then the *legionellosis risk management plan* shall include requirements for maintaining compliance with ASME/ANSI A112.1.2 [3] for air gaps and for maintaining compliance with codes and regulations applicable to other locations, selected by the owner or *designee*, for backflow preventers and for the height of the discharge outlets and makeup valve over the rim of the outflow in the cooling tower or evaporative condenser cold water basins.

c. Pools and spas. Pools and spas shall be operated and maintained in accordance with original equipment manufacturer (OEM) requirements.

d. Ornamental fountains and open water features
   1. Operation. The *legionellosis risk management plan* documents shall include a description of the procedures for
      i. draining, cleaning all components, disinfecting, and refilling if the water feature is not in operation for periods that exceed the number of idle days specified by the *Designated Team*;
      ii. confirming that submerged lights will not operate unless the circulating pump is running; and
      iii. confirming that circulating pumps are running.
   2. Maintenance. The *legionellosis risk management plan* documents shall include procedures for regular cleaning; for cleaning the visible buildup of dirt, organic matter, or other debris; and for maintaining pumps and filters as recommended by the manufacturer.
   3. Water treatment. The *legionellosis risk management plan* documents shall include procedures for
      i. the weekly cleaning, *disinfection* of equipment and components, and replacement of water in systems with total water volume <5 gal (20 L) or for the periodic use of a *disinfectant*, the products to be applied, and a requirement to follow *disinfectant* manufacturer's directions;
      ii. the periodic use of a *disinfectant*, the products to be applied, and a requirement to follow *disinfectant* manufacturer's directions for systems ≥5 gal (20 L); and
      iii. maintaining water temperature within the *control limits* in the *legionellosis risk management plan*.

(This annex is not part of this standard. It is merely informative and does not contain requirements necessary for conformance to the standard. It has not been processed according to the ANSI requirements for a standard and may contain material that has not been subject to public review or a consensus process. Unresolved objectors on informative material are not offered the right to appeal at ASHRAE or ANSI.)

INFORMATIVE ANNEX B
BIBLIOGRAPHY

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INFORMATIVE ANNEX C
GUIDANCE IF *LEGIONELLA* TESTING IS UTILIZED

When *testing* of environmental water samples is utilized, it should be by a laboratory with demonstrated proficiency in the subject method, such as may be evidenced by certification by a national, regional, or local government agency or by an accredited nongovernmental organization (NGO).

Laboratories performing microbiological culture *testing* of environmental water samples should be accredited by a regional, national, or international accrediting body according to a nationally or internationally recognized standard, for example ISO/IEC 17025:2005. *Legionella* culture *testing* must be included as well as the laboratory's scope of accreditation.

As part of the laboratory accreditation, laboratories should have demonstrated proficiency in the detection of *Legionella* culture in accordance with one of the following:

a. U.S. Centers for Disease Control and Prevention (CDC) Environmental *Legionella* Isolation Techniques Evaluation (ELITE) Program

b. European external quality assessment/proficiency *testing* program for *Legionella* isolation through Public Health England

c. An equivalent, nationally accredited proficiency test provider

NOTICE

INSTRUCTIONS FOR SUBMITTING A PROPOSED CHANGE TO THIS STANDARD UNDER CONTINUOUS MAINTENANCE

This standard is maintained under continuous maintenance procedures by a Standing Standard Project Committee (SSPC) for which the Standards Committee has established a documented program for regular publication of addenda or revisions, including procedures for timely, documented, consensus action on requests for change to any part of the standard. SSPC consideration will be given to proposed changes within 13 months of receipt by the Senior Manager of Standards (SMOS).

Proposed changes must be submitted to the SMOS in the latest published format available from the SMOS. However, the SMOS may accept proposed changes in an earlier published format if the SMOS concludes that the differences are immaterial to the proposed change submittal. If the SMOS concludes that a current form must be utilized, the proposer may be given up to 20 additional days to resubmit the proposed changes in the current format.

ELECTRONIC PREPARATION/SUBMISSION OF FORM FOR PROPOSING CHANGES

An electronic version of each change, which must comply with the instructions in the Notice and the Form, is the preferred form of submittal to ASHRAE Headquarters at the address shown below. The electronic format facilitates both paper-based and computer-based processing. Submittal in paper form is acceptable. The following instructions apply to change proposals submitted in electronic form.

Use the appropriate file format for your word processor and save the file in either a recent version of Microsoft Word (preferred) or another commonly used word-processing program. Please save each change proposal file with a different name (for example, "prop01.doc," "prop02.doc," etc.). If supplemental background documents to support changes submitted are included, it is preferred that they also be in electronic form as word-processed or scanned documents.

For files submitted attached to an e-mail, ASHRAE will accept an electronic signature (as a picture; *.tif, or *.wpg) on the change submittal form as equivalent to the signature required on the change submittal form to convey non-exclusive copyright.

Submit an e-mail containing the change proposal files to:
change.proposal@ashrae.org

Alternatively, mail paper versions to:
ASHRAE
Senior Manager of Standards
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Or fax them to:
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The form and instructions for electronic submittal may be obtained from the Standards section of ASHRAE's Home Page, www.ashrae.org, or by contacting a Standards Secretary via phone (404-636-8400), fax (404-321-5478), e-mail (standards.section@ashrae.org), or mail (1791 Tullie Circle, NE, Atlanta, GA 30329-2305).

FORM FOR SUBMITTAL OF PROPOSED CHANGE TO AN ASHRAE STANDARD UNDER CONTINUOUS MAINTENANCE

NOTE: Use a separate form for each comment. Submittals (Microsoft Word preferred) may be attached to e-mail (preferred), or submitted in paper by mail or fax to ASHRAE, Senior Manager of Standards, 1791 Tullie Circle, NE, Atlanta, GA 30329-2305. E-mail: change.proposal@ashrae.org. Fax: +1-404-321-5478.

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2. Number and year of standard:

3. Page number and clause (section), subclause, or paragraph number:

4. I propose to: [ ] Change to read as follows [ ] Delete and substitute as follows
(check one) [ ] Add new text as follows [ ] Delete without substitution

Use underscores to show material to be added (added) and strike through material to be deleted (deleted). Use additional pages if needed.

5. Proposed change:

6. Reason and substantiation:

7. Will the proposed change increase the cost of engineering or construction? If yes, provide a brief explanation as to why the increase is justified.

[ ] Check if additional pages are attached. Number of additional pages: _____
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POLICY STATEMENT DEFINING ASHRAE'S CONCERN FOR THE ENVIRONMENTAL IMPACT OF ITS ACTIVITIES

ASHRAE is concerned with the impact of its members' activities on both the indoor and outdoor environment. ASHRAE's members will strive to minimize any possible deleterious effect on the indoor and outdoor environment of the systems and components in their responsibility while maximizing the beneficial effects these systems provide, consistent with accepted Standards and the practical state of the art.

ASHRAE's short-range goal is to ensure that the systems and components within its scope do not impact the indoor and outdoor environment to a greater extent than specified by the Standards and Guidelines as established by itself and other responsible bodies.

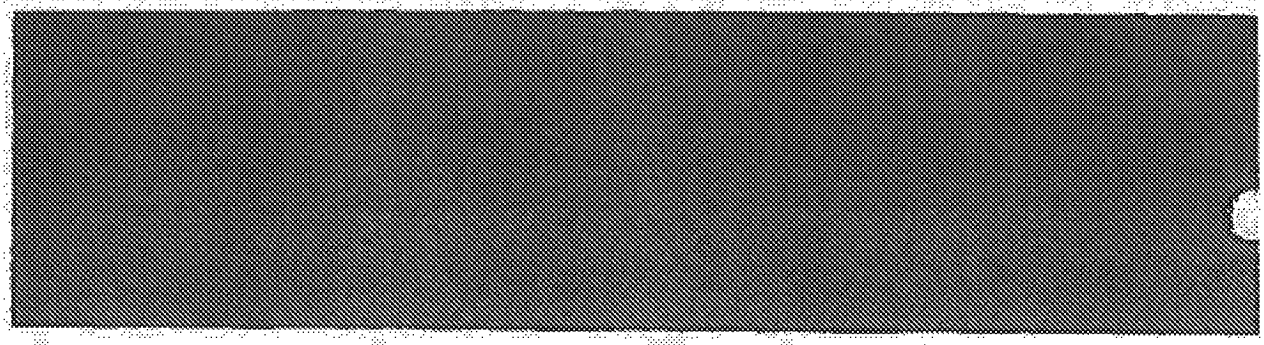
As an ongoing goal, ASHRAE will, through its Standards Committee and extensive Technical Committee structure, continue to generate up-to-date Standards and Guidelines where appropriate and adopt, recommend, and promote those new and revised Standards developed by other responsible organizations.

Through its *Handbook*, appropriate chapters will contain up-to-date Standards and design considerations as the material is systematically revised.

ASHRAE will take the lead with respect to dissemination of environmental information of its primary interest and will seek out and disseminate information from other responsible organizations that is pertinent, as guides to updating Standards and Guidelines.

The effects of the design and selection of equipment and systems will be considered within the scope of the system's intended use and expected misuse. The disposal of hazardous materials, if any, will also be considered.

ASHRAE's primary concern for environmental impact will be at the site where equipment within ASHRAE's scope operates. However, energy source selection and the possible environmental impact due to the energy source and energy transportation will be considered where possible. Recommendations concerning energy source selection should be made by its members.



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About ASHRAE

ASHRAE, founded in 1894, is a global society advancing human well-being through sustainable technology for the built environment. The Society and its members focus on building systems, energy efficiency, indoor air quality, refrigeration, and sustainability. Through research, Standards writing, publishing, certification and continuing education, ASHRAE shapes tomorrow's built environment today.

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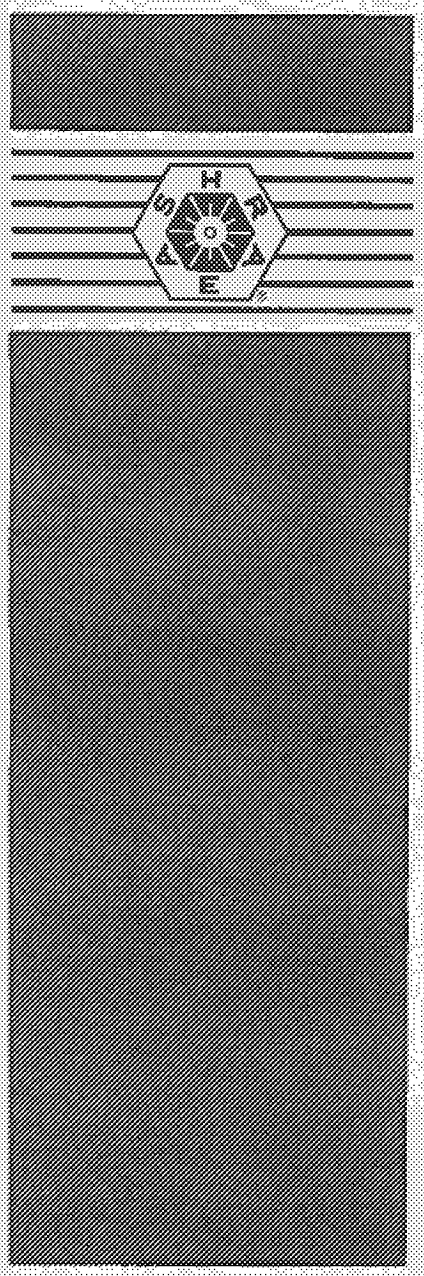

ASHRAE Guideline 12-2000

ASHRAE STANDARD

Minimizing the Risk of Legionellosis Associated with Building Water Systems

Approved by the ASHRAE Standards Committee February 8, 2000; by the ASHRAE Board of Directors February 18, 2000.

ASHRAE Guidelines are updated on a five-year cycle; the date following the standard number is the year of ASHRAE Board of Directors approval. The latest copies may be purchased from ASHRAE Customer Service, 1791 Tullie Circle, NE, Atlanta, GA 30329-2305. E-mail: orders@ashrae.org. Fax: 404-321-5478. Telephone: 404-636-8400 (worldwide) or toll free 1-800-527-4723 (for orders in U.S. and Canada).

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CONTENTS

ASHRAE Guideline 12-2000
Minimizing the Risk of Legionellosis Associated with Building Water Systems

SECTION		PAGE
1	Purpose	2
2	Scope	2
3	Ecology of *Legionella*	2
4	Potable and Emergency Water Systems	3
5	Heated Spas	5
6	Architectural Fountains and Waterfall Systems	7
7	Cooling Towers Including Fluid Coolers (Closed-Circuit Cooling Towers) and Evaporative Condensers	7
8	Direct Evaporative Air Coolers, Misters (Atomizers), Air Washers, and Humidifiers	10
9	Indirect Evaporative Air Coolers	12
10	Metalworking Systems	13
11	Monitoring for *Legionella*	13
12	References	14
Annex A:	Bibliography	16

1. PURPOSE

The purpose of this guideline is to provide information and guidance in order to minimize *Legionella* contamination in building water systems.

2. SCOPE

2.1 This guideline provides specific environmental and operational guidelines that will contribute to the safe operation of building water systems to minimize the risk of occurrence of Legionellosis.

2.2 This guideline is intended for use with nonresidential building systems (including but not limited to hotels, office buildings, hospitals and other health care facilities, assisted living facilities, schools and universities, commercial buildings, industrial buildings, etc.) and centralized systems in multifamily residential buildings (including but not limited to central heating/cooling systems, central domestic water systems, common area fountains, etc.). While not specifically intended for noncentralized or single-family residential building systems, some of the information may be useful for these systems.

2.3 This guideline is intended for the use of designers, installers, owners, operators, users, maintenance personnel, and equipment manufacturers.

3. ECOLOGY OF *LEGIONELLA*

3.1 Infection and Disease

The majority of *Legionnaires'* disease cases diagnosed and reported to the public health officials are sporadic (i.e., not occurring as part of a recognized outbreak).[1] Compared with outbreak-associated infection, much less is known about transmission of sporadic Legionellosis, although it is likely that transmission occurs by similar mechanisms. Exposure to legionellae in sporadic cases may occur in a variety of settings, including the home, the workplace, and public places visited during routine daily activities or during travel. The proportion of sporadic disease attributable to exposure in each of these settings and to various environmental sources is unknown.

Legionellae are bacteria. When legionellae are present in aquatic environments, the risk of transmission of infection to humans depends on the presence of several factors: conditions favorable for amplification of the organism, a mechanism of dissemination (e.g., aerosolization of colonized water), inoculation of the organism at a site where it is capable of causing infection, bacterial strain-specific virulence factors, and the susceptibility of the host. Over 40 species of *Legionella* have been identified; *L. pneumophila* appears to be the most virulent and is associated with approximately 90% of cases of Legionellosis. Most *L. pneumophila* infections are caused by serogroup 1; however, certain serogroup 1 strains may be more virulent. The risk of acquiring Legionnaires' disease is greatest for older persons and for those who smoke tobacco or have chronic lung disease. Persons whose immune system is suppressed by certain drugs or by underlying medical conditions appear to be at particularly high risk.

3.2 Habitats

Legionellae bacteria are commonly present in natural and man-made aquatic environments. The organism is occasionally found in other sources, such as mud from streams and potting soils; however, the overall importance of nonaquatic environmental sources in human disease is not yet known. In natural water sources and municipal water systems, legionellae are generally present in very low or undetectable concentrations. However, under certain circumstances within man-made water systems, the concentration of organisms may increase markedly, a process termed "amplification." Conditions that are favorable for the amplification of legionellae growth include water temperatures of 25-42°C (77-108°F), stagnation, scale and sediment, biofilms, and the presence of amoebae. Legionellae infect and multiply within several species of free-living amoebae, as well as ciliated protozoa. The initial site of infection in humans with Legionnaires' disease is the pulmonary macrophage. These cells engulf legionellae, provide an intracellular environment that is remarkably similar to that within host protozoa, and allow for multiplication of the bacterium. Hence, legionellae may be considered parasaprobic; i.e., they naturally infect free-living amoebae and incidentally infect the phagocytic cells within human lungs under certain circumstances. Although legionellae may be cultivated on special agar media in laboratory settings, growth in nature in the absence of protozoa and/or in the absence of complex microbial biofilms has not been demonstrated. Intracellular growth of legionellae within protozoa and/or within diverse microbial biofilms may be the primary means of proliferation.

There is an indication that growth of *Legionella* is influenced by certain materials. Natural rubbers, wood, and some plastics have been shown to support the amplification of *Legionella*, while other materials such as copper inhibit their growth.

Generally, *Legionella* thrive in diverse, complex microbial communities because they require nutrients and protection from the environment. Controlling the populations of protozoa and other microorganisms may be the best means of minimizing *Legionella*.[2]

3.3 Transmission of Legionnaires' Disease

Most data on the transmission of Legionnaires' disease are derived from investigations of disease outbreaks. These data suggest that, in most instances, transmission to humans occurs when water containing the organism is aerosolized in respirable droplets (1-5 micrometers in diameter) and inhaled by a susceptible host.

Prior to actual disease a number of events occur, some of which can be influenced by good engineering and maintenance practices. These events and prevention opportunities are outlined in Figure 1. The first event, survival in nature, is generally outside the scope of building engineering and management practices. The next three events—amplification, dissemination, and transmission—can be influenced by engineering design and maintenance practices. Subsequent events are influenced by the individual's health.

The most effective control for most diseases, including Legionellosis, is prevention of transmission at as many points

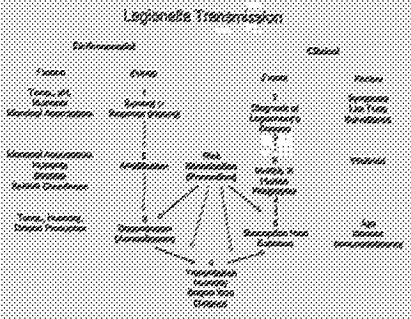

Figure 1 Legionella transmission.
Adapted from Bartram (1991)[5].

as possible in the disease's chain of transmission. The rationale for this is that if one preventive measure fails, others will be in place and act as fail-safe mechanisms. With this philosophy in mind, it may be desirable to design interventions to prevent transmission of Legionellosis at as many points as possible in the disease's chain of transmission. General concerns are presented so that readers may develop an understanding of the types of conditions that may allow amplification and transmission of *Legionella*.

A variety of aerosol-producing devices have been associated with outbreaks of Legionnaires' disease, including cooling towers,[6,7] evaporative condensers,[6,7] showers,[8,9] whirlpool spas,[10,11] humidifiers,[12] decorative fountains,[13,14] and a grocery store produce mister.[15] Aspiration of colonized drinking water into the lungs has been suggested as the mode of transmission in some cases of hospital-acquired Legionnaires' disease.[16-18]

Numerous investigations have demonstrated that cooling towers and evaporative condensers have served as the sources of *Legionella*-contaminated aerosols causing outbreaks of community- and hospital-acquired infection. Outbreak-associated transmission via cooling towers and evaporative condensers has been most commonly documented where those infected have been in close proximity to the contaminated devices; however, data from a few Legionnaires' disease outbreak investigations suggest that legionellae may be carried in cooling tower aerosols for distances of up to 3 kilometers (2 miles)[19] (this is regarded as requiring an unusual combination of climatic conditions). A number of outbreaks of Legionellosis associated with cooling towers and evaporative condensers have occurred after these devices have been restarted following a period of inactivity.[20,21]

Shower heads and tap faucets can produce aerosols containing legionellae in droplets of respirable size. Epidemiologic studies and air sampling conducted during outbreak investigations have established the role of aerosols produced by showers and tap faucets in disease transmission.[9] Aerosols produced by respiratory therapy equipment that have been filled or rinsed with contaminated potable water in hospitals have also caused disease transmission.[12,22]

Heated spa pools operate at temperatures conducive to bacterial growth. The aeration of spa pools can result in formation of potentially contaminated aerosols. A range of pathogenic microorganisms, including *Pseudomonas aeruginosa* and *L. pneumophila*, have been found in spa pools. Outbreaks of Legionellosis have occurred among bathers as well as people near colonized spas.[10,11]

A more complete and detailed description of the most common amplifiers associated with building water systems, including the treatments recommended to minimize the risk of Legionellosis, is found in Sections 4–10.

4. POTABLE AND EMERGENCY WATER SYSTEMS

4.1 Potable Water Systems

4.1.1 System Description. Potable water systems in buildings for this discussion start at the point where the water enters the building and end where it exits the piping at a faucet, showerhead, etc. The systems include all piping, hot water heaters, storage tanks, faucets, nozzles, and other distribution outlets.

4.1.2 System Operation. Factors associated with the plumbing system that may influence the growth of legionellae are as follows:

Chlorine concentration. Municipal potable water supplies are generally chlorinated to control the presence of microorganisms, historically to control microbes associated with sewage. The legionellae are more tolerant of chlorine than many other bacteria and may be present in small numbers in municipal water supplies.[23]

Temperature. Although legionellae have been recovered from cold water, the temperature range favorable for amplification is 25–42°C (77–108°F). The environment becomes more hostile as the temperature is moved from this range.

Design of plumbing system. Growth of legionellae may occur in portions of the system with infrequent use, in stagnant water, and in portions of the system with rapid temperature. Growth may also occur in dead-end lines, attached hoses, shower nozzles, tap faucets, hot water tanks, and reservoirs.

Plumbing materials. Rubber washers and fittings, including water hammer arrestors and rubber hoses with spray attachments, have been shown to provide sites for growth of legionellae.[24] Organic components leached from plumbing materials may contribute to growth of heterotrophic bacteria, including legionellae.

4.1.3 Water Droplet Size. Contaminated potable water sources present the greatest risk when dispersed into the air in a very small droplet size (less than 5 micrometers) that can be inhaled deeply into the lungs. Actions that may generate small droplets are those that break up the water stream, i.e., shower nozzles, aerators, spray nozzles, water impacting on hard surfaces, and bubbles breaking up.

4.1.4 Nutrients. Both dead and living microorganisms, biofilms, and debris may provide nutrient sources for legionellae growth. When legionellae are found in plumbing systems, it is common to detect the microbes in the sediment in hot water tanks and in peripheral plumbing fixtures that accumulate sediment. Legionellae growth appears to be heaviest at the solid–liquid interface with the development of slime deposits.

4.1.5 Associated Cases of Legionnaires' Disease. Potable based water systems are an important potential source of Legionellosis in all buildings and are of particular importance in hospitals, nursing homes, and other health care facilities.[25] Many reports link legionellae in hospital tap water to epidemics and clusters of nosocomial (hospital-acquired infection) Legionnaires' disease, often involving immunosuppressed patients.[26]

4.1.6 Recommended Treatment. Where practical in health care facilities, nursing homes, and other high-risk situations, cold water should be stored and distributed at temperatures below 20°C (68°F), while hot water should be stored above 60°C (140°F) and circulated with a minimum return temperature of 51°C (124°F). However, great care should be taken to avoid scalding problems. One method is to install preset thermostatic mixing valves. Where buildings cannot be retrofitted, periodically increasing the temperature to at least 66°C (150°F) or chlorination followed by flushing should be considered. Systems should be inspected annually to ensure that thermostats are functioning properly.

Where practical in other situations, hot water should be stored at temperatures of 49°C (120°F) or above.

Those hot or cold water systems that incorporate an elevated holding tank should be inspected and cleaned annually. Lids should fit closely to exclude foreign materials.

Detailed current plans for hot and cold water piping systems should be readily available. Hot water heaters and storage vessels for such systems should have a drainage facility at the lowest point, and the heating element should be located as close as possible to the bottom of the vessel to facilitate mixing and prevent water temperature stratification. In high-risk applications, insulated recirculation loops should be incorporated as a design feature. For all situations, the pipe runs should be as short as practical. Moreover, where recirculation is employed, the pipe runs should be insulated and long dead legs avoided. New shower systems in large buildings, hospitals, and nursing homes should be designed to permit mixing of hot and cold water near the showerhead. The warm water section of pipe between the control valve and showerhead should be self-draining.

Copper-silver ionization is a relatively new approach to controlling *Legionella* in hot water distribution systems and has been used successfully in a number of hospitals.[27,28] Electrolytically generated copper and silver ions build up in the hot water recirculating system to levels effective in eradicating *Legionella*, typically in the range of 0.2–0.8 mg/L copper and 0.02–0.08 mg/L silver. The optimal concentration of copper-silver ions for controlling *Legionella* in hot water is not known. A particular concentration may not be universally effective because of variables in water quality and system design. It is also important to note that the efficacy of copper-silver ions, like chlorine, is adversely affected by elevated pH.[29]

Where decontamination of hot water systems is necessary (typically due to implication of an outbreak of Legionellosis) the hot water temperature should be raised to 71–77°C (160–170°F) and maintained at that level while progressively flushing each outlet around the system. A minimum flush time of five minutes has been recommended by the Center for Disease Control Hospital Infection Control Practices Advisory Committee.[30] However, the optimal flush time is not known and longer flush times may be necessary. In the original report describing this method, multiple 30-minute flushes were required to significantly reduce *Legionella* colonization.[17] The number of outlets that can be flushed simultaneously will depend on the capacity of the water heater and the flow capability of the system. Local building and sanitary codes should be checked for any temperature limits of water discharged to the sewer. Appropriate safety procedures to prevent scalding are essential. When possible, flushing should be performed when the fewest building occupants are present (e.g., nights and weekends). For systems where thermal shock treatment is not possible, shock chlorination may provide an alternative.[12,23] However, there is less experience with this method of decontamination. Also, users should realize that the required levels of free chlorine residual can cause corrosion of metals. Chlorine should be added to achieve a free chlorine residual of at least 2 mg/L throughout the system. This may require chlorination of the water heater or tank to levels of 20 to 50 mg/L. The pH of the water should be maintained between 7.0 and 8.0. Each outlet should be flushed until the odor of chlorine is detected. The chlorine should remain in the system for a minimum of 2 hours (not to exceed 24 hours), after which the system should be thoroughly flushed.

Once the decontamination is complete, recolonization is likely to occur unless the proper temperatures are maintained, continuous supplemental chlorination is continued, or alternative approaches, such as the use of a silver/copper ionization device, are employed.

In high-risk applications, monthly removal of shower heads and tap aerators to clean out sediment and scale and to clean them in a chlorine bleach solution is recommended.

For potable water systems that were opened for repair or other construction or systems that were subjected to water pressure changes associated with construction (which may cause water to become brown and the concentration of *Legionella* to dramatically increase),[31] it is recommended that as a minimum the system be thoroughly flushed. High-temperature flushing or chlorination may be appropriate, and this judgement should be made on a job-specific basis. If only a portion of the system is involved, high-temperature flushing or chlorination may be used on only that portion of the system.

4.2 Emergency Water Systems—Safety Showers, Eye Wash Stations, and Fire Sprinkler Systems

4.2.1 System Description. All three of these systems are generally plumbed to the potable water system, have little or no flow with resulting stagnant conditions, and may reach temperatures warmer than ambient. Legionellae, heterotrophic bacteria, and amoebae have been cultured from these systems.[32] When the devices are used, aerosolization is expected.

4.2.2 **Associated Cases of Legionnaires' Disease.** Cases of Legionellosis resulting from exposure to these waters have not been documented.

4.2.3 **Recommended Treatment.** Safety shower and eye wash stations should be flushed at least monthly. In the case of fire sprinkler systems, it is recommended that fire-fighting personnel wear protective respiratory gear and that non-fire-fighting personnel exit the burning area. Appropriate precautions should be taken when checking the operation of fire sprinkler systems.

5. HEATED SPAS

5.1 *System Description*

Heated spas are small baths or pools used for relaxation (i.e., recreational), hygienic, or therapeutic purposes. Common features include warm water temperatures, (32-40°C/90-104°F) and the constant recirculation and agitation of the water through high-velocity jets and/or injection of air. While there is some confusion over the names used for each, the differences among the types of baths and pools are related mainly to size, purpose, material used, and equipment.

5.1.1 **Whirlpool Spa (Spa, Hydrotherapy Pool).** These are recreational baths or pools (public or private) holding more than one person and filled with warm turbulent water. The water is not replaced after each use but rather is filtered to remove particulates and chemically treated (typically with chlorine or bromine) to provide microbiological control. They may be located indoors or outdoors. Most smaller units are made from molded fiberglass, while larger in-ground varieties are generally made of gunite or concrete with a white plaster finish. They are generally circular in shape, always shallow (less than 1.5 m [52 in.]), and contain seats that allow occupants to submerge up to the chest or neck.

5.1.2 **Hot Tub.** These are traditionally deeper hot water baths or pools made of wood. Redwood is common, but they may also be made of cedar, mahogany, white oak, pine, or teak. Otherwise, the features and uses are similar to spas.

5.1.3 **Whirlpool.** This terminology has been traditionally used for the small therapeutic pools (often used in athletics) filled with warm, vigorously moving water, which may be small enough for treatment of a specific joint, such as a knee, ankle, or elbow. These pools are generally made of stainless steel and are emptied between uses.

5.1.4 **Whirlpool Bath.** These are small baths often found in bathrooms of hotel rooms or private residences. As such, they are used for both recreational and hygienic purposes. The baths are fitted with high-velocity water jets and/or air injection, but unlike whirlpool spas and hot tubs, the water is emptied after each use.

5.2 *System Operation*

Temperature. The water temperature in these spas, baths, and pools is generally in the range of 37-40°C (98-104°F), with the maximum temperature based on bather comfort. These warm temperatures are close to the optimum for the multiplication of *Legionella* and many other microorganisms. The warmer temperatures also accelerate the loss of the biocide.

Aerosol Production. Due to the operational features of the high-velocity water recirculation and air injection, a large number of bubbles of varying sizes rise to the water surface and burst. Microorganisms (e.g., *Legionella*) in the water can be released into the air via either bubbles or aerosol mist.

5.3 *Water Droplet Size*

This aerosol mist has water droplets of varying sizes (many less than 5 micrometers) and extends into the air to a height of at least 0.3 meters (1 1/2 ft) above the water surface (well within the breathing zone of the bathers). Under conditions of high relative humidity and air currents, the aerosol may also expose individuals outside the spa.

5.4 *Nutrients*

Due to the small volume of water per occupant (approximately 300 liters, compared to 10,000 liters in a typical swimming pool), the bathing load quickly contributes a variety of contaminants into the water, such as body oils, skin flakes, bacteria and fungi, suntan lotion, and other organic materials. In addition to serving as nutrients, these organic materials can also cause an increase in chlorine (or bromine) demand, resulting in a reduction in free available halogen.

5.5 *Associated Cases of Legionnaires' Disease*

In surveys of whirlpool spas, legionellae have been isolated from as many as 33% of the spas sampled, but only in those spas where the disinfectant (chlorine or bromine) levels were not adequately maintained. Thus, it is generally presumed that outbreaks of Legionellosis from whirlpool spas are likely to be associated with spas that have similar deficiencies in their disinfectant levels.

It is universally recognized that water treatment criteria for spas (and swimming pools) should include disinfection against coliforms and other fecal pathogens (bacteria, viruses, and protozoa). In recent years, these types of recreational and therapeutic spas have been recognized as important sources of infection by other waterborne pathogens, including *Pseudomonas aeruginosa* and *Legionella* species. Several multiple-case outbreaks of Legionellosis (Legionnaires' disease and Pontiac fever) have been traced to spas and hot tubs, and fatalities have occurred.[5,18] No cases of Legionellosis have been traced to whirlpool baths.[19,20]

5.6 *Recommended Treatment*

5.6.1 **Whirlpool Spas.** Whirlpool spas are currently subject to state and local regulations related to public swimming and bathing facilities. These regulations may cover all areas of operation, including mechanical specifications, operational parameters (i.e., flow rate, temperature), water chemistry, and bacteriology. To minimize the occurrence of whirlpool-related infectious diseases (including Legionellosis), the following guidelines are relevant.

5.6.1.1 **Bather Load.** Clearly post and enforce the maximum number of occupants (0.93 m^2 [10 ft^2] of surface area per bather). Using this formula, a 2.5 meter (8 ft) diameter circular spa would have a maximum bather load of five at one time.

5.6.1.2 **Bather Health Restrictions.** Clearly post warnings on the increased health risk related to use by individuals who are immunocompromised or who have chronic lung disease.

5.6.1.3 **Filter Operation.** Hygienic maintenance of spa filters is more difficult than that of swimming pool filters because of the higher ratio of number of bathers to pool volume. Health codes consistently accept filter flow rates as follows:

High rate sand filters — 3.4-6.7 L/s per m^2
(5-10 gal/min per ft^2) of filter media
Diatomaceous earth filters — 1 L/s per m^2
(1.5 gal/min per ft^2) of filter media
Cartridge filters — 0.25 L/s per m^2
(0.375 gal/min per ft^2) of filter media

Maintenance of filters includes back flushing regularly to remove the buildup of organic debris. Determining the frequency of back flushing is currently based on manufacturer recommendations (flow-rate requirements) rather than microbiological criteria. As a general rule, daily back flushing may be required during periods of heavy usage. Filter cartridges should also be cleaned or replaced on a regular basis (once or twice weekly).

5.6.1.4 **Water Chemistry.** The American National Standards Institute and National Spa and Pool Institute (ANSI/NSPI) have established chemical standards related to pool disinfection. The standards are generally used as a basis for most state and local regulations and have been modified slightly by the Centers for Disease Control in their "Interim Recommendations to Minimize Transmission of Legionnaires' Disease from Whirlpool Spas on Cruise Ships (1993)."[21]

	Minimum	Ideal Value	Maximum
Free chlorine (mg/L)	3.0	4.0-5.0	10.0
Combined chlorine (chloramines) (mg/L)	None	None	0.2
Bromine (mg/L)	4.0	4.0-5.0	10.0
pH	7.2	7.4-7.6	7.8

The upper value of 10 mg/L (free chlorine or bromine) should not be considered a routine target maintenance level; however, this level is acceptable for relatively short durations.

The ideal values should be considered minimum values for control of *Legionella* because of the relative resistance of *Legionella* to halogens (compared to other bacteria and enteric viruses). Maintaining the required free available halogen level is absolutely critical for controlling the growth of bacteria (including *Legionella*) in the spa water. Thus, these parameters should be measured frequently, as often as hourly during periods of heavy use. Automatic systems that continuously monitor the free halogen and adjust as needed would offer the best control of the water chemistry. In addition, it would be desirable to install halogen level-dependent injector devices on both sides of the filter to ensure that adequate levels of biocide are maintained within the filter and within the water exiting the filter.

Several alternative or adjunctive nonhalogen water treatment procedures are currently being marketed, including copper/silver ion water treatment, ionization treatment, ultraviolet light treatment, and ozonation. While any or all of these approaches may successfully control *Legionella* and other bacteria in pools and spas, there are insufficient data at the present time to recommend any major variation from current water treatment practices. This situation may change as additional data from laboratory and real-world studies become available.

5.6.1.5 **Bacteriological Parameters.** Regular testing of all spas can provide an important record of safe operating conditions and may alert operators of unsafe conditions when they occur. However, since bacteriological results require as much as 24 hours (or longer for *Legionellae*) for results, they should be used only to spot-check or confirm the effectiveness of the disinfection system, not as a replacement for frequent testing of the water chemistry or routine maintenance. Where culturing for legionellae is to be done, see section 11 for steps on proper sampling, handling, and shipping.

Standard aqua plate count (35°C)-	200 cfu per mL (maximum)
Total coliforms-	3 organisms per 100 mL (maximum)
Fecal coliforms-	None detectable
Pseudomonas aeruginosa (41°C)-	None detectable
Legionella species-	None detectable

5.6.1.6 **Routine Maintenance.** Current ANSI/NSPI recommendations include taking the spa out of service at the end of each day in order to carry out a superchlorination (i.e., shock disinfection) using 10 mg/L or 10 times the combined chlorine level, whichever is greater, for one to four hours. Due to the buildup of total dissolved solids and organic matter in the water, the spa water should also be replaced at least once a week (depending on the frequency of use). Daily water changes may be necessary under continuous conditions of high use. At the same time, the spa should be thoroughly cleaned, including a vigorous scrubbing of the spa surface, weirs, and skimming devices, in order to remove buildup of microbial biofilm. Conditions of high bacterial counts also require shock disinfection in order to achieve safe operating conditions, often coupled with changing the water, cleaning the spa, and maintenance of filters.

5.6.1.7 **Training and Record Keeping.** Training of maintenance personnel on all aspects of the safe operation of whirlpool spas should be mandatory. As part of this training, it should be emphasized that spas are not the same as swimming pools; thus, maintenance required for safe operation is very different. Maintenance personnel should also be trained to maintain good records of all water chemistry measurements, back flushing of filters, water changes, and spa cleaning. Results of samples sent to outside labs for bacteriological analysis should also be maintained. All records should be kept for a period of at least two years.

5.6.2 **Whirlpool Baths.** Since whirlpool baths are always filled with fresh potable tap water and drained at the end of each use, the recommendations for control of Legionellosis would fall initially under those guidelines developed for potable water systems.

6. ARCHITECTURAL FOUNTAINS AND WATERFALL SYSTEMS

6.1 System Description

In these systems, water is either sprayed in the air or cascades over a steep media such as rocks, and then it returns to the man-made pool. This guide is not intended to cover fountains in natural bodies of water or natural waterfalls.

6.2 System Operation

These systems are sometimes operated intermittently with on-time often scheduled only during certain time periods. Applications can include elaborate displays specifically intended to periodically attract large crowds in entertainment centers. Systems that are operated intermittently may encourage greater biocontamination.

6.2.0.1 Temperature. Because of the high temperature ranges needed for proliferation of legionellae bacteria, outdoor fountains and pools in hotter climates and indoor fountains and pools subject to sources of heat may be susceptible to becoming amplifiers. Temperature increases may be facilitated by heat from the pump/filter systems themselves. Intermittent operation may also create situations where temperature increases occur in limited parts of the system.

6.3 Water Droplet Size

These systems can produce droplets of various sizes and certainly have the potential to produce droplets less than 5 micrometers. Generally speaking, the legionellae risk increases as the rate of aerosol production increases.

6.4 Nutrients

Fountains are subject to contamination from a wide variety of sources, including materials scrubbed from the air and returned to the pool with the falling water droplets as well as organic and inorganic materials dropped, thrown, or blown into the pool.

Algae and bacteria are recognized as a particular problem in pools less than 1 meter (3 ft) deep. When used, filter systems are similar to the types used for swimming pools.

6.5 Associated Cases of Legionnaires' Disease

Several multiple-case outbreaks of Legionellosis have been associated with decorative fountains in public buildings, particularly hotels.[1,11] However, the true incidence of disease from these sources may be much higher due to the occurrence of isolated cases where no association with the building or the fountain was suspected.

6.6 Recommended Treatment

6.6.1 Design Considerations

- Drains or sumps should be located at the lowest level of the pool, with no other local low points that are not served by drains or sumps.
- Provision for maintenance should be considered in the design stage. Access to pump(s) and filter(s) should be provided. Stagnant areas or areas that are difficult to clean should be avoided.

6.6.2 Maintenance

- Regular cleaning is recommended.
- Use of filters should be considered; however, systems with a small water volume may be drained and refilled with fresh water every few weeks in lieu of filtering.

6.6.3 Water Treatment

Microbial fouling control is important, especially where the conditions are such that there are significant periods of time when the temperature of the fountain water is in the range that is favorable for the amplification of legionellae growth (see 3.2). When biocidal treatment is employed for microbial fouling control, the biocide must be registered with the Environmental Protection Agency for use in decorative fountains. For further information on water treatment, see 7.6.2 of this guideline and the "Water Treatment" chapter in the Applications volume of the ASHRAE Handbook.

7. COOLING TOWERS (INCLUDING FLUID COOLERS (CLOSED-CIRCUIT COOLING TOWERS) AND EVAPORATIVE CONDENSERS

7.1 Cooling Towers

7.1.1 System Description. A cooling tower is an evaporative heat transfer device in which atmospheric air cools warm water, with direct contact between the water and the air, by evaporating part of the water (see Figure 2). Air movement through such a tower is typically achieved by fans, although some large cooling towers rely on natural draft circulation of air. Cooling towers typically use some media, referred to as "fill," to achieve improved contact between the water and the cooling air.

7.1.2 System Operation. Cooling towers associated with building water systems are typically used for rejection of waste heat from the condenser of chillers providing air conditioning for a building. Water from the cooling tower is piped to the condenser where it is heated and then back to the cooling tower to be cooled.

7.1.2.1 Temperature. The typical temperature of the water in cooling towers ranges from 29°C (85°F) to 35°C (95°F) although temperatures can be above 49°C (120°F) and below 21°C (70°F) depending on system heat load, ambient temperature, and system operating strategy.

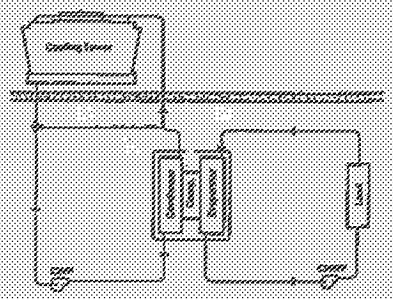

Figure 2 Typical cooling tower/chiller system.

7.1.2.2 Circulating Water System. Cold water piping from the cooling tower runs to one or more pump(s), then to the chiller condenser, where it is heated, and then back to the hot water distribution system in the cooling tower. Considerable variation in the piping arrangement occurs. Stagnant areas or dead legs may be difficult to clean or penetrate with biocides.

A significant volume of water may be contained in the piping system.

7.2 Closed-Circuit Cooling Towers and Evaporative Condensers

7.2.1 System Description. Closed-circuit cooling towers and evaporative condensers are also evaporative heat transfer devices. Both are similar to conventional cooling towers, but there is one very significant difference. The process fluid (either a liquid such as water, an ethylene glycol/water mixture, oil, etc., or a condensing refrigerant) does not directly contact the cooling air. Rather, the process fluid is contained inside a coil assembly (see Figure 3).

7.2.2 System Operation. Water is drawn from the basin and pumped to a spray distribution system over the coil assembly while the cooling air is blown or drawn over the coil by fans. Removal of heat is achieved by evaporating part of the water.

7.2.2.1 Temperature. Water temperature in closed-circuit cooling towers and evaporative condensers is similar to that in cooling towers.

7.2.2.2 Circulating Water System. Most commonly, there is no external piping in these systems. Because the water is totally contained within the unit, the volume of water is generally significantly less than with conventional cooling tower systems.

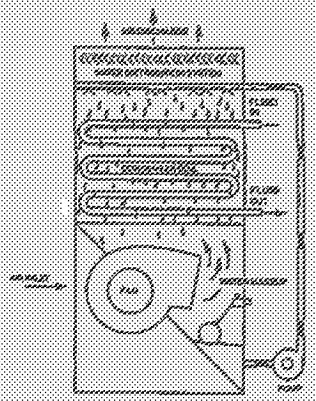

Figure 3 Typical closed-circuit cooling tower or evaporative condenser.

7.3 Water Droplet Size

Cooling towers and evaporative condensers incorporate inertial stripping devices called drift eliminators to remove water droplets generated within the unit. While the effectiveness of these eliminators can vary significantly with the design (new state-of-the-art eliminators are significantly more efficient than older designs) and the condition of the eliminators, it should be assumed that some water droplets in the size range of less than 5 micrometers leave the unit. In addition, some larger droplets leaving the unit may be reduced to 5 micrometers or less by evaporation.

7.4 Nutrients

Because cooling towers and evaporative condensers are highly effective air scrubbers and because they move large volumes of air, organic material and other debris can be accumulated. This material may serve as a nutrient source for legionellae growth. Diverse biofilms, which can support the growth of legionellae, may be present on heat exchanger surfaces, structural surfaces, sump surfaces, and other miscellaneous surfaces.

7.5 Associated Cases of Legionnaires' Disease

Evaporative heat rejection equipment such as cooling towers and evaporative condensers have been implicated in numerous outbreaks of Legionnaires' disease, and studies have shown that detectable levels of legionellae are present in many, if not most, such devices.[9,10]

7.6 Recommended Treatment

The key recommendations are that the system be maintained clean and that a biocidal treatment program be used. It is also recommended that the services of a qualified water treatment specialist be used to define and oversee the treatment.

7.6.1 System Maintenance. Keeping the system clean reduces the nutrients available for *Legionella* growth. Regular visual inspections should be made for general cleanliness. The cold water basin of the unit should be cleaned when any buildup of dirt, organic matter, or other debris is visible or found through sampling. Mechanical filtration may be used to help reduce these solids. Strainers, cartridge filters, sand filters, centrifugal-gravity-type separators and bag-type filters can be used to assist in removal of debris.

The drift eliminators should also be inspected regularly and cleaned if required or replaced if deteriorated or damaged.

Operation and maintenance records should include the following information:

- system schematic
- system water volume, with date and method of determination
- manufacturers' instructions for equipment operation
- regular water treatment procedures
- material safety data sheets for chemicals used (MSDS)
- names of persons responsible for system operation and shutdown
- dates of inspections and written results of inspections
- dates and nature of routine maintenance
- dates of equipment repairs or modifications with description of work done

7.6.2 Water Treatment. Water treatment provides a heat transfer fluid that allows equipment to function optimally. Objectives of water treatment for cooling water systems is to use water efficiently as well as to

- minimize microbial growth,
- minimize scale,
- minimize corrosion,
- minimize sediment/deposition of solids (organic or inorganic) on heat transfer surfaces.

An effective water treatment program should allow more efficient operation due to lower fouling, a longer system life due to decreased corrosion, and safer operation of the system due to reduced chances of microbial exposure to the public.

Control of scaling and corrosion is necessary in many water treatment programs. Scale such as calcium carbonate and/or other minerals containing silica, magnesium, and phosphate may precipitate onto heat exchanger and piping surfaces. Scaling can be minimized by use of inhibitors containing phosphonates, phosphates, and polymers to keep calcium and carbonate and other minerals in solution. Corrosion can be minimized by the use of inhibitors such as phosphate, azoles, molybdenum, and zinc. Scale and corrosion inhibitors are effective if microbial fouling and biofilm development are properly controlled. Microbial fouling can influence scaling and corrosion processes and can affect the performance of inhibitors. Microbial biofilms on surfaces can consume certain inhibitors (such as phosphates, phosphonates, and azoles), prevent access of inhibitors to surfaces, create localized oxygen-depleted zones, change the pH near surfaces, and accumulate or trap deposits onto surfaces.

Surfactants have also been used to minimize deposition on surfaces (particularly heat transfer surfaces). When used, the surfactant must be compatible with the scale and corrosion inhibitors as well as appropriate for the type of dirt, oil, or other material that is present.

Equally important to controlling scale and corrosion is keeping the system clean and free of sediment. Common sources of sediment include materials scrubbed from the air (dirt, leaves, paper, kitchen or other organic exhaust), precipitated solids (calcium, magnesium, carbonate silica), and corrosion products (rust). Microbes including bacteria, protozoa, algae, and (infrequently) fungi can grow in cooling systems and use the above materials as nutrients. Consequently, it is desirable to either prevent the entry of the material into the system or to remove it from the system.

Strategies to accomplish this include siting of the towers (relative to kitchen exhausts, etc.), scale and corrosion control, and filtration and/or separation.

Microbial fouling is controlled by the use of biocides, which are compounds selected for their ability to kill microbes while having relatively low toxicity for plants and animals. In the USA, the Environmental Protection Agency has regulatory authority for biocides and requires registration of all biocides. In addition, registration is required in each state where the biocide will be distributed. The data package submitted to the EPA includes efficacy data against a variety of microbes and toxicity data for animals. Much of the laboratory data are provided by the manufacturers of the individual biocides. Biocides must be used in accordance with the directions on the label.

There are two main groups of chemical biocides: oxidizers and nonoxidizers.

Oxidizing biocides include bromine, bromo-chloro-hydantoin, chlorine, chlorine dioxide, iodine, hypochlorites, ozone, or other compounds with the ability to accept electrons from other compounds that serve as reducing agents. Oxidizing biocides can accelerate corrosion of metals if they are dosed at excessive concentrations. Halogen biocides (chlorine, bromine, and iodine) react with the protein in cell membranes to cause the protein to become dysfunctional, thus killing/controlling the organism. Ozone and chlorine dioxide are believed to oxidize other components of the microbial cell.

Nonoxidizing biocides include many organic compounds registered with the EPA for cooling water applications, such as bromonitropropanediol, bromonitrostyrene, carbamates, decylthioethanamine, dibromonitrilopropionamide, dodecylguanidine hydrochloride, glutaraldehyde, isothiazolines, methylene bisthiocyanate, quaternary phosphonium salts, and tris-hydroxymethylnitromethane. Quaternary ammonium compounds are sometimes used but were found to be ineffective against legionellae in a recent study.[41] These biocides function in a number of ways, including reacting with intracellular enzymes, solubilizing cell membranes, and precipitating essential proteins in microbial cell walls. Properly used, nonoxidizing biocides are effective for control of the microbial fouling process in cooling water systems.

Both oxidizers and nonoxidizers can undergo chemical reactions with materials in the water that decrease their effectiveness. Some biocides react with components of some scale and corrosion inhibitors to render both compounds less effective for their intended purpose. Selection of corrosion/scale inhibitors as well as the biocide requires a knowledge of water chemistry, a basic understanding of water microbiology, and specific information about the system (what the system is cooling, sources of contamination, etc.).

It is generally sound practice to regularly alternate the biocides used for a cooling water system to avoid the selection and growth of resistant strains of microbes. The alternating biocide approach has been emphasized with the rationale that the population that survives the biocide treatment one week is susceptible to the alternate biocide a week or two later. Alternating the dose and frequency of the same biocide is also used to achieve this goal.

Because *Legionella* are known to enter cooling water systems in the makeup water, it should be assumed that they are present in the water along with other bacteria, protozoans, and algae. Protozoa are highly resistant to both oxidizing and nonoxidizing biocides; hence they must be controlled by limiting the microbial biofilms that serve to provide them nutrients.[42]

For further information on the subject of water treatment, see the "Water Treatment" chapter in the Applications volume of the ASHRAE Handbook.

7.6.3 Cooling Tower System Shutdown and Start-Up Procedures[43]

Shutdown

When the system is to be shut down for a period of more than three days, it is recommended that the entire system (cooling tower, system piping, heat exchangers, etc.) be drained to waste. When draining the system is not practical during shutdowns of short duration, the stagnant cooling water must be pretreated with an appropriate biocide regimen before tower start-up.

Start-Up for Drained Systems

- Clean all debris, such as leaves and dirt, from the cooling tower.
- Fill the system with water. While operating the condenser water pump(s) and prior to operating the cooling tower fans, execute one of the two alternative biocidal treatment programs described below
  - (1) Treat with the biocide that had been used prior to shutdown. Utilize the services of the water treatment supplier. Maintain the maximum recommended biocide residual (for the specific biocide) for a sufficient period of time (residual and time will vary with the biocide) to bring the system under good biological control.
  - (2) Treat the system with sodium hypochlorite to a level of 3 to 5 mg/L (ppm) free chlorine residual at a pH of 7.2 to 7.6. The chlorine residual must be held at 4 to 5 mg/L (ppm) for six hours, measurable with standard commercial water test kits.
- Once one of these two biocidal treatments has been successfully completed, the fan can be turned on and the system returned to service. Resume the standard water treatment program (including biocidal treatment).

Start-Up for Undrained (Stagnant) Systems

Remove accessible solid debris from the cooling tower sump and from any remote storage tank(s) that may be used.

- Perform one of the two biocide pretreatment procedures (described in "Start-Up for Drained Systems") directly to the cooling tower sump or remote storage tank. Do not circulate stagnant bulk cooling water over cooling tower fill or operate cooling tower fans during pretreatment.
- Stagnant cooling water may be circulated with the main cooling system pump(s) if tower fill is bypassed. Otherwise, add approved biocide directly to the bulk water source and mix with either manual or by sidestream flow methods. Take care to prevent the creation of aerosol spray from the stagnant cooling water from any point in the cooling water system.
- After biocidal pretreatment has been successfully completed, the cooling water should be circulated over the tower fill with fans off. When biocide residual is maintained at a satisfactory level for at least six hours, the cooling tower fans may be operated.

7.6.4 Emergency Decontamination of Wet-Type Heat Rejection Systems for *Legionella*. The Cooling Tower Institute has formulated an "Emergency Protocol" for decontaminating cooling towers and evaporative condensers using chlorine and dispersants.[44] However, this procedure must not be used routinely because it can be very corrosive and produce toxic fumes. This procedure has been adapted to include additional safety precautions and a 10 mg/L free residual chlorine level for 24 hours.[31]

7.6.5 Siting. In locating cooling towers and evaporative condensers, attention should be given to the following considerations.

- Locate as far as possible from fresh air intakes, including windows that can be opened.
- Do not locate in the immediate area of kitchen exhaust fans, plants, truck bays, or other sources of organic matter.
- Consider the direction of prevailing winds and do not locate upstream of outdoor public areas.
- Consider future construction, including nearby sites

8. DIRECT EVAPORATIVE AIR COOLERS, MISTERS (ATOMIZERS), AIR WASHERS, AND HUMIDIFIERS

8.1 System Description

Direct evaporative air-cooling equipment and humidifiers cool and humidify air by direct contact with the water, either by wetted-surface materials (as in wetted media air coolers) or with a series of sprays (as in air washers and misters). These devices (see Figures 4 and 5) are used to control the temperature and humidity levels for commercial, industrial, and agricultural applications.

They utilize either once-through or recirculating water. Wetted media systems may include a pump, water distributing piping, and a sump to collect or hold water. A fan may be utilized to move air across the system and distribute evaporatively cooled and humidified air to the location being served. Concentration of contaminants in the water is limited by bleed off and quality of fresh water makeup.

8.1.1 Wetted Media. Wetted media devices utilize a porous substrate to provide an extended surface area for evaporation of water. Water is either circulated over the media or the media are rotated through a water bath. Since evaporation occurs from the surface of the media, no water droplets are produced. Mist eliminators are generally not necessary. These

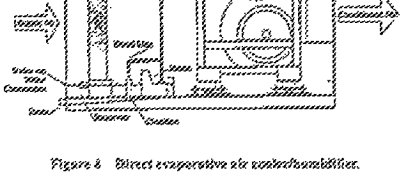

Figure 4 Direct evaporative air cooler/humidifier.

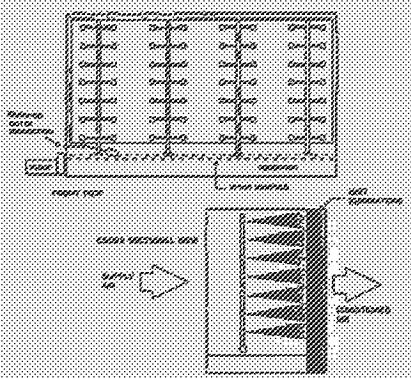

Figure 5 *Single bank air washer humidifier.*

devices utilize either once-through potable building water or are equipped with a recirculating system including a pump, automatic makeup water valve, a bleed-off/purge, and a positive draining reservoir.

8.1.2 *Air Washers.* Air washers utilize high-pressure nozzles to reduce water to small droplets for efficient evaporation. These systems have a chamber or casing containing one or more banks of spray nozzles and drift eliminators. Air washers contain a sump for collecting and holding excess spray water. The eliminator sections removes entrained droplets of water from the air. Air washers also utilize either once-through potable building water or are equipped with a recirculating system including a pump, automatic makeup water valves, a bleed-off/purge, and a positive draining reservoir. The water may be chilled for additional cooling and/or dehumidification.

8.1.3 *Misters.* Misters produce an aerosol by use of ultrasonic devices, spinning disks, or spray nozzles. Normally these devices are supplied with fresh potable water directly from the building water systems; however, some systems contain a reservoir.

8.1.3.1 *Heated Element and Steam-Type Humidifiers.* Heated element and vapor-type humidifiers convert water to vapor that is discharged into the space being conditioned. Due to the elevated temperature and the fact that water droplets are not generated, these humidifiers are not considered a risk for the growth of *Legionella* during normal operation. However, if the humidifier is improperly installed, moisture may accumulate in the duct and lead to bacterial growth. During periods of time when equipment is not in use, all water should be drained from the system to avoid the possibility of bacterial growth.

8.2 System Operation

See 8.1.

It should be noted that due to process conditions, there may be periods of time when equipment is shut down. It is common practice to drain sumps when the units are not in use. In addition, a continuous bleed or purge cycle is usually employed to limit the buildup of solids and contaminants in the basin. High dilution rates remove bacteria, nutrients, and other contaminants before they are a problem. It is rare for growth of *Legionella* to occur under these conditions.

8.2.1 *Water Temperature—Wetted Media Evaporative Air Coolers/Humidifiers and Air Washers.* For wetted media evaporative air coolers/humidifiers and air washers, the recirculating water temperature approximates the wet-bulb temperature of the airstream to which it is exposed. Since the wet-bulb temperature in most regions where these devices are used is well below 25°C (77°F), the water tends to be maintained at temperatures below the *Legionella* growth temperature range of 25-42°C (77-108°F).

8.2.2 *Water Temperature—Misters.* For misters supplied directly from the building potable water system, the temperature would tend to be at the supply cold water temperature. If fed from a stagnant reservoir, or pipes exposed to heat, the temperature could increase. The temperature could exceed 25°C (77°F), which is favorable for amplification of legionellae.

8.2.3 *Water Temperature—Air Washers.* Air washer operating conditions are based on the requirements of the process; however, a standard operating temperature range for circulating water is 4-10°C (40-50°F). The normal operating portions of air washer systems tend to be maintained at temperatures below the *Legionella* growth temperature range of 25-42°C (77-108°F).

8.3 *Water Droplet Size*

8.3.1 *Wetted Media.* Wetted media equipment generally produces few droplets during operation. However, large droplets may form as a result of improper maintenance and uneven water or air distribution. The exact size of the droplets will vary with the condition of the wetted media and mist eliminators (where used), air velocity through the unit, and irrigation rate. It should be assumed that under extreme conditions droplets of less than 5 micrometers could be created.

8.3.2 *Air Washers.* The major causes of droplets being entrained into the airstream are fouled spray nozzles and damaged or dirty mist eliminators. Air washers can produce droplets of various sizes and certainly have the potential to produce droplets less than 5 micrometers in diameter.

8.3.3 *Misters.* These systems can produce droplets of varying size and certainly have the potential to produce droplets less than 5 micrometers in diameter.

8.4 *Nutrients*

Because direct evaporative air coolers/humidifiers are efficient air scrubbers and move large volumes of air, organic matter and other debris can be accumulated. This may serve as a nutrient source for *Legionella* growth.

8.4.0.1 *Wetted Media Evaporative Air Coolers/Humidifiers and Air Washers.* Wetted media evaporative coolers/humidifiers and air washers have potential for growth where dirt, scale, or biological matter can accumulate. Most likely areas of such accumulation are collection troughs, mist eliminators, or water storage tanks.

8.4.1 *Misters.* Nutrient availability would be minimal when fed potable water directly from the building potable water system. If distribution piping and/or a holding reservoir is used, nutrients in the form of sediment and other debris may exist.

8.5 Recommended Treatment

8.5.1 *All Systems.* Regular inspection and maintenance of evaporative air coolers/humidifiers, air washers, misters, and ancillary equipment are recommended. Avoid dead-end piping, low spots, and other areas in the water distribution system where water may stagnate during shutdown.

Consider the use of photochemical ozone generators to control microbial concentrations in water in sumps and distribution piping. Water filters and air filters should be cleaned as required. The entire cooling water loop should be cleaned and flushed monthly.

8.5.2 *Recirculating Systems.* Proper sump water level or spray pressure must be maintained. Bleeding off or purging some of the water is the most practical means to minimize scale and nutrient accumulation. The bleed rate or purge depends on water quality (including hardness) and airborne contaminant level. Regular inspections should be made to ensure that the bleed rate or purge is adequate and is maintained. As an added precaution, sumps could be automatically drained during shutdown of the fan. When it is impractical to shut a system down for cleaning, it should be provided with a positive draining sump and easily accessible flush-out of the water distribution header so it can be flushed during operation. After flushing, dose the recirculating cooling water with a biocide approved by the EPA for such applications.

8.5.3 *Air Washers.* Use corrosion inhibitors to prevent corrosion of metals in the systems and formation of corrosion products. Control the level of suspended solids that can supply nutrients and growth areas for legionella. Finally, the microbiological activity should be controlled through the utilization of biocides approved by the EPA for such applications.

8.5.4 *Wetted Media Evaporative Air Coolers/Humidifiers.* Media located inside a large built-up air house may not dry completely during period of shutdown (i.e., weekends), resulting in stagnation. In order to dry out the media, pumps should be shut down prior to scheduled fan shutdowns. Smaller systems and those having the media located adjacent to inlet louvers normally dry sufficiently without assistance. For systems experiencing high contaminant loading, a flush-out cycle may be used that runs fresh water through the pad every 24 hours during a period of time when the system is not in operation. Media should be cleaned or replaced when necessary.

8.5.5 *Misters.* Never recirculate atomized water. Drain pipes and reservoir when equipment is not in use. For portable misters, drain and disinfect piping and reservoir regularly. Only sterile water should be added to the reservoir of portable humidifiers used in health care environments or in other areas where immunocompromised persons are likely to be exposed to the generated aerosols.

8.6 *Siting*

Evaporative air coolers/humidifiers should not be located near the outlet of a cooling tower, fluid cooler, evaporative condenser, kitchen exhaust, or any other source of organic contamination. Filtration upstream of the evaporative air cooler/humidifier is recommended when particulate contamination is expected. Filtration downstream of the equipment must be a sufficient distance to allow absorption of moisture into the air stream.

8.7 *Associated Cases of Legionnaires' Disease*

There have been no known cases of legionnaire's disease with air washers, wetted media evaporative air coolers/humidifiers, or steam humidifiers. A supermarket vegetable misting device using water from a holding tank was implicated in one outbreak of Legionnaires' Disease.[13] There is a documented case of Legionnaires' Disease that occurred in a hospital setting and resulted from aerosolized tap water from a humidifier.[8,22]

9. INDIRECT EVAPORATIVE AIR COOLERS

Indirect evaporative air coolers cool air in a heat exchanger, which transfers heat to a secondary airstream as shown in Figure 6. Although the primary air is cooled by the evaporatively cooled secondary air, no moisture is added to the primary air.

9.1 *System Description*

The heat exchanger is cooled by evaporation of water utilizing one of several methods:

1. direct wetting of the heat exchanger surface
2. cooling of secondary air utilizing evaporative cooling media
3. atomizing spray into secondary airstream or onto heat exchanger surface
4. cooling tower and coil.

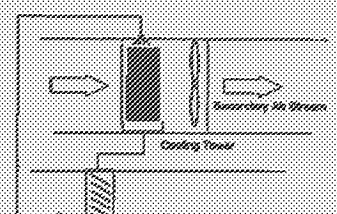

Figure 6 *Indirect evaporative cooler.*

9.2 System Operation

9.2.1 *Temperature.* The recirculated water temperature approximates the wet-bulb temperature of the secondary airstream. As is the case with direct evaporative air coolers, it is unlikely that the water temperature will exceed 25°C (77°F).

9.3 Water Droplet Size

Water droplet size will vary with exchanger type, condition of the media and mist eliminators (where used), air velocity through the unit, and other factors. Refer to the section of this guideline regarding specific exchanger type, i.e., cooling towers, misters, etc.

9.4 Nutrients

See 7.4 for equipment using a cooling tower to cool the secondary airstream and 8.4 for equipment using evaporative coolers or misters to cool the secondary airstream.

9.5 Recommended Treatment

See 7.5 for equipment using a cooling tower to cool the secondary airstream and 8.5 for equipment using evaporative coolers or misters to cool the secondary airstream.

9.6 Siting

Indirect evaporative air coolers should not be located near the outlet of a cooling tower, fluid cooler, evaporative condenser, kitchen exhaust, paint booth, incinerator, or any other source of organic matter.

9.7 Associated Cases

There has been no positive association of Legionnaires' disease with indirect evaporative air coolers.

10. METALWORKING SYSTEMS

10.1 System Description

In these systems, metalworking fluids are applied to cutting surfaces for lubrication and to prevent overheating of both the machine tool and the machined part.

10.2 System Operation

Both oil-based and water-based fluids are used. A variety of such fluids are commercially available from many companies.

As a rule, microbial growth does not occur in oil-based products. However, water-based fluids do become contaminated by microorganisms.

10.2.1 *Temperature.* As the fluids cool the machine tool and machined part, they become heated and the ambient temperature of the fluid sumps ranges between 24° and 32°C (75°F and 90°F), permitting the growth of many pathogens including *Legionella* species.

10.3 Water Droplet Size

These systems can produce droplets of varying size depending on the specific machining operation and have the potential to produce droplets less than 5 micrometers in size.

10.4 Nutrients

These systems are typically open and subject to contamination from the air and surfaces that are being machined.

10.5 Associated Cases of Legionnaires' Disease

Metalworking systems have been implicated in the outbreak of Pontiac fever as well as acute respiratory syndrome and hypersensitivity pneumonitis.[45]

10.6 Recommended Treatment

Exposures from metalworking operations can be a serious potential health concern, the magnitude of which is not fully understood. Biocides are supplied with fluid concentrates, which are diluted when used and/or added to the fluid reservoir. However, the variety of fluids, microbial types, turnover rate, and metal operations makes successful dosing not always predictable. Selections of biocides should be based on fluids and microbes being treated.

It is recommended that care be taken to minimize contamination and to reduce exposure to machine operators until further information is available.

11. MONITORING FOR LEGIONELLA

Culturing for *Legionella* may be appropriate if carried out for a specific purpose, such as verifying the effectiveness of a water treatment protocol, tracing the source of an outbreak, evaluating the potential amplifier/transmission sources at a facility, verifying that the decontamination procedures have been effective, or in health care facilities caring for patients with exceedingly high risk of developing Legionnaires' disease (e.g., organ transplant recipients).[16-48] Where culturing is performed, proper sampling, handling, and shipping methods should be used.[49]

However, except as discussed in 5.6.1.5, routine culturing of samples from building water systems may not be predictive of the risk of transmission for the following reasons.

1. Presence of the organism cannot be directly equated to the risk of infection. The bacterium is frequently present in water systems without being associated with known cases of disease.
2. Interpretation of the results of culturing of water is confounded by use of different bacteriologic methods in various laboratories, by variable culture results among sites sampled within a water system, and by fluctuations in the concentration of *Legionella* isolated from a single site.
3. The risk of illness following exposure to a given source is influenced by a number of factors other than the concentration of organisms in a sample. These factors include, but are not limited to, strain virulence, host susceptibility, and how efficiently the organisms are aerosolized to the small particle size required to reach the deep portion of the human lung and remain viable.
4. Test results only represent the counts at the time the sample was collected. A negative result from such a sample is likely to lead to a false sense of security because any amplifier can quickly become heavily colonized if it suffers neglect.

Testing is not a substitute for sound maintenance practices and water treatment.

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(This informative annex is not a part of this guideline and is for information purposes only.)

ANNEX A

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POLICY STATEMENT DEFINING ASHRAE'S CONCERN FOR THE ENVIRONMENTAL IMPACT OF ITS ACTIVITIES

ASHRAE is concerned with the impact of its members' activities on both the indoor and outdoor environment. ASHRAE's members will strive to minimize any possible deleterious effect on the indoor and outdoor environment of the systems and components in their responsibility while maximizing the beneficial effects these systems provide, consistent with accepted standards and the practical state of the art.

ASHRAE's short-range goal is to ensure that the systems and components within its scope do not impact the indoor and outdoor environment to a greater extent than specified by the standards and guidelines as established by itself and other responsible bodies.

As an ongoing goal, ASHRAE will, through its Standards Committee and extensive technical committee structure, continue to generate up-to-date standards and guidelines where appropriate and adopt, recommend, and promote those new and revised standards developed by other responsible organizations.

Through its Handbook, appropriate chapters will contain up-to-date standards and design considerations as the material is systematically revised.

ASHRAE will take the lead with respect to dissemination of environmental information of its primary interest and will seek out and disseminate information from other responsible organizations that is pertinent, as guides to updating standards and guidelines.

The effects of the design and selection of equipment and systems will be considered within the scope of the system's intended use and expected misuse. The disposal of hazardous materials, if any, will also be considered.

ASHRAE's primary concern for environmental impact will be at the site where equipment within ASHRAE's scope operates. However, energy source selection and the possible environmental impact due to the energy source and energy transportation will be considered where possible. Recommendations concerning energy source selection should be made by its members.

McLaren FLINT	Policy Title: Water Supply Failure (Code W)	
Effective Date: 4/2015 Reviewed: Revised:	Oversight Level: Level 2	Policy No: EC-105
McLaren Flint Business Unit: Engineering Department	Functional Responsibility for the Policy: Director of Engineering	

Objective: McLaren Flint Hospital campus will be able to prepare for, respond to, and recover from a total or partial interruption of McLaren Flint's normal water supply.

Scope: This policy applies to McLaren Flint Hospital, the adjacent outpatient sites and all immediate grounds.

Policy: A water supply failure can be categorized as one of multiple types of system disruptions:

1. Visibly Discolored Water
2. Water Boil Advisory
3. Scheduled Interruption of Water Supply
4. Emergency Loss of Water Supply

Visibly Discolored Water

Visibly discolored water can be defined when the appearance of potable water, specifically, is iron-tinted and or yellow in color. There are two major sources that can cause water to be discolored – flow changes in the municipal distribution system caused by a main leak, valve failure or an open fire hydrant, and/or a flow change to the internal water system of the building. Discolored water is not a health threat even though it is not very appealing to drink. Even very low levels of iron can color the water.

1. Engineering Services shall recommend the affected area run water continuously (or flush) for a minimum of five (5) minutes or until it clears of the discoloration. If water does not clear within five (5) minutes contact Engineering Services via a work order using AIMS, the Computerized Maintenance Management System (CMMS).

2. In the event that the five (5) minute flush is not successful, Engineering Services will investigate the cause of the discoloration, which may include contacting the City of Flint or appropriate municipality to determine if discoloration is externally caused.

3. Based on information gathered from the municipality or knowledge of the source, Engineering Services will determine if a Code W shall be announced.

Boil-Water Advisory

A boil-water advisory or boil-water order is a public health advisory or directive given by government or health authorities to consumers when a community's drinking water is, or could be, contaminated by pathogens.

1. Boil Advisory notification received from the City of Flint, Flint Township, Genesee County Health Department or another governmental agency, such as the EPA.

2. Engineering Services is to establish and maintain direct contact with the governmental agency to determine location/boundaries of the advisory, estimate the duration of the advisory and provide a status report.

3. Engineering Services shall direct a Code W to be announced over head, with duration and details, if known.

4. Communications will immediately begin notification of critical departments by direct phone call and shall document the contact. (see Attachment A)

5. The Incident Commander and /or Nursing Supervisor with Administration shall determine if the HIC (Hospital Incident Command) is needed for communication management purposes. If so a Code Triage alert shall be announced overhead and paged to all HIC.

6. Engineering Services will shut off the water source to ice machines and drinking fountains, following the Engineering Services Ice Machine policy. The remaining ice in the ice machines shall not be used for human consumption. The ice may be utilized within ice packs. Signs shall be posted indicating the inability to use these units.

7. Distribution of potable water and the appropriate dispensing apparatus to departments for drinking purposes and hand-washing shall be conducted by Engineering Services.

8. Departmental-specific procedures including alternate hand washing protocols are instituted.

9. The sanitary sewer system (toilets, urinals and drains) may still be used.

10. All affected departments shall enact departmental-specific water conservation procedures. If deemed necessary, Engineering Services shall enact the "Extreme Conservation Procedures" of the Disaster Internal/External Engineering policy.

Scheduled Interruption of Water Supply

A scheduled interruption of water supply includes a total loss or reduced volume of the municipal water supply. The loss may be internally created or by a municipality. Prior notice will be given to all areas affected.

1. All attempts will be made to provide a minimum of 48 hour notice to the affected areas or buildings.

2. Engineering Services is to establish and maintain direct contact with the governmental agency to determine the area affected and estimate the duration of the interruption and provide status reports as necessary.

3. Administration and Engineering shall determine if the HIC (Hospital Incident Command) is necessary for communication management. If so the HCC will be set up ahead of the scheduled interruption.

4. Distribution of potable water and the appropriate dispensing apparatus to departments for drinking purposes and hand-washing shall be conducted by Engineering Services.

5. Engineering services will contact the bottled water supplier to increase the bottled potable water supply and dispensing apparatus available for drinking use and hand washing prior to the interruption to maintain a minimum of fifty (50) 5-gallon bottles at the hospital during the water interruption.

6. Engineering Services will shut off the water source to ice machines and drinking fountains, following the Engineering Services Ice Machine policy. The remaining ice in the ice machines may be dispensed and used. Signs shall be posted indicating the inability to use these units once the ice has been completely dispensed.

7. All affected departments shall enact departmental-specific water conservation procedures. If deemed necessary, Engineering Services shall enact the "Extreme Conservation Procedures" of the Disaster Internal/External Engineering policy.

8. If water shut down duration is anticipated to be greater than four (4) hours, Engineering Services will contract to provide portable sanitary toilets for staff and visitor use.

9. The sanitary sewer system (toilets, urinals and drains) may not be used.

10. Code W shall be announced overhead with duration and details.

11. Engineering Services shall update a Code W status report every hour to staff via an overhead page.

12. Engineering Services shall contact the State of Michigan Fire Marshal.

13. Engineering Services will institute a fire watch for affected areas.

14. In the event of a prolonged interruption or unforeseen emergency Administration shall initiate a code triage alert.

Emergency Loss of Water Supply

An emergency loss of water supply includes a total loss or reduced municipal water supply, with no prior notice. The loss may be internally created or by a municipality.

1. Engineering Services is to establish and maintain direct contact with the governmental agency to determine the area affected and estimate the duration of the interruption and provide status reports as necessary.

2. Engineering Services shall contact the State of Michigan Fire Marshal.

3. Engineering Services will institute a fire watch for affected areas.

4. All affected departments shall enact the departmental-specific water conservation procedures. If deemed necessary, Engineering Services shall enact the "Extreme Conservation Procedures" of the Disaster Internal/External Engineering policy.

5. Administration and Engineering shall determine if the HIC (Hospital Incident Command) is necessary for communication management. If so a code triage alert will be announced.

6. Code W shall be announced overhead with duration and details.

7. Engineering Services shall update a Code W status report every hour to staff via an overhead page.

8. Communications will immediately begin notification of critical departments by direct phone call and shall document the contact. (see Attachment A)

9. All affected departments shall enact the departmental-specific water conservation procedures. If deemed necessary, Engineering Services shall enact the "Extreme

Condition Conservation" procedures of the Disaster Internal/External Engineering policy.

10. Distribution of potable water and the appropriate dispensing apparatus to departments for drinking purposes and hand-washing shall be conducted by Engineering Services.

11. Engineering services will contact the bottled water supplier to supplement the potable water supply and dispensing apparatus available for drinking use to maintain a minimum of fifty (50) 5-gallon bottles at the hospital.

12. Engineering Services will shut off the water source to ice machines and drinking fountains, following the Engineering Services Ice Machine policy. The remaining ice in the ice machines may be dispensed and used. Signs shall be posted indicating the inability to use these units once the ice has been completely dispensed.

13. If water shut down duration is anticipated to be greater than four (4) hours, Engineering Services will contract to provide portable sanitary toilets for staff and visitor use.

14. The sanitary sewer system (toilets, urinals and drains) may not be used.

Definitions: Boil-water advisory : a public health advisory or directive given by government or health authorities to consumers when a community's drinking water is, or could be, contaminated by pathogens

Code W: a water supply failure/interruption

Emergency loss of water supply: a total loss or reduced municipal water supply, with no prior notice. The loss may be internally created or by a municipality.

Fire Watch: a person or persons assigned to an area for the purpose of protecting the occupants from fire or similar emergencies. (NFPA 101, *Life Safety Code*, §3.3.77, 2000 edition)

Municipal Water: water originating from a ground or surface water source (raw water) which is purified through a treatment process, stored and distributed using a distribution system network of pumping stations and underground piping to the user.

Potable water: water suitable for drinking and hand washing.

Scheduled interruption of water supply: a total loss or reduced municipal water supply. The loss may be internally created or by a municipality. Prior notice will be given to all areas affected.

Visibly discolored water: when the appearance of potable water, specifically, is iron-tinted and or yellow in color. There are two major sources that can cause water to be discolored – flow changes in the municipal distribution system caused by a main leak, valve failure or an open fire hydrant, and/or a flow change to the internal water system of the building. Discolored water is not a health threat even though it is not very appealing to drink. Even very low levels of iron can color the water.

Provisions: The City of Flint provides municipal water and monitors the quality of water provided to McLaren Flint Hospital, Ballenger MRI, Surgery and Endoscopy Center, McLaren Imaging Center, Barbara Ann Karmanos-McLaren Flint Cancer Center and Proton Beam.

Flint Township provides municipal water to Medical Education, Beech Hill Centre, McLaren

Corporate Offices, McLaren Health Plan, and the McLaren Hospitality House.

250 gallons of potable water are stored on site and stock is checked periodically.

Administrative Responsibility:	McLaren Flint Director of Engineering has overall administrative responsibility for this policy.
Exception Provisions:	McLaren Flint Incident Commander, State of Michigan Fire Marshal, McLaren Flint Director of Engineering, Vice President of Ancillary and Support Services and/or Chief Executive Officer may supersede any or all of the above noted directives with expressed written documentation.
References or Appendices:	Extreme Condition Conservation procedures, Disaster Internal/External policy Departmental Contact Numbers - Attachment A

APPROVAL:

Donald Kooy
President and CEO

McLaren FLINT	Policy Title: Water Management Including Legionella Prevention	
Effective Date: 2/01 Review Dates: 12/16 Revised: 12/04, 4/07, 11/10, 5/14, 12/14	Oversight Level: Level 2	Policy No: EG-101
McLaren Flint Business Unit: Engineering	Functional Responsibility for the Policy: Engineering Department	

Objective: To ensure safe water management for McLaren Flint

Scope: All departments, units, clinics and facilities under the direction of McLaren Flint

Definitions: McLaren Flint shall provide a potable water supply for drinking, food preparation, hand washing, and personal hygiene for patients, visitors, and employees.

Provisions:

A. When potable (drinking) water is not available, a potable supply will be furnished. Engineering shall establish sources for potable water per policy and arrange for supplies in times of water interruption (See Engineering Procedure Manual).

B. If there is a break in the water system to the facility, the municipal water supplier is responsible for testing the water. As a precaution, a copy of the city's report shall be obtained and reviewed by engineering to confirm results.

C. If there is a potential internal or external contamination of the water system within the facility and the need for testing is evident, water samples shall be collected by a third-party consultant and sent to a licensed laboratory for analysis.

D. All construction areas with new plumbing fixtures shall have water samples collected by a third-party consultant and sent to a licensed laboratory for analysis prior to use.

E. If a disruption of service is planned or occurs spontaneously, Engineering shall notify Infection Control and the managers of the affected area, establish a potable water source, and conduct water testing if required. The Infection Preventionist, along with area managers, shall notify and educate staff, patients, and visitors as to the source and use of the temporary potable water supply.

F. Only potable water can be used for drinking, food preparation, handwashing, and personal hygiene. In the event of a water shortage or disruption in service, an alcohol-based hand rinse may be used temporarily until access to a potable water source has been established. Alcohol-based hand rinses shall not replace hand washing on a permanent basis.

G. Anti-siphon valves shall be installed on faucets used for dialysis to prevent backflow and contamination during use.

H. Incoming potable water contains chlorine for continued disinfecting. McLaren Flint may inject additional chlorine to reduce or remove microbe colonization within the water system. Chlorine levels are checked twice per week to assure levels are adequate for prevention of Legionella growth (1-2 mg/L while remaining within standards of the Environmental Protection Agency.) These records are maintained by Engineering Services and are made available to the Infection Control Coordinator upon request.

I. Environmental Services shall flush all showers and faucets of all plumbing fixtures at the time of routine cleaning. Faucets shall be wiped with a disinfectant during the daily cleaning. Aerators containing sediment that has compromised the output and cannot be properly cleaned shall be reported to Engineering for service.

J. Cooling tower water management shall be treated for microbial growth using approved chemical disinfectants. Treatment schedules shall be dictated by the type of disinfectant and recommended concentration. Cooling tower maintenance and treatment records shall be maintained by Engineering. Testing, treatment, and documentation shall be maintained by Engineering.

K. Water system shall be flushed with chlorine or monochloramine on at a minimum of twice a year basis. During system flushing bottled water and coolers of ice shall be made available to floors for patient and staff use. (See the Engineering Procedure Manual for a detailed reference to the hyperchlorination process.)

L. Water management issues shall be reported to the Environment of Care Committee quarterly. In case of abnormal events or trends, the Infection Control Coordinator shall be consulted for recommendation.

Administrative Responsibility: Infection Control, Engineering Services

References: Association for Professionals in Infection Control and Epidemiology, Inc. APIC Text of Infection Control and Epidemiology: Principles and Practice; 2014, Chapter 84

Engineering Procedure Manual

APPROVAL:

Donald Kooy
President and CEO

Sophia

PHAP →

Ledane / Michael - DEQ

Genesee Water:
MDCH - EH
EPA
CDC - Drinking Water

DHS
WIC

Steve

Sarah Cardria scarderinal@health.ny.gov
$ 646 632 6188

Jessa -
Craig Vickstrom
Physician - Partners in Health
3/27 - 4/12
ETU until 4/11
PPE, No Breaches Asymptomatic, Afebrile
10:00 PM Hancock, Lansing MI L'Anse MI
UA 5351
Some Risk, Sierra

4/14/15
MDCH/DEQ

McLaren -

Chlorine	These all look good
Turbidity	
Coliform	
Plate Counts	

Total Organic Carbon is slightly higher after the switch.

Look at steps taken by McLaren
- Specific remediation
- MDCH/DEQ
- Risk assessment and control program.

F, K, S, C, J,

Mike - 99 Hospitals
Susan - ELC 5/12, GCHD Legionella,
NM - VRSA, Hep C at Ingham
BB - Speaking at APIC - GL, Outreach to regionals, Norovirus
TB - Taking over Ebola Weekly Report
TH - Birthday 5/4, Karen shower Friday
GM - None
JH - Packaging recert. training, Norovirus Recall
KA - NSSP
JF - Allison NHSN, Katrina Ebola Assessment,
SB - Flu BT, SW/SE, Outbreak.net/Patient, Suspect MERS, One today low-risk
SJ - CD Conf. 5/19, Register !!!
SE - HPAI is all around us. Commercial Turkey Flocks, **AP H5N2**
Laura, Steven, Michael

[redacted]

Introductions

60-100 Samples per year for lead and copper → have out tap to and average the out must be < 15 ppb.

Push a high level of phosphates even after the switch

IEUBK Model 5 mg/dl in blood no more than 5% of children above that level (target population).

2 high risk zip codes.

Closed PODs - incarcerated, large businesses, SAM,

LARA 11/2/15

Systems - Hospitals
Nursing licenses/CME RNs - CME
Smaller - CHA

Offices w/o RN may still have CHA certificates

Regional CME lodging meeting LTC, Hosp, Hospice, SA

Emergency Preparedness regulations: 17 provider types.

Alternative rules discussion:

Looking every 3 years. Can get a waiver if another entity has been out.

- Pull out the IC rule set for review/update.

3K docs/year for 3 years 200K
11K / year ?

SPBN - Hospital Call Travel Screening Reply back
Advisory group part of discussion.

Check PHEP Ebola supplemental for exercise objectives.

Give Next Week CASPER

Written Statement

2 summaries - elevated legionella in Genesee Co
Follow-up investigation using a legionnaires-specific questionnaire was attempted w/ all reported cases

Cassandra Davis, Roseanne, Nikita Womack, Steve Galloway,

Wine 7th Floor

MFT - MFT - MFT

23464
22310

Communicating changes: Helpdesk, Liaison (Cassandra, Roseanne)
903
Columns to complete @ earlier type regarding status
Primary flag? Model?

RICE Field Net presentation. ETC.
Tilden test plan presentation at MARRO

Day - 5

1 source identified

Doccen My

Sen sp. e/s

single facility de

alter

Nurs evidence me's to test.

Trust

Monitor

A. Ucan

N O W

c 3

coffee related g/es in Mss

HBTV
Body Art Section

Smith
Jason
59769

Mark Johnson

Jonathan Yoder

Nursing homes

Other systems

Not a system-wide solution to these.

[illegible]

[illegible]

Michelle Peterson.

13206 Farm Ln
Dewitt, MI 48820

Conf. Call

Doug Kittle
Mark Johnson
Laurel

Julie
John Treski NCEH
Jason Kunke

Access to individuals and information

Connecting people w/ knowledge
"I appreciate that clarifying

What might they expect w/ the switchovers.
Water Dist and cases – link – hard or impossible to do.
(eg, myco, pseudo, acanthamoeba, viru

Darren - Water Main Breaks (plotted)
Chlorine data - levels since 2012 relative to hospitals, etc

"incidental reports and general geographic info" Anecdotal. (SC)

Boil water advisories.

Marc Rogers - Mycobacterium. Resist disinfection.

SC - MC testing. McLaren - no permission. Not shared.
Hurley - A number of samples.
10/2015 - 62 1L samples
29 locations 97% Legionella
93% Legionella pneumophila

McLaren - Russell Hardin

CASPER review.

Red Sky

Press Release
HAN → Updated.
- CDC link to preventing HA pneumonias.

5 year Legionella Gen, Mac, Wayne, Detroit
Statewide
National Increase in Legionella.

Capacitance

EH

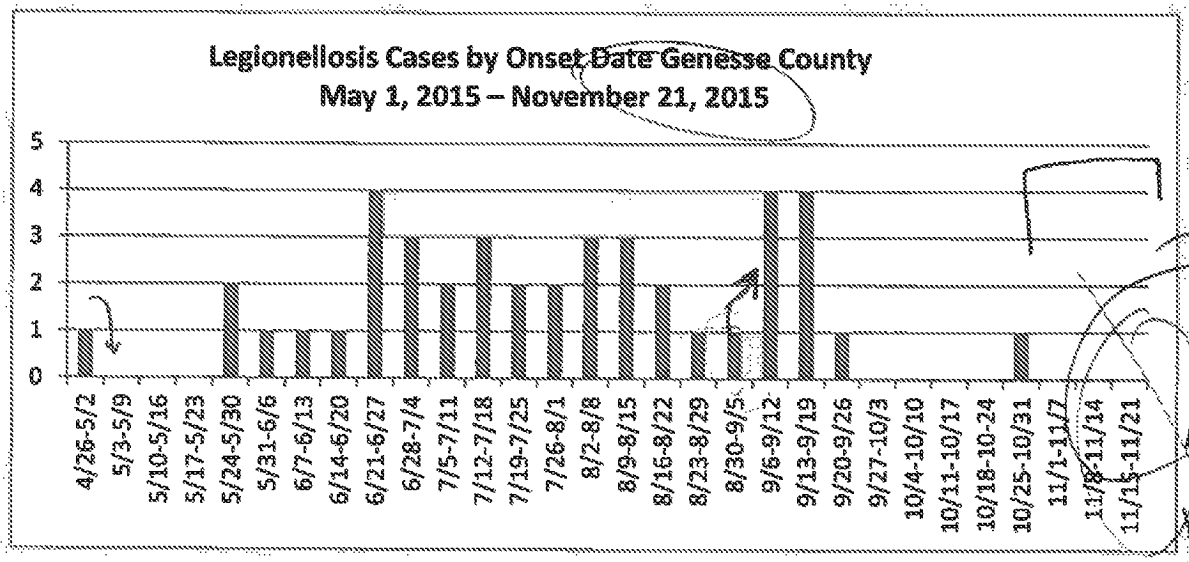
12/4/2015 Provisional data

Update on Genesee County Legionellosis cases —~~May-Nov, 2015~~

Current Case Count

- 42 cases reported since 5/1/2015 (41 Legionnaires disease, 1 Pontiac Fever)
- 38/42 (90%) interviewed with supplemental questionnaire
- Illness onset dates: 5/4/15-10/29/15

2015 calendar by month?



Any cases that are still being investigated?

- 22 (52%) male; median age 67 years (range 35–89 years)
- 42 patients were hospitalized; 2 deaths ← Cause of death?

Case Counts by Hospital

Hospital admissions

Hospital	Number of cases diagnosed	Previously admitted?*		Case Residence on City of Flint Water**
		To any hospital	To case hospital	
A	5	0	0	3
B	26	19+	18	6
C	8	0	0	0
Out of county	2	1++	0	1
Total	41	20	18	10

*Hospitalization within the two weeks prior to Legionellosis illness onset

**Based on Legionella Questionnaire answers and patients address

+One case DX'd at Hospital B spent significant time at Hospital A during the 2 weeks prior, but was not admitted

++ This case was previously admitted to Hospital B

Suzanne

Hospital B timeline

Talking Points / Timeline

12/4/2015 Provisional data

Lab Results

- 42 (100%) were Legionella Urinary Antigen positive
- To date, 11 respiratory specimens have been received at the MDHHS Bureau of Labs for culture/typing
  - 8 were culture confirmed; all *L. pneumophila* Serogroup 1
    - 3 specimens unsuitable for PFGE: 2 no growth, 1 specimen overgrown with mold
    - 8 specimens were able to have PFGE performed

-6/8 specimens had unique patterns:

Onset date	Hospitalization within 2 weeks prior to onset?	Residence on City of Flint water?
7/7/15	No	No
7/16/15	No	No
7/23/15	No	No
8/28/15	No	No
9/1/15	No	Yes
9/10/15	No	No

-2/8 specimens had matching patterns:

Onset date	Hospitalizations within 2 weeks prior to onset?	Residence on City of Flint water?
5/27/15	Yes- Hospital B	No
8/15/15	No	No

Exposure History

- Cases with hospitalization during the 2 weeks prior to onset: 21*/42 (50%)
  - 20/21 (95%) were hospitalized at Hospital B in the 2 weeks prior to their onset
    - The last case with a hospitalization exposure to Hospital B during the 2 weeks prior to onset occurred the beginning of September; last date of hospitalization: 9/1/15, onset: ~9/10/15
  - *1/21 (5%) was not hospitalized, but spent significant time at Hospital A during the 2 weeks prior to onset
- 21/42 (50%) cases have no prior hospitalization reported during the 2 weeks prior to onset
- 32/42 (76%) case residences NOT on the City of Flint water system
- 10/42 (23%) case residences on the City of Flint water system
  - 6/10 (60%) cases with residence on the City of Flint water system also had a hospitalization at Hospital B during the 2 weeks prior to onset

NoRS – is it complete?
Get it finalized and submit.

MDHHS Preliminary Data on Genesee County Legionellosis Investigation (April 29, 2015)
Epi Info Analysis of Questionnaire Data

30 cases of 46 have been interviewed so far (65% interviewed). Of these interviews, 29 are complete and 1 interview was refused half way through (97% completed, 63% of all cases).

(exposure period)

3.) Where did you get your tap (drinking and other household use) water from __/__/__ to __/__/__?

Water Source	Number	%
City of Flint Water	13	43
City of Flint Township Water	3	10
Other municipal water system	4	13
Private well	7	23
Unknown	3	10
TOTAL	30	100

4.) During the last year, has the water pressure at your residence changed?

Variable	Yes	%	No	%	Unk	%	Total Number
City of Flint Water	2	67	8	36	3	60	13
City of Flint Township Water	0	0	2	9	1	20	3
Other municipal water system	0	0	3	14	1	20	4
Private well	1	33	6	27	0	0	7
Unknown	0	0	3	14	0	0	3
TOTAL	3	100	22	100	5	100	30

5.) During the last year, has the water quality (appearance, taste, smell) at your residence changed?

Variable	Yes	%	No	%	Unk	%	TOTAL
City of Flint Water	10	100	2	11	1	100	13
City of Flint Township Water	0	0	3	16	0	0	3
Other municipal water system	0	0	4	21	0	0	4
Private well	0	0	7	37	0	0	7
Unknown	0	0	3	16	0	0	3
TOTAL	10	100	19	100	1	100	30

6.) Prior to your illness, did you make any recent plumbing changes or repairs at your residence?

Variable	Yes	%	No	%	Unk	%	TOTAL
City of Flint Water	1	33	11	44	1	50	13
City of Flint Township Water	0	0	3	12	0	0	3
Other municipal water system	2	67	1	4	1	50	4
Private well	0	0	7	28	0	0	7
Unknown	0	0	3	12	0	0	3
TOTAL	3	100	25	100	2	100	30

7.) Prior to your illness, were there any water main breaks or other water line issues that affected the water at your residence, including boil water advisories?

Variable	Yes	%	No	%	Unk	%	TOTAL
City of Flint Water	6	100	5	23	2	100	13
City of Flint Township Water	0	0	3	14	0	0	3
Other municipal water system	0	0	4	18	0	0	4
Private well –N/A	0	0	7	32	0	0	7
Unknown	0	0	3	14	0	0	3
TOTAL	6	100	22	100	2	100	30

8.) During this 2 week period (exposure period), did you work or volunteer, either full or part time?

Variable	Yes	%	No	%	Not Sure	%	Total
Work or volunteer	6	21	23	79	0	0	29

10.) Visit, reside, or work in a long term care facility, nursing home, assisted living facility, or senior living facility?

Variable	Yes	%	No	%	Unk	%	TOTAL
Resident	0	0	29	100	0	0	29
Visitor	2	7	27	93	0	0	29
Employee	0	0	29	100	0	0	29

11.) In the 2 weeks before you before you got sick, did you spend any nights away from home (excluding healthcare settings)?

Variable	Yes	%	No	%	Unk	%	TOTAL
Travel Exposure	2	7	27	93	0	0	29

2 different places. 1 in GC. One at a diffent MI location.

12.) In the 2 weeks before you before you got sick (__/__/__ to __/__/__), did you visit any of the following community venues?

Variable	Yes	%	No	%	Unk	%	Total
Hotel (no stay)	0	0	28	97	1	3	29
Auditorium	1	3	28	97	0	0	29
Barbershop or Hair salon	7	23	22	73	1	3	30
Car Wash	5	17	24	80	1	3	30
Casino	3	10	26	87	1	3	30
Place of worship*	8	28	21	72	0	0	29
Gym or Work out facility	1	3	27	93	0	0	29
Grocery Store	20†	69	7	24	2	7	29
Aldi's**	3						
Kroger**	8						
Meijer** (Some of these are closer)	9						
Walmart**	4						
Other stores	5						
Home improvement store	7	24	17	59	3	10	29
Spa or nail salon	0	0	27	93	0	0	29
Mall or Department store	2	7	24	83	1	3	29
Movie Theater	0	0	28	97	0	0	29
Other (specify) (No overlap)	4	14	17	59	0	0	29

*Only 2 reported the same church

**Need to check addresses, not all the same location

†Do not sum to 20 because people visited multiple locations

13.) In the 2 weeks before you got sick, did you have exposure to any of the following water sources, either *at home* or while *away from home*?

Variable	Yes	%	No	%	Unk	%	Total
At Home							
Shower	27	93	2	7	0	0	29
By water source:							
City of Flint	10(37%)						
City of Flint Township	3 (11%)						
Other Municipal water system	4 (15%)						
Private	7 (26%)						
Unknown	3 (11%)						
Use a detachable shower head or hose	8	28	21	72	0	0	29
By water source:							
City of Flint	3 (38%)						
City of Flint Township	0 (0%)						
Other Municipal water system	1 (13%)						
Private	3 (38%)						
Unknown	1 (13%)						
Hot tub, whirlpool spa, Jacuzzi tub	2	7	27	93	0	0	29
Sat NEAR a working hot tub or whirlpool spa	0	0	29	100	0	0	29
Steam room or wet sauna	0	0	29	100	0	0	29
Humidifier	6	21	22	76	1	3	29
By water source:							
City of Flint	2 (33%)						
City of Flint Township	0 (0%)						
Other Municipal water system water	1 (17%)						
Private	3 (50%)						
Unknown	0 (0%)						
Respiratory therapy machine	6	21	23	79	0	0	29
CPAP (bottled water)	1 (17%)						
Nebulizer (I used tap water)	5 (83%)						
Away from home							
Shower at gym, work, other location	3	10	26	89	0	0	29
Use a detachable shower head or hose	1	3	28	97	0	0	29
Hot tub, whirlpool spa, Jacuzzi tub	0	0	29	100	0	0	29
Sat NEAR a working hot tub or whirlpool spa	0	0	29	100	0	0	29
Humidifier (whole house or portable)	1	4	27	96	0	0	28
Pool/splash pad/waterpark (3 different locations)	3	11	25	89	0	0	28
Recreational or cooling misters	0	0	29	100	0	0	29
Steam room or wet sauna	0	0	29	100	0	0	29
Decorative fountain	1	3	27	93	1	3	29
Outdoor watering hose or sprinkler	5	17	23	79	1	3	29
Beach, lake, pond, river, creek, etc.	2	7	27	93	0	0	29

Number of comorbid conditions by healthcare exposure (ANY)

Comorbidities are self-report from interviews, hospital exposure from medical records

	Healthcare Exposure (N=17)								No known healthcare exposure (N=12)		TOTAL	
	Hurley		McLaren		McLaren & Hurley		Total					
	n	%	n	%	n	%	n	%	n	%	n	%
≥1 comorbidity	1	5.88	14	82.35	1	5.88	16	94.12	9	75.00	25	86.21
0 comorbid conditions	0	0.00	1	5.88	0	0.00	1	5.88	3	25.00	4	13.79
1 comorbid conditions	1	5.88	6	35.29	0	0.00	7	41.18	3	25.00	10	34.48
2 comorbid conditions	0	0.00	2	11.76	0	0.00	2	11.76	1	8.33	3	10.34
3 comorbid conditions	0	0.00	1	5.88	0	0.00	1	5.88	3	25.00	4	13.79
4 comorbid conditions	0	0.00	4	23.53	1	5.88	5	29.41	1	8.33	6	20.69
5 comorbid conditions	0	0.00	1	5.88	0	0.00	1	5.88	0	0.00	1	3.45
6 comorbid conditions	0	0.00	0	0.00	0	0.00	0	0.00	1	8.33	1	3.45

Community Exposures by healthcare exposure (ANY)

	Healthcare Exposure (N=17)								No known healthcare exposure (N=12)		TOTAL	
	Hurley		McLaren		McLaren & Hurley		Total					
	n	%	n	%	n	%	n	%	n	%	n	%
Auditorium	0	0.00	1	5.88	0	0.00	0	0.00	0	0.00	1	3.45
Barbershop	1	5.88	2	11.76	1	5.88	4	23.53	3	25.00	7	24.14
Car Wash	1	5.88	0	0.00	1	5.88	2	11.76	3	25.00	5	17.24
Casino	1	5.88	0	0.00	0	0.00	1	5.88	2	16.67	3	10.34
Church	0	0.00	4	23.53	1	5.88	5	29.41	3	25.00	8	27.59
Gym	1	5.88	0	0.00	0	0.00	1	5.88	0	0.00	1	3.45
Grocery	1	5.88	9	52.94	1	5.88	11	64.71	9	75.00	20	68.97
Home Improvement Store	0	0.00	3	17.65	0	0.00	3	17.65	4	33.33	7	24.14
Spa/Nail Salon	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Mall	0	0.00	0	0.00	1	5.88	1	5.88	1	8.33	2	6.90
Movie Theater	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00

Genesee Legionnaires' Disease Outbreak Investigation
Interview Data Analysis Plan

1. Cleaning
    - ✓ Check address and City of Flint Water (COFW) status
        i. Check the one non-COFW to COFW water (purple tabs on Water map)
    - ✓ Check hospitalization during exposure period?
    - ✓ Create variables: Inpatient YN, Outpatient YN, Visited YN and check if the hospital exposure occurred during the exposure period , Any HealthCare Exp YN
2. Add comorbidity and symptom data from MR/MDSS to EpiInfo
- ✓ Stratify by healthcare, COFW
- ✓ Basic analysis of interview data
- ✓ Stratify Q4-7 by Tap Water Source
3. Community Exposures Analysis
    - ✓ Stratify Community exposures by COFW Y/N
    - ✓ Stratify Community exposures by hospital visit status Y/N
    - ✓ Map Community Exposures of 9 non-hospital/non-CoFW exposure with interviews
4. M- Healthcare exposure analysis
    - ✓ Stratify by LoS
    - ✓ Stratify by CoF water
    - ✓ Stratify by smoking status
5. L- Comorbidity analysis
    - ✓ General
    - ✓ Of hospitalized patients
    a. Unknown exposures
6. 12 non-healthcare, non-flint
    - ✓ Check resident address
    - ✓ Mapping (see 2c)

Based on Medical Records:

45 Cases

→ 25 people had some exposure to a hospital (inpatient, outpatient, or visitor)

1. 18 hospitalized (inpatient) within exposure period (XX did not)
    a. 16 McLaren: 8 on CoFW, 8 not on CoFW
    b. 2 Hurley: 1 on CoFW, 1 not on CoFW
2. 5* outpatient visits within exposure period (41 did not, 0 unknown)
    a. 5 McLaren: 3 on COFW, 2 not on COFW
    b. One also had an inpatient visit to McLaren (NOT on COFW)
3. 4* visited someone in the hospital (17 did not, 23 were unknown)
    a. 1 visited McLaren and Hurley (NOT on COFW)
    b. 2 McLaren (1 on COFW, also had inpatient at McLaren, 1 not COFW)
    c. 1 Hurley (on COFW)

→20 people with no exposure to hospital based on Medical Records

4. 8 on COFW
5. 12 not on COFW

→ 12 people not on CoFW with no hospital exposure

6. 9 interviewed
7. 3 lost to follow-up

Based on

Report 8: Epi-Curve Graph

Time Period: 01/01/2010 - 04/14/2015

Time Breakdown: by Month

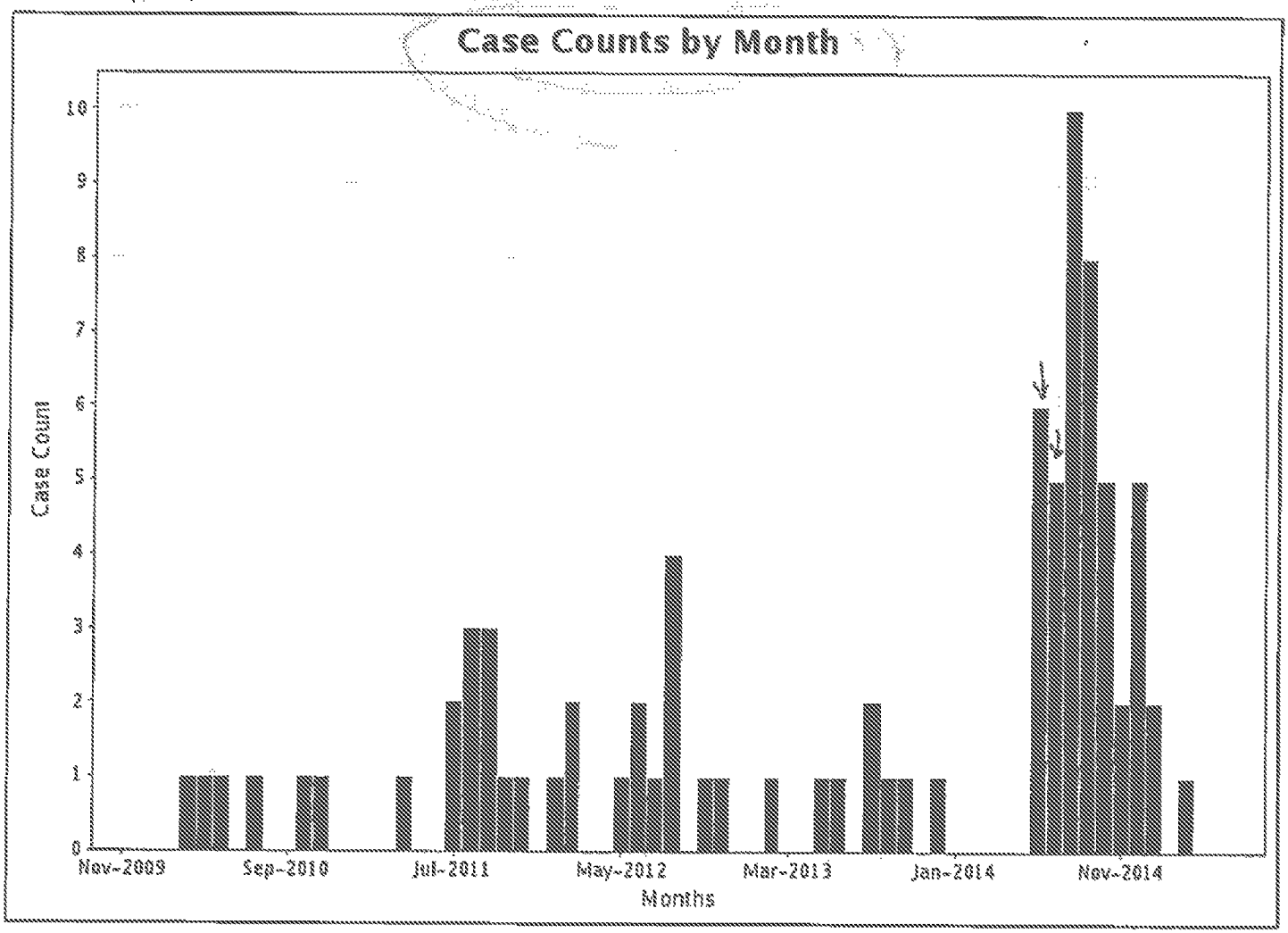
Reportable Condition: Legionellosis

Case Status: Confirmed, Probable, Suspect, Unknown

Investigation Status: Active, Completed, Completed - Follow Up, New, Review

Jurisdictions:
Genesee County

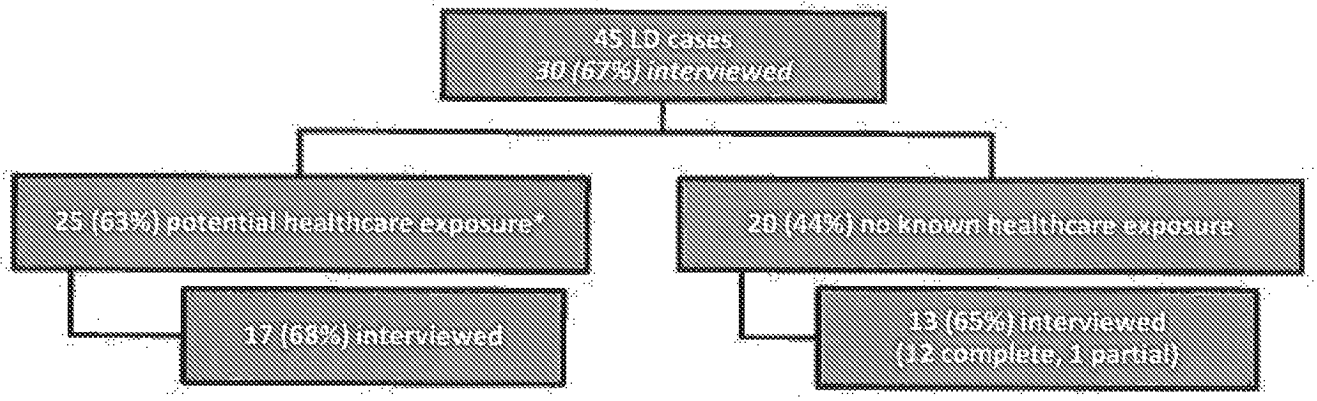
Case Types: Individual and Aggregate

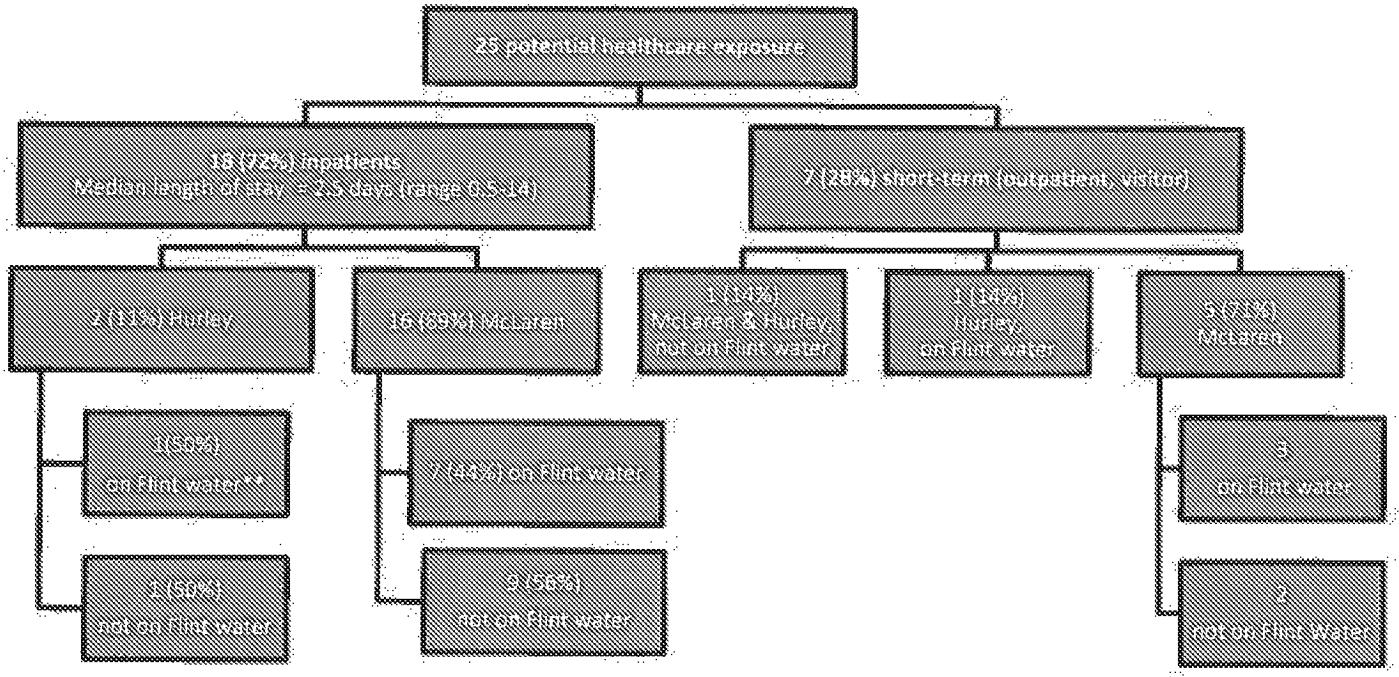


Month	Total
MAR 2010	1
APR 2010	1
MAY 2010	1
JUL 2010	1
OCT 2010	1
NOV 2010	1
APR 2011	2
JUL 2011	2
AUG 2011	3
SEP 2011	3
OCT 2011	1
NOV 2011	1
JAN 2012	1
FEB 2012	2
MAY 2012	1
JUN 2012	2
JUL 2012	1
AUG 2012	4
OCT 2012	1
NOV 2012	1

Month	Total
FEB 2013	1
MAY 2013	2
JUN 2013	1
AUG 2013	2
SEP 2013	1
OCT 2013	1
DEC 2013	1
JUN 2014	6
JUL 2014	5
AUG 2014	10
SEP 2014	8
OCT 2014	5
NOV 2014	2
DEC 2014	5
JAN 2015	2
MAR 2015	1

Legionellosis Cases by Healthcare Exposure (as of May 15, 2015)





* Healthcare exposure = Inpatient, outpatient or visitor to McLaren or Hurley health systems during 14 days prior to symptom onset date (exposure period)

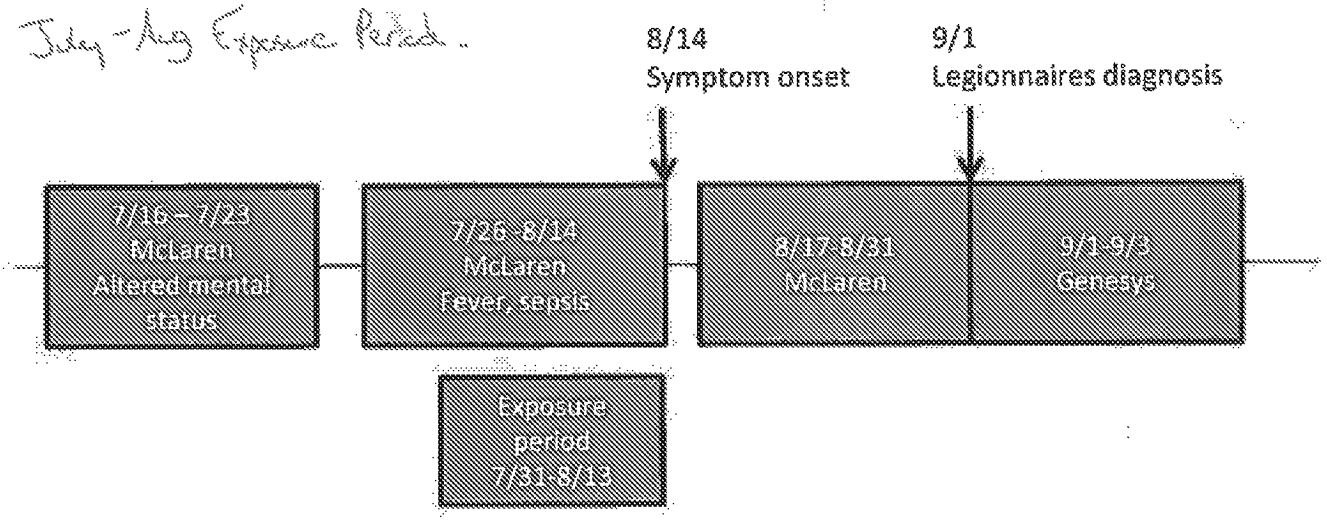
** On Flint water = patient's residential water (during exposure period) supplied by City of Flint

Type of Healthcare Exposure

	# cases	McLaren			Hurley			Live on Flint water	Epi Info Record #
		IN	OUT	VISIT	IN	OUT	VISIT		
McLaren (n=10)	7	Y	N	N	N	N	N	N	2, 5, 6, 12, 19, 25, 29
	1	Y	Y	N	N	N	N	N	17
	1	N	Y	N	N	N	N	N	14
	1	N	N	Y	N	N	N	N	33
McLaren & Flint H_2O (n=11)	7	Y	N	N	N	N	N	Y	4, 9, 23, 27, 30, 35, 44
	3	N	Y	N	N	N	N	Y	13, 39, 45
	1	Y	N	Y	N	N	N	Y	37
Hurley (n=1)	1	N	N	N	Y	N	N	N	26
Hurley & Flint H_2O (n=2)	1	N	N	N	Y	N	N	Y	40
	1	N	N	N	N	N	Y	Y	11
McLaren & Hurley (n=1)	1	N	N	Y	N	N	Y	N	7
total	*25*	*16*	*5*	*3*	*2*	*0*	*2*	*13*	

1 patient (EpiInfo Record #6) spent entire exposure period in McLaren

July - Aug Exposure Period.

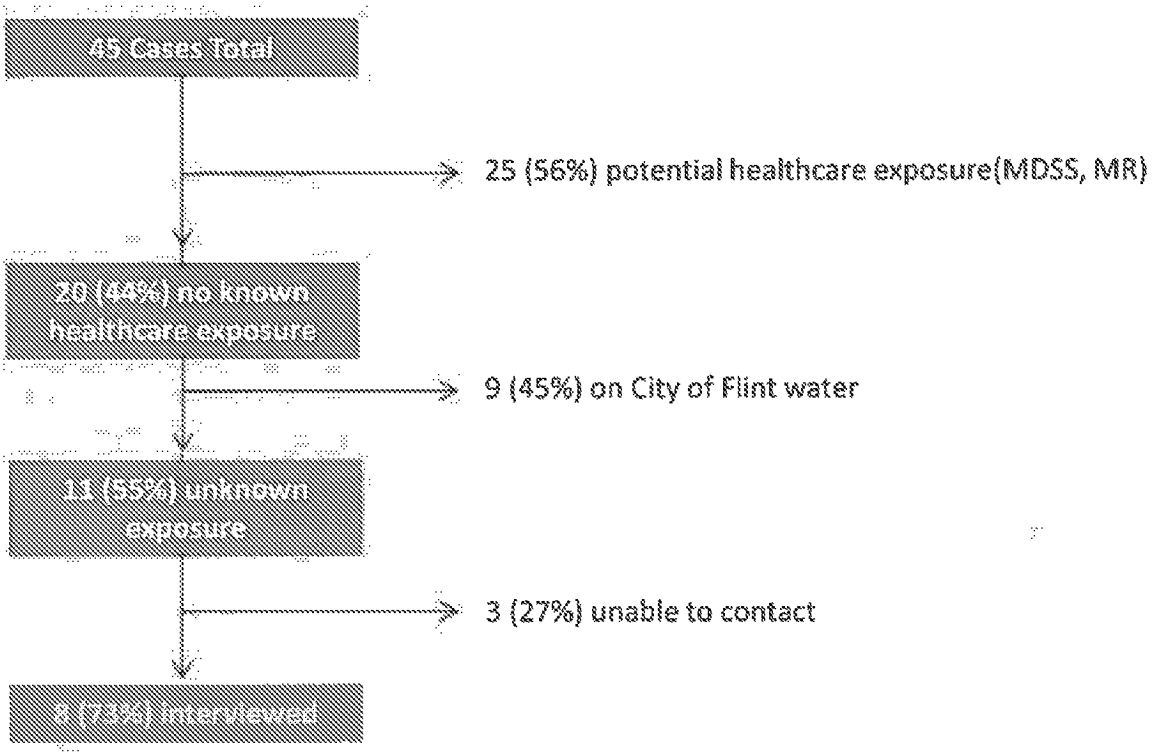


Patient reported comorbidities and health behaviors by healthcare exposure

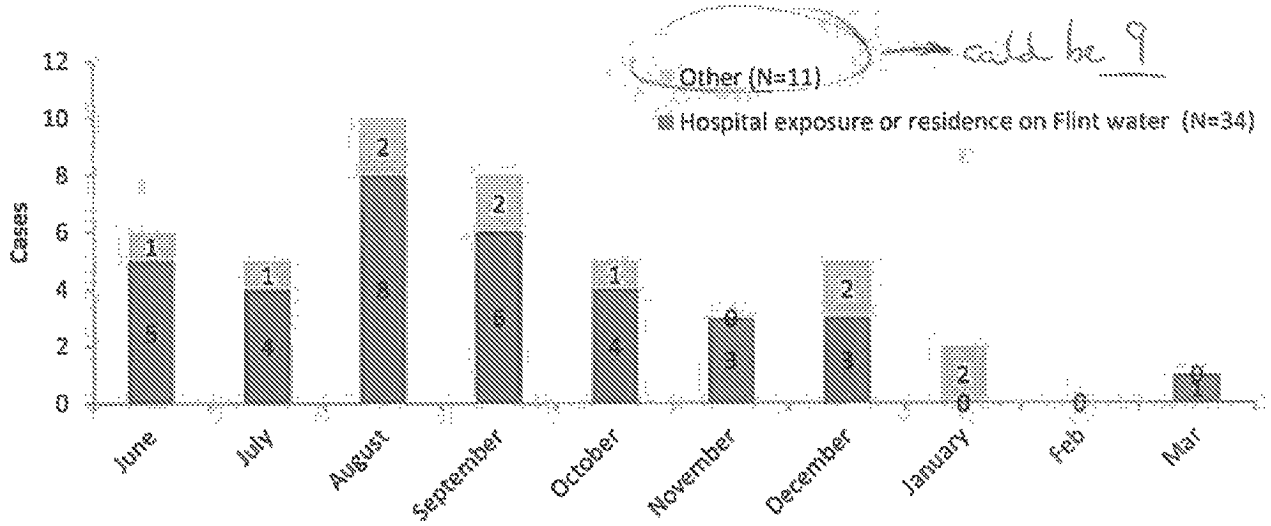
	Total		Healthcare exposure (N=17)		No known healthcare exposure (N=12)	
	n	%	n	%	n	%
≥1 comorbidity	25	86.2	16	94.1	9	75.0
Chronic kidney disease	11	37.9	7	41.2	4	33.3
Immunocompromised	9	33.3	4	26.7	5	41.7
Diabetes	11	39.3	8	47.1	3	27.3
Chronic lung disease	12	41.4	8	47.1	4	33.3
Asthma, chronic bronchitis	7	24.1	4	23.5	3	25.0
Heart disease	12	41.4	8	47.1	4	33.3
Liver disease	0	0.0	0	0.0	0	0.0

	Total		Healthcare exposure (N=17)		No known healthcare exposure (N=12)	
	N	%	N	%	N	%
Former or current smoker	24	82.8	14	82.4	10	83.3
Current smoker	11	37.9	7	41.2	4	33.3
Median packs per day (range)			1 (0.15-2)		1 (0.14-2)	
Median years (range)			35 (20-45)		30 (15-35)	
Former smoker	14	53.8	7	50.0	7	58.3
Median packs per day (range)			1 (0.5-1.5)		1 (0.2-3.5)	
Median years (range)			35 (20-45)		30 (15-35)	
Drinks alcohol	9	31.0	6	35.3	3	25.0
Median drinks per day (range)			1.1 (0.1-2)		1 (0.2-2)	
Median years (range)			45 (1-57)		no data	

Legionellosis Cases with Unknown Exposures (as of May 15, 2015)



Legionnaires' Disease Cases by Estimated Symptom Onset—Genesee County, June 2014–March 2015 (N=45)



Cases with no known hospital exposure and not on City of Flint water

EpiInfo Number	City of Flint Exposure	Exposure
3	No	Industrial Painter
10	No	Probably drove through Flint(?)
15	Yes (?)	Aldi
16	Yes	HR Technician, Hurley
18	Yes	Kroger & Aldi
20	No	Had Mclaren visit prior to exposure period
22	No	
32	Yes	Motel 6; Not interviewed
36	?	Not interviewed
38	?	Not interviewed
44	Yes	Visit wife at Hurley and McLaren

Barbershop visit during exposure period?	
Yes	7
Not on Flint Water	
1209 E Wackerly St, Midland MI 48642	1
12163 N State Rd., Ottisville, MI 48463	1
Atherton Rd Burton MI	1
Pasadena St, Flint MI	1
On Flint water	
3122 Clio Road, Flint MI 48504	1
"Beauty School" Flint	1
Pierson Road	1
No	22
Not on Flint Water	12
On Flint water	10
Unknown	1
Missing	16

Place of Worship visit during exposure period?	
Yes	8
Not on Flint Water	
First Baptist	1
804 W Main St, Durand MI 48429	
First United Church	1
1116 W Hill Rd, Flint MI 48507	
Kingdom of Heaven Ministries	1
2430 Dutcher Rd, Flint, MI	
Shown Baptist Church	1
2493 N Genesee Rd. Burton, MI 48509	
On Flint water	
St John Vianney Catholic Church	2
2415 Bagley St Flint MI 48504 (corner of N Chevrolet Ave)	
Unsure	2
No	21
Not on Flint Water	12
On Flint water	9
Unknown	0
Missing	17

Carwash visit during exposure period?	
Yes	5
Not on Flint Water	
Center Rd and Atherton Rd, Burton MI	1
Clio, MI?	1
Pierson Rd, Flushing MI	1
On Flint water	
112 W 5th Ave Flint, MI 48503	1
Flint, MI ?	1
No	24
Not on Flint Water	13
On Flint water	11
Unknown	1
Missing	16

'Yes' to Home Improvement Store exposure:	
Not on Flint Water	Interview Total=3
Home Depot	
4245 E Court St. Burton, MI	1
Menards	
11357 Linden Rd, Clio MI	1
7410 E Court Davison MI 48423	1
On Flint Water	Interview Total= 4
Home Depot	
4380 W Corunna Rd, Flint, MI 48532	1
5300 Pierson Road Flushing, MI 48433	1
4245 E Court St. Burton, MI	2
Lowes	
2100 T A Mansour Blvd Flint, MI 48532	1
4274 Court St. Burton	1

'Yes' to grocery store exposure:

Not on Flint Water	Interview Total=12
Kroger	
7188 N Saginaw Rd, Mount Morris, MI 48458	2
700 N State Rd Davison MI 48423	1
3838 Richfield Rd Flint, MI 48506	1
Meijer	
2333 Center Rd. Flint MI 48519	4
9515 Birch Run Rd, Birch Run MI	1
2591 E M21, Corunna MI 48817	1
4141 Morrish Road, Swartz Creek MI 48473	1
Aldi	
Center St. Burton	2
5340 W Pierson Rd, Flushing, MI 48433	1
Corunna Rd Flint MI	1
WalMart	
11493 N Linden Rd, Clio, MI, 48420	2
5323 E Court St N Burton, MI 48509	1
Other (Not in Flint)	4

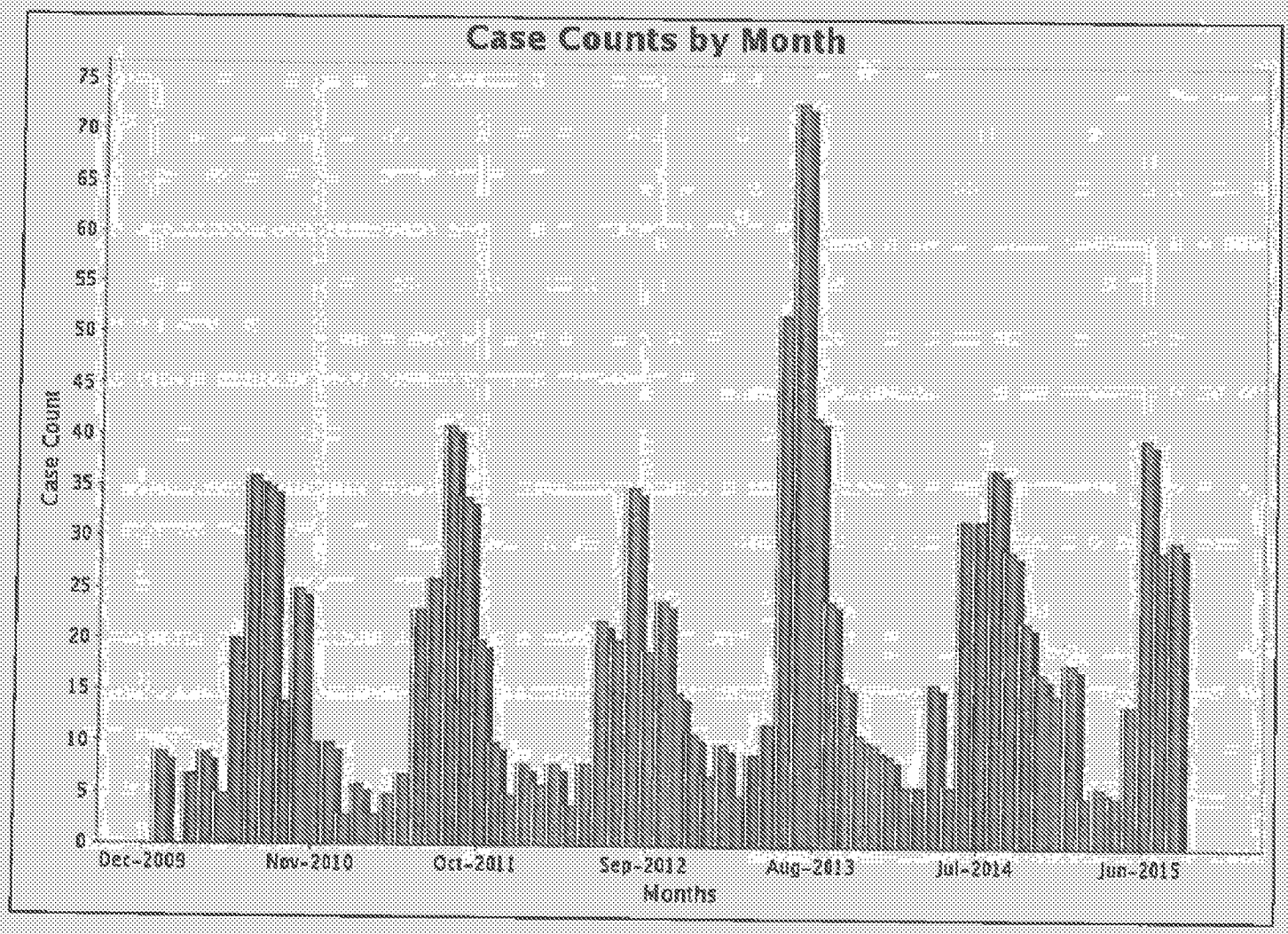
On Flint Water	Interview Total= 8
Kroger	
5249 Corunna Rd, Flint, MI 48532	2
1542 E Pierson Rd, Flushing	1
1916 Davison Rd, Flint	2
Meijer	
2333 Center Rd. Flint MI 48519	1
4333 W Pierson Rd	3
WalMart	
4313 Corunna Rd, Flint	1
Save-a-Lot	
1918 N Dort Hwy Flint, MI 48506	1

Report 8: Epi-Curve Graph

Time Period: 01/01/2010 - 09/11/2015
Time Breakdown: by Month
Reportable Condition: Legionellosis
Case Status: Confirmed
Investigation Status: Completed

Geographic Area:
The State of Michigan

Case Types: Individual and Aggregate



Month	Total
JAN 2010	9
MAR 2010	7
APR 2010	9
MAY 2010	8
JUN 2010	20
JUL 2010	36
AUG 2010	35
SEP 2010	14
OCT 2010	25
NOV 2010	10
DEC 2010	10
JAN 2011	3
FEB 2011	6
MAR 2011	3
APR 2011	9
MAY 2011	7
JUN 2011	23
JUL 2011	26
AUG 2011	41
SEP 2011	34

Month	Total
OCT 2011	20
NOV 2011	10
DEC 2011	5
JAN 2012	8
FEB 2012	6
MAR 2012	8
APR 2012	4
MAY 2012	8
JUN 2012	22
JUL 2012	20
AUG 2012	35
SEP 2012	19
OCT 2012	24
NOV 2012	15
DEC 2012	11
JAN 2013	7
FEB 2013	10
MAR 2013	5
APR 2013	9
MAY 2013	12

Month	Total
JUN 2013	52
JUL 2013	73
AUG 2013	42
SEP 2013	24
OCT 2013	16
NOV 2013	11
DEC 2013	10
JAN 2014	9
FEB 2014	6
MAR 2014	6
APR 2014	16
MAY 2014	6
JUN 2014	32
JUL 2014	32
AUG 2014	37
SEP 2014	29
OCT 2014	22
NOV 2014	17
DEC 2014	15
JAN 2015	18

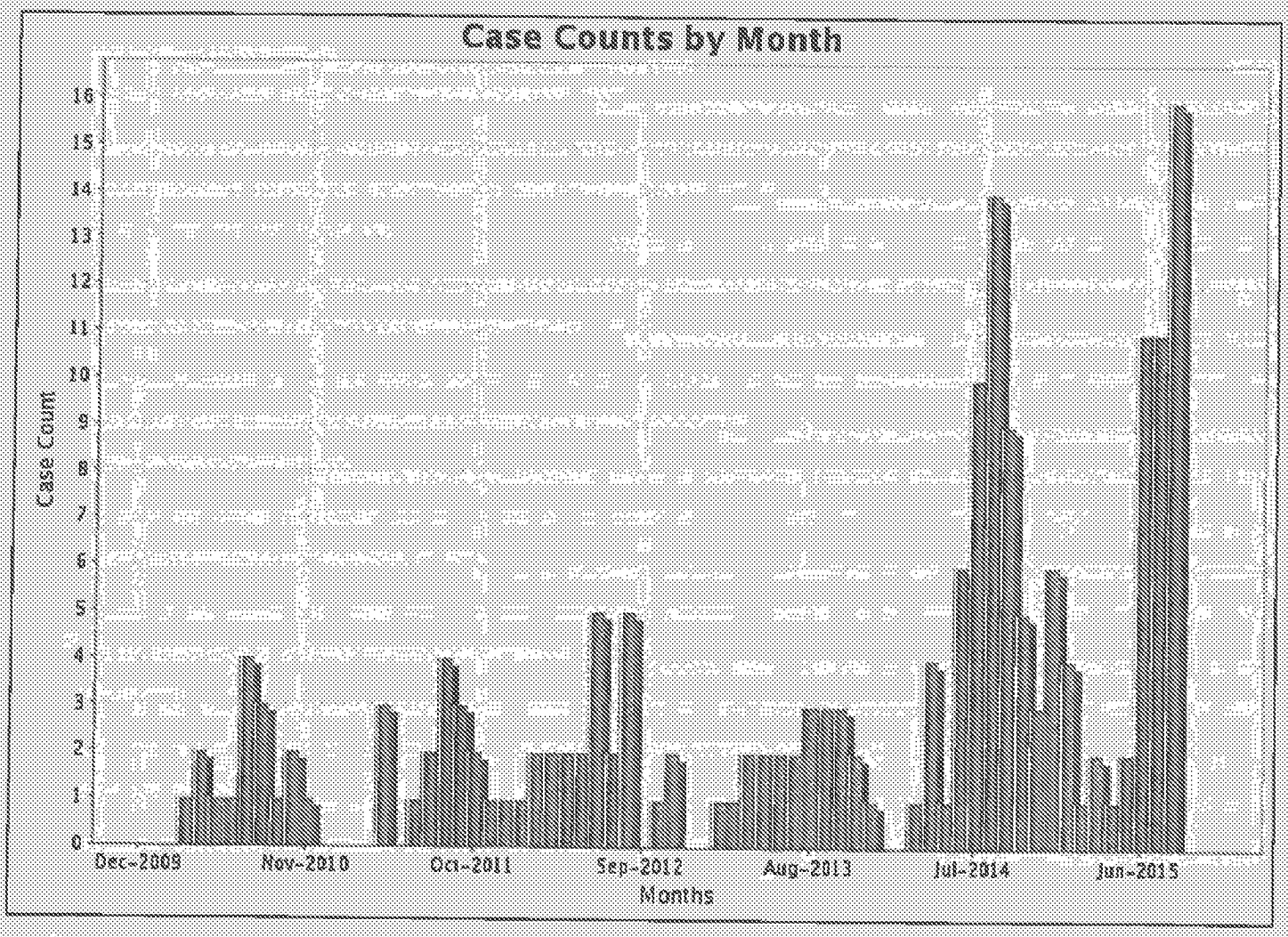
Month	Total
FEB 2015	6
MAR 2015	6
APR 2015	5
MAY 2015	14
JUN 2015	40
JUL 2015	29
AUG 2015	30

Report 8: Epi-Curve Graph

Time Period: 01/01/2010 - 09/11/2015
Time Breakdown: by Month
Reportable Condition: Legionellosis
Case Status: Confirmed
Investigation Status: Completed

Regions:
3

Case Types: Individual and Aggregate



Month	Total
MAR 2010	1
APR 2010	2
MAY 2010	1
JUN 2010	1
JUL 2010	4
AUG 2010	3
SEP 2010	1
OCT 2010	2
NOV 2010	1
APR 2011	3
JUN 2011	1
JUL 2011	2
AUG 2011	4
SEP 2011	3
OCT 2011	3
NOV 2011	1
DEC 2011	1
JAN 2012	1
FEB 2012	2
MAR 2012	2

Month	Total
APR 2012	2
MAY 2012	2
JUN 2012	5
JUL 2012	2
AUG 2012	5
OCT 2012	1
NOV 2012	2
FEB 2013	1
MAR 2013	1
APR 2013	2
MAY 2013	2
JUN 2013	2
JUL 2013	2
AUG 2013	3
SEP 2013	3
OCT 2013	3
NOV 2013	2
DEC 2013	1
MAR 2014	1
APR 2014	4

Month	Total
MAY 2014	1
JUN 2014	6
JUL 2014	10
AUG 2014	14
SEP 2014	9
OCT 2014	5
NOV 2014	3
DEC 2014	6
JAN 2015	4
FEB 2015	1
MAR 2015	2
APR 2015	1
MAY 2015	2
JUN 2015	11
JUL 2015	11
AUG 2015	16

http://www.wnem.com/story/31096078/familys-pet-poisoned-by-lead-laced-water

Family's pet poisoned by lead-laced water

City of Flint Zip Codes	Zip Codes on Flint Water	Greater Flint (Flint Metro Area Zip Codes)
48501	48501	48451
48502	48502	48430
48503	48503	48442
48504	48504	48439
48505	48505	48473
48506	48506	48433
48507	48507	48420
48529	48529	48458
48532	48532	48423
48551	48509	
48552	48519	
48553		
48554		

High-risk ZIP Col (MCR)

48480	Genesee	Grand Blanc	N
48501	Genesee	Flint	Y
48502	Genesee	Flint	Y
48503	Genesee	Flint	Y
48504	Genesee	Flint	Y
48505	Genesee	Flint	Y
48506	Genesee	Flint	Y
48507	Genesee	Flint	Y
48509	Genesee	Burton	N
48519	Genesee	Burton	N
48529	Genesee	Burton	N
48531	Genesee	Flint	N
48532	Genesee	Flint	Y
48550	Genesee	Flint	N
48551	Genesee	Flint	N
48552	Genesee	Flint	N
48553	Genesee	Flint	N
48554	Genesee	Flint	N
48555	Genesee	Flint	N
48556	Genesee	Flint	N
48557	Genesee	Flint	N
48559	Genesee	Flint	N

Pending Data Sharing Agreements

Organization/Individual	Date Initiated	Have I responded?	Status	IRB Status	Date last action	MOU developed?			
Center for Urban Studies	6/2/2015	yes	discussed with Colin		7/2/2015	no			
ClearCorp	6/4/2015	yes	discussed with Colin		7/2/2015	no			
Gazze/MIT	6/3/2015	yes	discussed with Colin		7/2/2015	no	8/3/15 still waiting for LG to send MIT IRB		
DDD	6/8/2015	yes	discussed with Colin		8/11/2015	no	I sent email asking for changes, also suggesting wait for Kaplowitz/Larder work. Kit left phone message, I sent email explaining the project.		
Moody & Grady, MSU	6/23/2015	yes	approved, data sent	Approved	12/30/2015	no	Complete	8/25/15 made a few edits and sent DUA w/attachment to Colin, and sent IRB review app to MDHHS-IRB	11/6 asked Heather/sue about waiver approval
Tanaka/Tufts	8/5/2015	yes	submitted to Colin		8/27/2015	no	Nudge Colin when you get IRB response.		
McElmurry, WSU	9/8/2015	yes	returned to McElmurry		9/9/2015	no			
~~Edgerton Virginia Tech~~	9/7/2015	yes					request was withdrawn		
Hanna-Attisha, Hurley	9/22/2015	yes	Approved	Approved	10/2/2015	no	Data sent		
Pizarro-Zeoli			green light from Colin		12/30/2015		waiting for Waiver document, then will send all to IRB 1/4/16		
CEHI		yes	green light from Colin		1/6/2016		waiting for Waiver document, then will send all to IRB		

2/11 Submitted to IRB
I signed DUA & submitted to Martha, to Linda; signature

Submitted all docs to IRB.
2/11 Also sent DUA to Pizarro for signature

2/11 Replied to Shiri inquiry; stating I'm still waiting for Tufts IRB approval
I don't know if Tufts IRB or DCH

(?) WCHD - sent DUA - Completed, data set

F-9. Too few children in Michigan are screened for lead through routine blood tests as recommended for children ages 1 and 2. Statewide screening goals for children enrolled in Medicaid are met in very few instances at the county level or within Medicaid health plans. This lack of information leaves parents, healthcare professionals, and local and state public health authorities uninformed about the possibility of lead poisoning for thousands of Michigan children.

F-10. Coordination between MDEQ and MDHHS was inadequate to properly address the public health issues related to water quality in Flint. Communication was infrequent, and when it did occur, the default position was to conclude that the health problems were not related to the water supply switch – rather than to assume that the problems might be related to the switch.

F-11. Communication and coordination among local and state public health staff and leadership regarding Legionellosis cases in 2014-2015 was inadequate to address the grave nature of this outbreak. The fact that these cases occurred *while* there were several simultaneous concerns about quality and safety of water in Flint should have caused public health staff and leadership at local and state levels to coordinate their actions to ensure a prompt and thorough investigation.

Recommendations

R-6. Establish policies and procedures at MDEQ and MDHHS to ensure input by health experts and scientists when permit decisions may have a direct impact on human health.

R-7. Establish and maintain a Flint Toxic Exposure Registry to include all the children and adults residing in Flint from April 2014 to present.

The Flint Toxic Exposure Registry will serve as an authoritative reference source of information (including contact details [for example, primary contact information, back-up contact information, and preferred mode of contact]) for purposes of timely health assessments in the short-term and long-term, as well as subsequent communication regarding policies and scientific findings. Timely assessments will include clinical evaluations and re-evaluations in healthcare settings, appropriate follow-up conducted by public health professionals, and longitudinal assessments of the impact of environmental exposure on children's and adults' health (including among pregnant women).

R-8. Re-establish the Michigan Childhood Lead Poisoning Prevention and Control Commission.

The Commission would perform a comprehensive review of the state's lead poisoning prevention program; evaluate the effectiveness of the program, including its ability to satisfy federal law requiring that 100 percent of all young children enrolled in Medicaid be screened with a blood lead test; and make recommendations for the program's improvement. The Commission would also conduct public hearings, review information from other sources, and study other states' experiences. The Commission must also develop short- and long-range strategic recommendations for childhood lead poisoning prevention and control in Michigan.

R-9. Ensure that MDHHS is transparent and timely in reporting and analysis of aggregate data regarding children's blood lead levels. MDHHS data regarding lead levels shall be provided

to individuals and organizations, based on their expertise, upon request and in cases when the interpretation of data by MDHHS is questioned.

R-10. Establish a more aggressive approach to timely clinical and public health follow-up for all children known to have elevated blood lead levels, statewide. MDHHS should expand its local efforts and partnerships to accomplish this goal. Whenever possible, routine screening for lead and appropriate follow-up should occur in children's primary care medical homes.

R-11. Strive to be a national leader in monitoring and responding to exposure of children to lead by converting the Childhood Lead Poisoning Prevention Program (CLPPP) from passive collection of test results into an active surveillance and outreach program.

Performance of the surveillance program should be reported to the public. MDHHS should be prepared to amplify its efforts if performance targets are not met.

R-12. Improve screening rates for lead among young children through partnerships with county health departments, health insurers, hospitals, and healthcare professionals.

R-13. As the state authority on public health, and as the organization that conducted the epidemiologic study of Legionellosis cases in Genesee County in 2014-15, take responsibility for coordinating with GCHD and CDC to protect Michigan residents from further outbreaks of Legionellosis.[43]

R-14. In cases of switches in drinking water supplies in the future, the state must assume that outbreaks of cases of Legionellosis may be related to changes in water source and should communicate the potential risk to the public, rather than assuming and communicating the opposite.

Michigan Governor's Office

Defined Role

The Governor of Michigan heads the executive branch of Michigan state government and has the power to reorganize state departments and appoint department heads. All executive branch departments of state government report to the Governor, including the three key departments involved in the Flint water crisis: MDEQ, MDHHS, and Treasury. The Governor also appoints personal staff to keep him informed of issues and events. Among other responsibilities, the Governor (through the Michigan Department of Technology, Management and Budget) submits an annual budget and has a line-item veto for appropriations bills.

Rick Snyder, Michigan's 48th Governor, took office in January 2011. He began his second term in January 2015.

[43] Specific steps should include: (a) anticipate the risks of Legionellosis infections going forward; (b) take timely steps to minimize those risks in Flint drinking water by working with EPA, MDEQ and Flint WTP; (c) coordinate with healthcare facilities to minimize risks of healthcare facility-acquired Legionellosis; (d) communicate with the public about steps being taken and cases of Legionellosis that occur.

DRAFT CONFIDENTIAL NOT FOR PUBLIC DISTRIBUTION

To: [TO BE DETERMINED]
From: [TO BE DETERMINED]
Date: [TO BE DETERMINED]
Subject: Leveraging Health Information Technology to Respond to the Flint Crisis

Purpose of the Memo

The contamination of Flint's drinking water with lead has created a major public health crisis throughout the city. As part of the State of Michigan's response to the crisis, MDHHS is improving the reporting and monitoring of blood lead testing results and expanding Medicaid coverage to affected residents. The use of health information technology (HIT) will be critical for achieving both of these goals, and MDHHS will leverage the statewide health information exchange infrastructure and Transformed Medicaid Statistical Information System (T-MSIS) as part of this effort. This memo outlines the current status of HIT in Michigan and identifies a strategy for expanding HIT solutions to respond to the crisis.

Current Status of Electronic Reporting for Blood Lead Analysis Results

Timely reporting of blood lead analysis results is a crucial component of combatting childhood lead exposure in Michigan. The State of Michigan and federal government have taken action to ensure that lead exposure is effectively identified and reported. Clinical laboratories are required under Michigan law to electronically report blood lead analysis results to MDHHS. State and federal policies require children to be tested for lead exposure if they receive services through the Medicaid program or Women, Infant, and Child nutrition program. Finally, MDHHS incentivizes Medicaid Health Plans to test enrolled children for lead exposure: MDHHS has included a Lead Screening in Children metric as part of performance measurement for the health plans, and the Department also incorporated the metric into the performance bonus program and automatic assignment algorithms. These policies have improved blood lead testing rates of Medicaid enrolled children and reporting of blood lead analysis results to MDHHS.

The Childhood Lead Poisoning Prevention Program (CLPPP) within MDHHS is the statewide program that collects and uses testing results in order to guide public health efforts. Laboratories may submit testing results to CLPPP through one of three methods, which are described in further detail below. Please also refer to Figure 1, which highlights key pieces of infrastructure that support electronic reporting of test results.

- Method #1: A laboratory may submit testing results through the secure File Transfer application at the Data Exchange Gateway. (The vast majority of laboratories use this method currently.) This method usually involves editing of each laboratory's submission so that the file conforms to the structure of the surveillance database. It also involves the use of text files or Excel files, which must be manually uploaded by MDHHS staff into the Michigan Childhood Lead Poisoning Surveillance System (MICLPSS).
- Method #2: A laboratory may submit test results through the Michigan Health Information Network (MiHIN). For this method, a laboratory sends the test results message through the laboratory's Health Information Exchange, and the Health Information Exchange passes the message to the MiHIN. MiHIN forwards the message to the MDHHS Data Hub, which processes the message content and sends relevant information to the Michigan Disease Surveillance System (MDSS) and MICLPS.

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Commented [SM(1]: I find this description of the three methods very confusing. Are you describing how labs report electronically now, or how they would report under the new scenario. I think you need to have the first section describe how electronic lab reports come in now and get uploaded to the surveillance database, and then describe how it would work in the new system described in the flow chart below.
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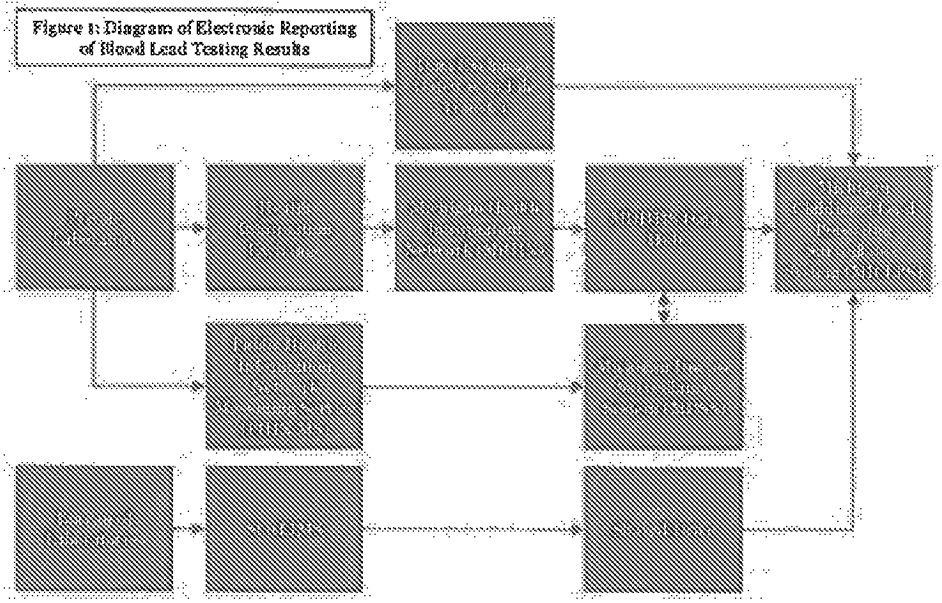
- Method #3: A laboratory may submit test results through the Public Health Information Network Messaging Service (PHIN MS). Some Private laboratories primarily use this method of reporting. For this method, the laboratory would submits the test results to the federal Public Health Information Network Messaging Service (PHIN MS), and PHIN MS would then forward the results to MDSS. MDSS then sends the message to the MDHHS Data Hub, which would process the message and send relevant information to the MICLPS.

Figure 1: Diagram of Electronic Reporting of Blood Lead Testing Results



The Bureau of Laboratories within MDHHS also conducts testing for blood lead. The Bureau of Laboratories currently emits a file with new testing results to a secure shared drive, and CLPPP staff retrieve the file and upload the information into the MICLPS system. Please refer to Figure 1 for additional information.

Once the testing results are uploaded into MICLPS, CLPPP makes the data available in various ways to community partners who provide services to children with lead exposure. Local Health Departments are able to log into the Healthy Homes and Lead Poisoning Surveillance System (HHLPSS) to access case information for local children with lead exposure. CLPPP also sends Blood Lead Extract Files with Medicaid data and surveillance data to the Medicaid Health Plans, who can identify children who have not been tested yet and make arrangements for testing and follow-up services.

Current Status of the Management of Medicaid Information through T-MSIS

The Michigan Medicaid program provides essential support for preventing and treating lead exposure amongst children. The T-MSIS system facilitates the delivery of Medicaid-funded services such as

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Commented [SM(3]: I don't think this is right, either. My understanding is that PHIN MS isn't a data repository which data goes in and out of, it is software that CDC makes available to states to use for "exchanging data securely over the Internet and facilitating interoperability among myriad public health information systems." See http://www.cdc.gov/phin/tools/phinms/index.html

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testing, treatment, and follow-up care for lead exposure. T-MSIS collects and organizes data on eligibility, enrollment, program, utilization, and expenditure data for Medicaid and Children's Health Insurance Program services. This information is used to coordinate the delivery of services, improve the management of the Michigan Medicaid program, and meet reporting requirements from the Centers for Medicare and Medicaid Services (CMS). MDHHS also uses T-MSIS to compile a weekly Blood Lead Extract of Medicaid data and surveillance data, which is sent to the Medicaid Health Plans. The Medicaid Health Plans use this information to coordinate services for children who have suffered from lead exposure.

On March 3rd, 2016, CMS approved a new 1115 demonstration authority to extend Medicaid coverage to Flint residents impacted by the lead exposure. Under the new 1115 authority, 15,000 additional children and pregnant women will become eligible for Medicaid coverage, and 30,000 current Medicaid beneficiaries in Flint will be eligible for expanded services. The T-MSIS system will play a key role in implementing this expansion through (1) managing eligibility, enrollment, and coverage information and (2) enabling longitudinal tracking and provision of follow-up services for affected residents.

Strategy for Leveraging HIT to Respond to the Flint Crisis

MDHHS will build upon current policies and HIT solutions in order to effectively respond to the Flint crisis. This strategy outlines actions, investments, and partnerships that MDHHS will pursue as part of the public health response.

- Connecting Providers to HIT

HIT can improve the capacity of providers to test children for lead exposure, coordinate services for affected residents, and report crucial public health information to MDHHS. MDHHS will promote the adoption and use of HIT in Flint through the following strategies.

MDHHS operates a Medicaid Electronic Health Record Incentive Program to assist Medicaid providers with adopting and using HIT. CMS also operates a similar incentive program for Medicare providers. According to federal data, 611 providers in Genesee County are participating in the Medicaid program and/or Medicare program: this figure includes 426 Medicare providers, 182 Medicaid providers, and 3 Dual Eligible Hospitals. MDHHS determined that 34 additional providers may be eligible to participate in the Medicaid program. MDHHS will conduct outreach to these providers and assist them with enrollment and participation in the program. MDHHS will also explore opportunities under the recent State Medicaid Director letter to use Medicaid funding to facilitate electronic public health reporting.

CMS has also purchased point-of care blood lead analysis devices to deploy at clinics in Flint. These devices allow clinics to complete blood lead testing analysis without having to send results to the laboratory. These portable devices are considered laboratories, and clinics and offices that use them are required to report under the same rules as CLIA certified laboratories. MDHHS will collaborate with providers, CMS, and the Office of the National Coordinator for Health Information Technology on integrating these devices into public health reporting efforts.

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Finally, Great Lakes Health Connect (GLHC) is partnering with the Greater Flint Health Coalition to improve information sharing and service coordination for affected residents. This partnership will allow providers and community service organizations to access GLHC's virtual health record platform. MDHHS will explore opportunities to partner with GLHC and other stakeholders on using GLHC's platform to improve the delivery of services to residents.

- Improving the Reporting and Sharing of Blood Lead Analysis Results

Laboratories can submit testing results to MDHHS through MDSS. The Flint crisis highlighted the need to improve participation rates in MDSS. Some local health departments have also expressed interest in directly receiving testing results from MDHHS instead of having to log into HHLPSS. MDHHS will work with the Michigan Health Information Network (MiHIN), Health Information Exchanges, providers, and local health departments to expand participation and explore opportunities to send testing results directly to local health departments.

- Enhancing Information Management and Service Coordination within MDHHS

MDHHS will upgrade its contracts and information technology systems to support the response to the Flint crisis. On January 1, 2016, MDHHS revised its contracts with Medicaid Health Plans to require the development of care management programs for children with Elevated Blood Lead Levels. MDHHS will also integrate client identifiers into the Transformed Medicaid Statistical Information System (T-MSIS) to enable longitudinal tracking and provision of follow-up services for affected residents in Flint.

Challenges and Potential Solutions for Improving the Use of HIT

In order to fully implement the strategy, MDHHS and its partners must confront two potential challenges, which are outlined below.

- Lack of Interoperability for the Blood Lead Analysis Testing Devices

The first challenge is addressing the limited functionality of the blood lead analysis devices that CMS has purchased. The current models on the market can only be connected to printers and cannot be integrated with an Electronic Health Record (EHR) system. While these devices will allow the clinics to conduct testing, the clinics must manually enter the results into their EHRs and prepare a separate spreadsheet to send to MDHHS. This duplicative process discourages participation of clinics in electronic reporting. MDHHS will work with providers, Health Information Exchanges, and MiHIN to explore opportunities for optimizing EHRs in order to enable direct electronic reporting to MDHHS.

- Lack of Participation by Private Laboratories in the MDHHS Electronic Reportable Labs Use Case

The second challenge is overcoming the barriers to participation by laboratories in MDSS. Many providers use laboratories to conduct blood lead analysis tests. Most laboratories send testing results to MDHHS through "flat files" (Method #1) or PHIN MS (Method #3) instead of MDSS (Method #2). MDHHS would like to encourage laboratories to migrate towards participation in MDSS. However, this migration would require laboratories to reconfigure their HIT systems to send HL7 messages as opposed to flat files or PHIN MS messages. Due to the potential costs and labor hours involved in this process, most laboratories have chosen to keep their legacy processes. To address this issue, MDHHS will explore opportunities under the recent State Medicaid Director letter to facilitate the participation of laboratories in the use case.

Conclusion

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Commented [SM[5]]: I don't think this is right either. PHIN MS is compatible with HL7 isn't it? Need to talk with Ed Hartwick or Jim Collins or Jay Fiedler to get all this straight. On the other hand, I certainly could be wrong!
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MDHHS is working to respond to the Flint lead crisis through a series of strategic actions, investments, and partnerships. HIT will play an essential role in this effort through supporting improvements in public health reporting and facilitating the expansion of Medicaid coverage and services to affected residents. MDHHS will also be required to address challenges with using HIT such as the limitations of Blood Lead Analysis Testing Devices and lack of participation in the MDHHS Electronic Reportable Labs Use Case. However, MDHHS can work to overcome these issues by pursuing the aforementioned strategy and building partnerships with key stakeholders.

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DRAFT CONFIDENTIAL NOT FOR PUBLIC DISTRIBUTION

To: [TO BE DETERMINED]
From: [TO BE DETERMINED]
Date: [TO BE DETERMINED]
Subject: Leveraging Health Information Technology to Respond to the Flint Crisis

Purpose of the Memo

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The Childhood Lead Poisoning Prevention Program (CLPPP) is the statewide program that collects and uses testing results in order to guide public health efforts. Laboratories may submit testing results to CLPPP through one of three methods, which are described in further detail below. Please also refer to Figure 1, which highlights key pieces of infrastructure that support electronic reporting of test results.

- Method #1: A laboratory may submit testing results through the secure File Transfer application or the Data Exchange Gateway. The vast majority of laboratories use this method. This method also involves the use of text files or Excel files, which must be manually input by MDHHS staff into the Michigan Childhood Lead Poisoning Surveillance System (MICLPS).

- Method #2: A laboratory may submit test results through the Michigan Health Information Network (MiHIN). This method is known as the MDSS Electronic Reportable Labs Use Case. For this use case, a laboratory sends the test results message through the laboratory's Health Information Exchange, and the Health Information Exchange passes the message to the MiHIN. MiHIN forwards the message to the MDHHS Data Hub, which processes the message content and sends relevant information to the Michigan Disease Surveillance System (MDSS) and MICLPS.

- Method #3: A laboratory may submit test results through the Public Health Information Network Messaging Service (PHIN MS). Some laboratories use this method of reporting. For this method, the laboratory would submit the test results to the federal Public Health Information Network

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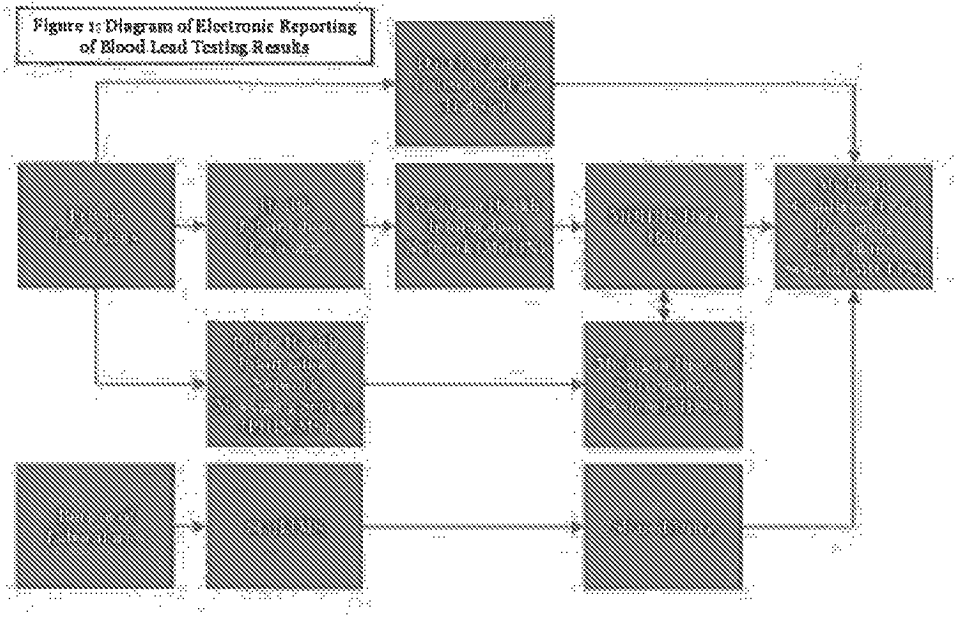
Deleted: provider

Messaging Service (PHIN MS), and PHIN MS would then forward the results to MDSS. MDSS would then send the message to the MDHHS Data Hub, which would process the message and send relevant information to the MICLPS.

Figure 1: Diagram of Electronic Reporting of Blood Lead Testing Results



The Bureau of Laboratories within MDHHS also conducts testing for blood lead. The Bureau of Laboratories currently posts a file with new testing results to a shared drive, and CLPPP staff retrieves the file and input the information into the MICLPS system. Please refer to Figure 1 for additional information.

Deleted: sends the test results message to the MDHHS Data Hub, which processes the message and sends relevant information to MICLPS.

Once the testing results are collected by MDHHS, the Department shares this information with several community partners who provide services to children with lead exposure. Local Health Departments are able to log into the Healthy Homes and Lead Poisoning Surveillance System (HHLPSS) to access case information for local children with lead exposure. MDHHS also sends Blood Lead Extract Files with Medicaid data and surveillance data to the Medicaid Health Plans, who can identify children who have not been tested yet and make arrangements for testing and follow-up services.

Deleted: provide

Deleted: to enrollees who have been exposed to lead

Current Status of the Management of Medicaid Information through T-MSIS

The Michigan Medicaid program provides essential support for preventing and treating lead exposure amongst children. The T-MSIS system facilitates the delivery of Medicaid-funded services such as testing, treatment, and follow-up care for lead exposure. T-MSIS collects and organizes data on eligibility, enrollment, program, utilization, and expenditure data for Medicaid and Children's Health Insurance Program services. This information is used to coordinate the delivery of services, improve the

management of the Michigan Medicaid program, and meet reporting requirements from the Centers for Medicare and Medicaid Services (CMS). MDHHS also uses T-MSIS to compile a weekly Blood Lead Extract of Medicaid data and surveillance data, which is sent to the Medicaid Health Plans. The Medicaid Health Plans use this information to coordinate services for children who have suffered from lead exposure.

On March 3rd, 2016, CMS approved a new 1115 demonstration authority to extend Medicaid coverage to Flint residents impacted by the lead exposure. Under the new 1115 authority, 15,000 additional children and pregnant women will become eligible for Medicaid coverage, and 30,000 current Medicaid beneficiaries in Flint will be eligible for expanded services. The T-MSIS system will play a key role in implementing this expansion through (1) managing eligibility, enrollment, and coverage information and (2) enabling longitudinal tracking and provision of follow-up services for affected residents.

Strategy for Leveraging HIT to Respond to the Flint Crisis

MDHHS will build upon current policies and HIT solutions in order to effectively respond to the Flint crisis. This strategy outlines actions, investments, and partnerships that MDHHS will pursue as part of the public health response.

- Connecting Providers to HIT

HIT can improve the capacity of providers to test children for lead exposure, coordinate services for affected residents, and report crucial public health information to MDHHS. MDHHS will promote the adoption and use of HIT in Flint through the following strategies.

MDHHS operates a Medicaid Electronic Health Record Incentive Program to assist Medicaid providers with adopting and using HIT. CMS also operates a similar incentive program for Medicare providers. According to federal data, 611 providers in Genesee County are participating in the Medicaid program and/or Medicare program: this figure includes 426 Medicare providers, 182 Medicaid providers, and 3 Dual Eligible Hospitals. MDHHS determined that 34 additional providers may be eligible to participate in the Medicaid program. MDHHS will conduct outreach to these providers and assist them with enrollment and participation in the program. MDHHS will also explore opportunities under the recent State Medicaid Director letter to use Medicaid funding to facilitate electronic public health reporting.

CMS has also purchased point-of care blood lead analysis devices to deploy at clinics in Flint. These devices allow clinics to complete blood lead testing analysis without having to send results to the laboratory. MDHHS will collaborate with providers, CMS, and the Office of the National Coordinator for Health Information Technology on integrating these new devices into public health reporting efforts.

Finally, Great Lakes Health Connect (GLHC) is partnering with the Greater Flint Health Coalition to improve information sharing and service coordination for affected residents. This partnership will allow providers and community service organizations to access GLHC's virtual health record platform. MDHHS will explore opportunities to partner with GLHC and other stakeholders on using GLHC's platform to improve the delivery of services to residents.

- Improving the Reporting and Sharing of Blood Lead Analysis Results

Laboratories can submit testing results to MDHHS through the MDSS Electronic Reportable Labs Use Case. The Flint crisis highlighted the need to improve participation rates in the use case. Some local

Deleted: Providers

Deleted: provider

health departments have also expressed interest in directly receiving testing results from MDHHS instead of having to log into MHLPSS. MDHHS will work with the Michigan Health Information Network (MiHIN), Health Information Exchanges, providers, and local health departments to expand participation and explore opportunities to send testing results directly to local health departments.

- Enhancing Information Management and Service Coordination within MDHHS

MDHHS will upgrade its contracts and information technology systems to support the response to the Flint crisis. On January 1, 2016, MDHHS revised its contracts with Medicaid Health Plan to require the development of care management programs for children with Elevated Blood Lead Levels. MDHHS will also integrate identifiers into the Transformed Medicaid Statistical Information System (T-MSIS) to enable longitudinal tracking and provision of follow-up services for affected residents.

Challenges and Potential Solutions for Improving the Use of HIT

In order to fully implement the strategy, MDHHS and its partners must confront two potential challenges, which are outlined below.

- Lack of Interoperability for the Blood Lead Analysis Testing Devices

The first challenge is addressing the limited functionality of the blood lead analysis devices that CMS has purchased. The current models on the market can only be connected to printers and cannot be integrated with an Electronic Health Record (EHR) system. While these devices will allow the clinics to conduct testing, the clinics must manually enter the results into their EHRs and prepare a separate spreadsheet to send to MDHHS. This duplicative process discourages participation of clinics in electronic reporting. MDHHS will work with providers, Health Information Exchanges, and MiHIN to explore opportunities for optimizing EHRs in order to enable direct electronic reporting to MDHHS.

- Lack of Participation by Private Laboratories in the MDHHS Electronic Reportable Labs Use Case

The second challenge is overcoming the barriers to participation by laboratories in the MDHHS Electronic Reportable Labs Use Case. Many providers use laboratories to conduct blood lead analysis tests. Most laboratories send testing results to MDHHS through "flat files" (Method #1) or PHIN MS (Method #3) instead of the use case (Method #2). MDHHS would like to encourage laboratories to migrate towards participation in the use case. However, this migration would require laboratories to reconfigure their HIT systems to send HL7 messages as opposed to flat files or PHIN MS messages. Due to the potential costs and labor hours involved in this process, most laboratories have chosen to keep their legacy processes. To address this issue, MDHHS will explore opportunities under the recent State Medicaid Director letter to facilitate the participation of laboratories in the use case.

Conclusion

MDHHS is working to respond to the Flint lead crisis through a series of strategic actions, investments, and partnerships. HIT will play an essential role in this effort through supporting improvements in public health reporting and facilitating the expansion of Medicaid coverage and services to affected residents. MDHHS will also be required to address challenges with using HIT such as the limitations of Blood Lead Analysis Testing Devices and lack of participation in the MDHHS Electronic Reportable Labs Use Case.

Deleted: testing
Deleted: of devices
Deleted: in Flint will be able
Deleted: and print hard copies of testing results
Deleted: lack of interoperability with Electronic Health Record systems will become a major roadblock for electronically reporting the results to MDHHS
Deleted: will continue to
Deleted: options
Deleted: integrating these devices into the public health reporting process
Deleted: private
Deleted:
Deleted: private
Deleted: and most private laboratories utilize the PHIN MS process (Method #2) instead of the use case (Method #1). Some laboratories send testing results to MDHHS through "flat files"..
Deleted: the private
Deleted: private
Deleted: or flat files
Deleted: private

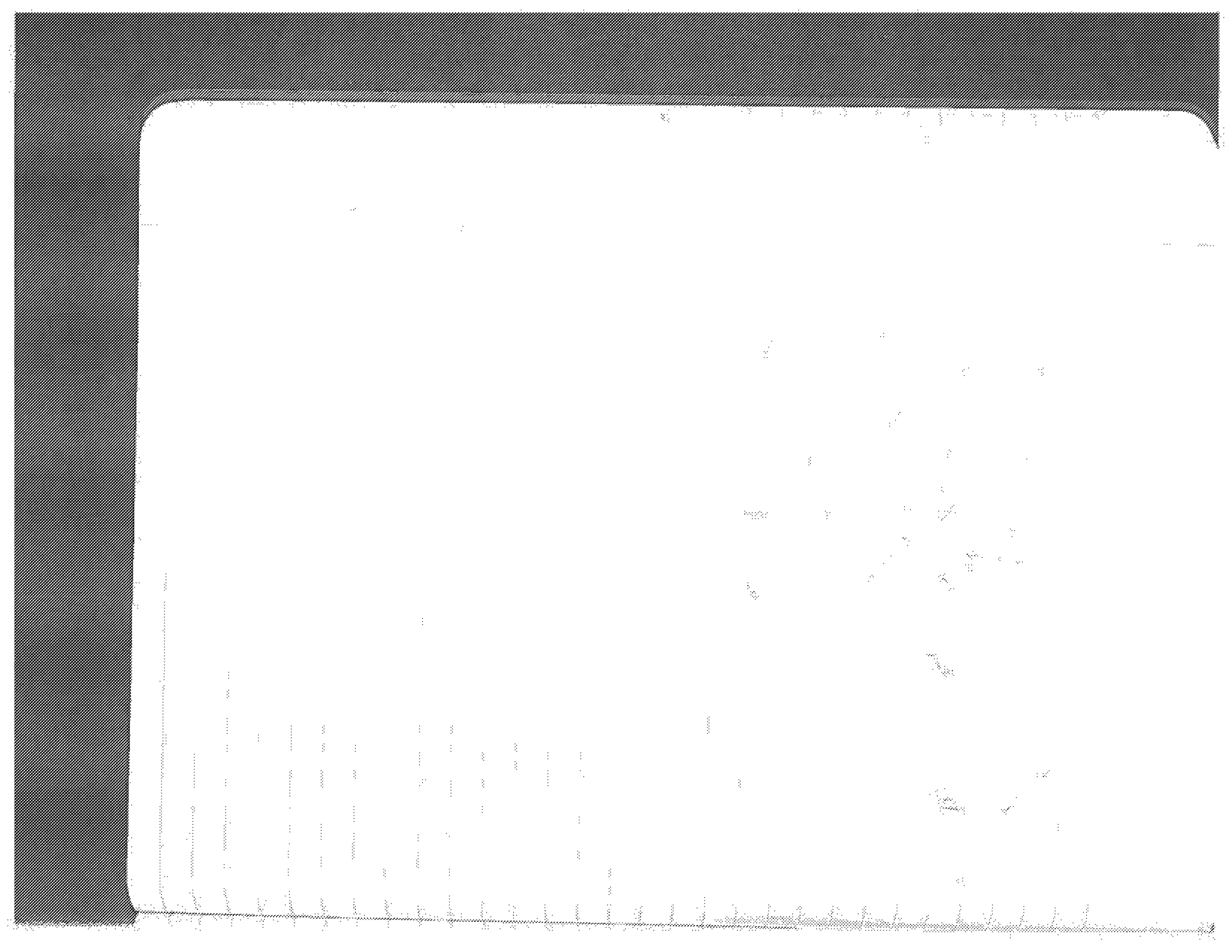
However, MDHHS can work to overcome these issues by pursuing the aforementioned strategy and building partnerships with key stakeholders.

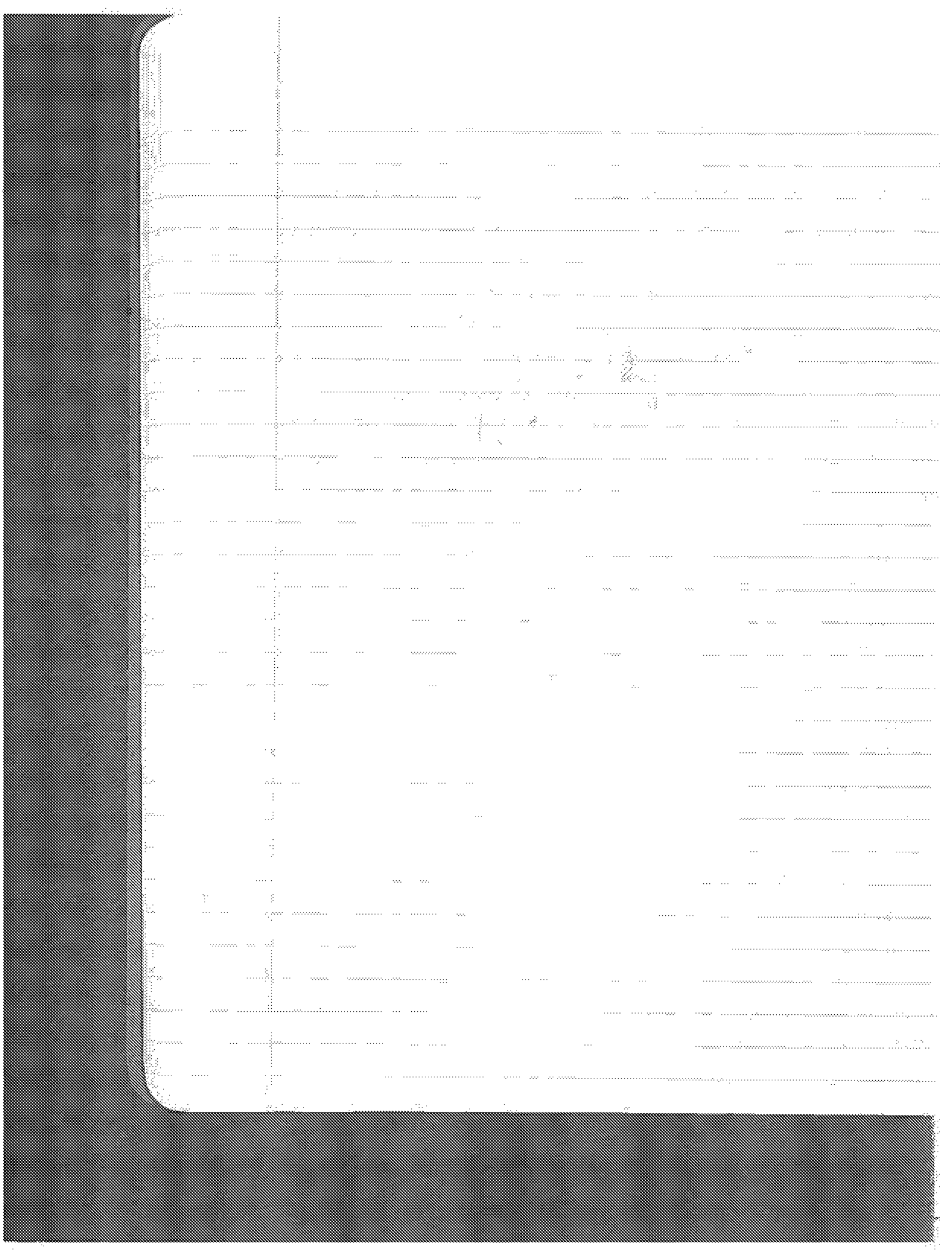
Deleted: ¶

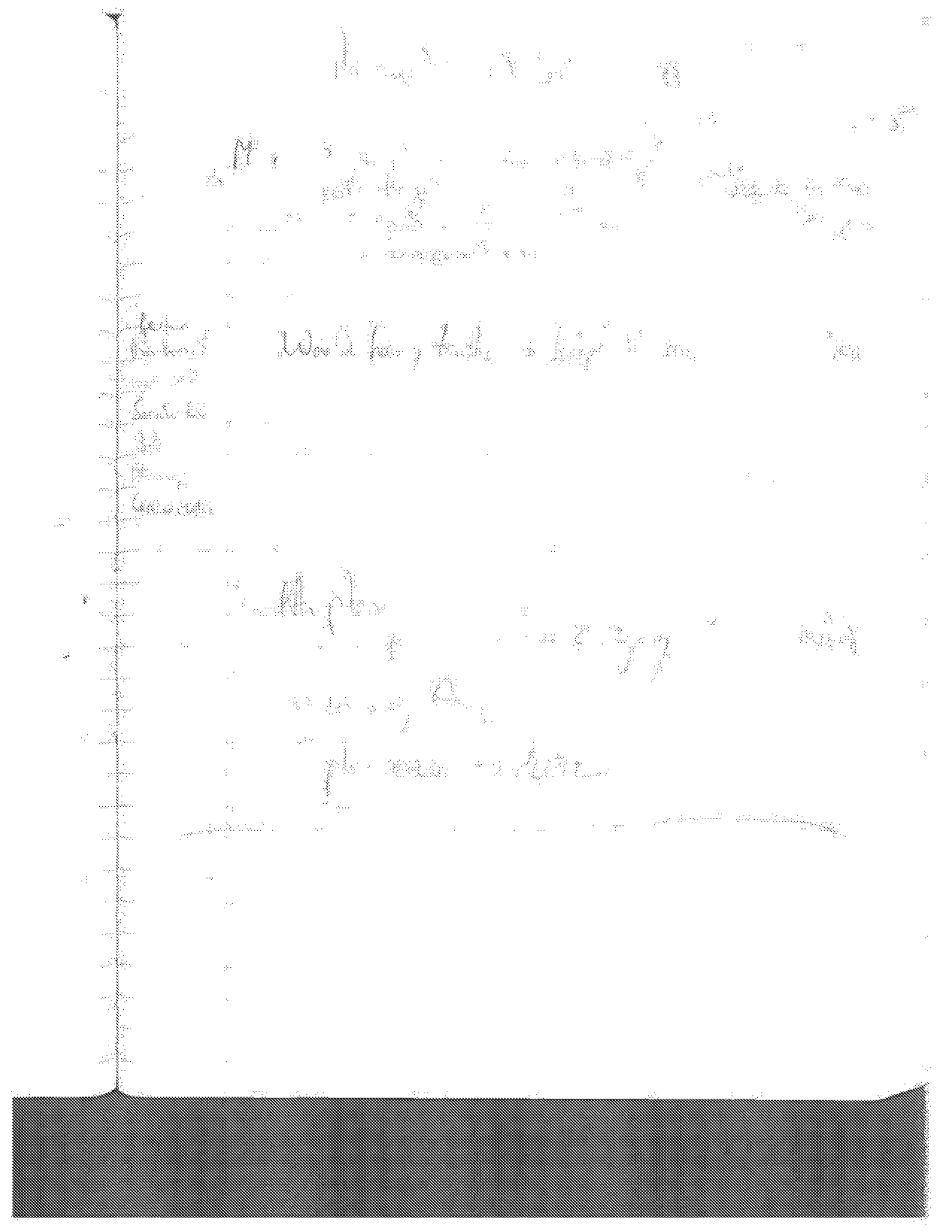
Down on Excel list

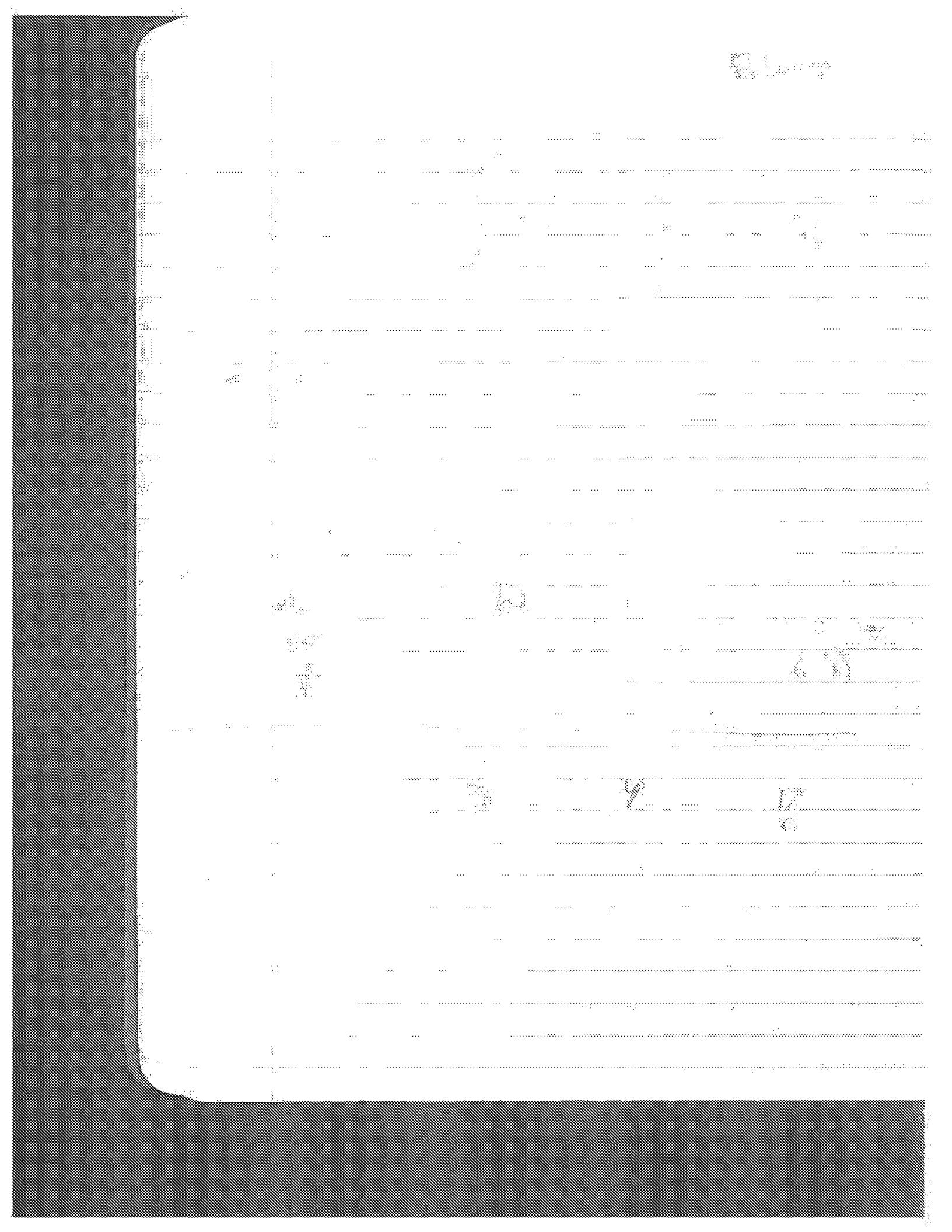
- ✓ Help Patti make permanent change to settings in Warehouse Lead Model—save column headings.
- ✓ Write a procedure for updating the Flint Master List.
- Get CDC extracts and required reports on calendar!
- Investigate Macomb/HHLPSS issue, then send to hhlpss mailbox.
- Gather existing procedures, starting updating, start writing new ones as needed.
- Set up meeting with MPHI evaluation team—Jessie Jones et al.
- Look for an Evaluation REPORT.
- Send CDC RFPs to Martha.
- Check FFS report query—plug a couple of names from previous reports into new MHP query, see what comes up.
- ✓ Review CEHI material and send same to Martha. (or did I?) No
- Request updated User Manual and Data Dictionary from CDC (check email to see what you might have).
- Scope out Warehouse duplicates issue, then contact Jeremy.
- Update Next Test Due dates in HHLPSS and Master List (90 days for 5-14s; 30 for 15-44).
- ✓ Set up HL7 meeting with Tina, Jeff Shaw, Amy Hertel, Martha
- ✓ Flint map – 5 years of ebIls
- Set up meeting with Tom Hudson, Martha, re HHLPSS and MICLPS hosting, in January
- Find anything from Colin re ClearCorp, and old BAA and new DUA, send to Martha, then set up meeting with Wes.
- Send Martha any info about ClearCorp and WSU CUS lead activities, maybe a screenshot of database
- ✓ Find CDC Success Story guidance
- How many DUAs pending, and at what stage?
- ✓ Find CEHI docs, read, assess and respond.

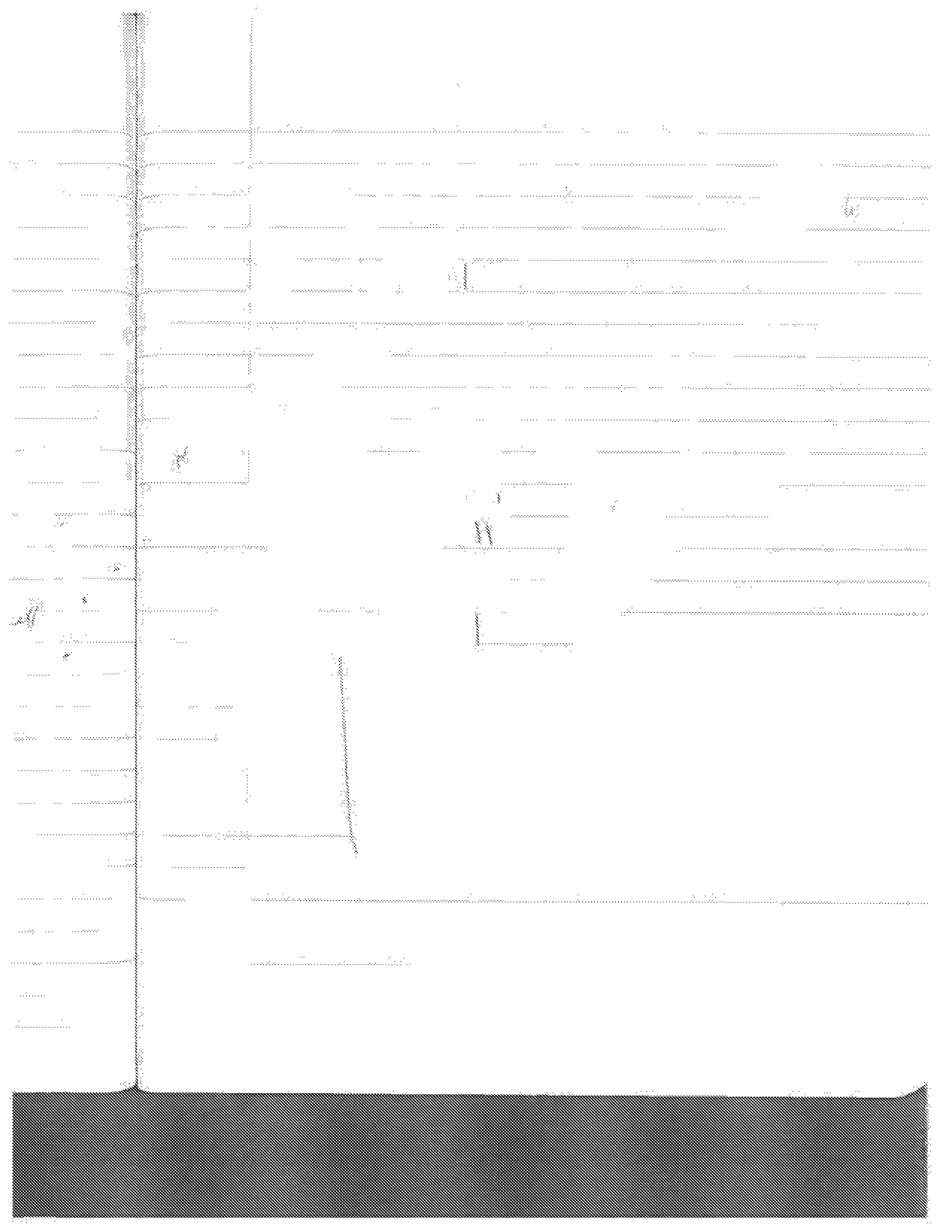
Look in CDC survey responses

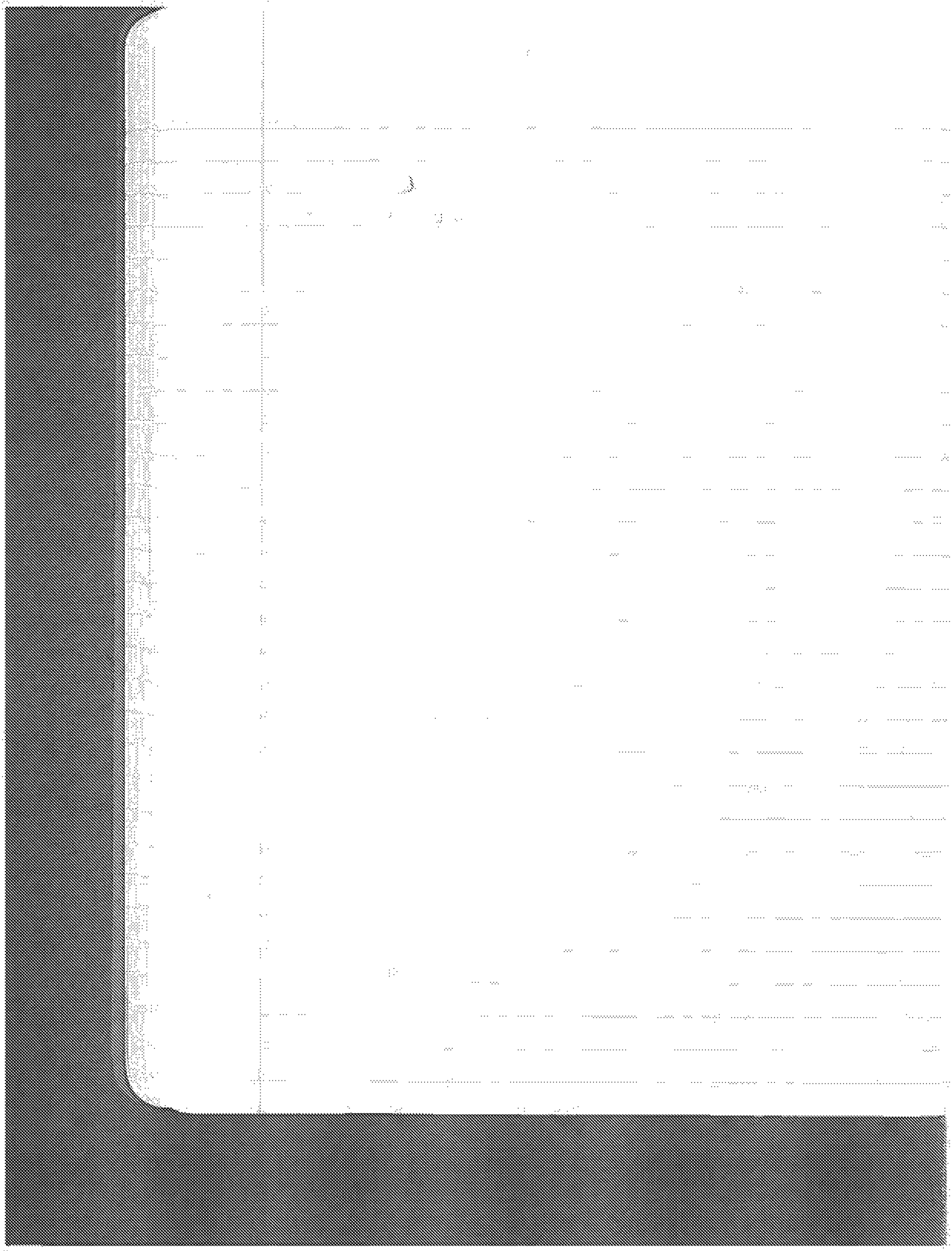


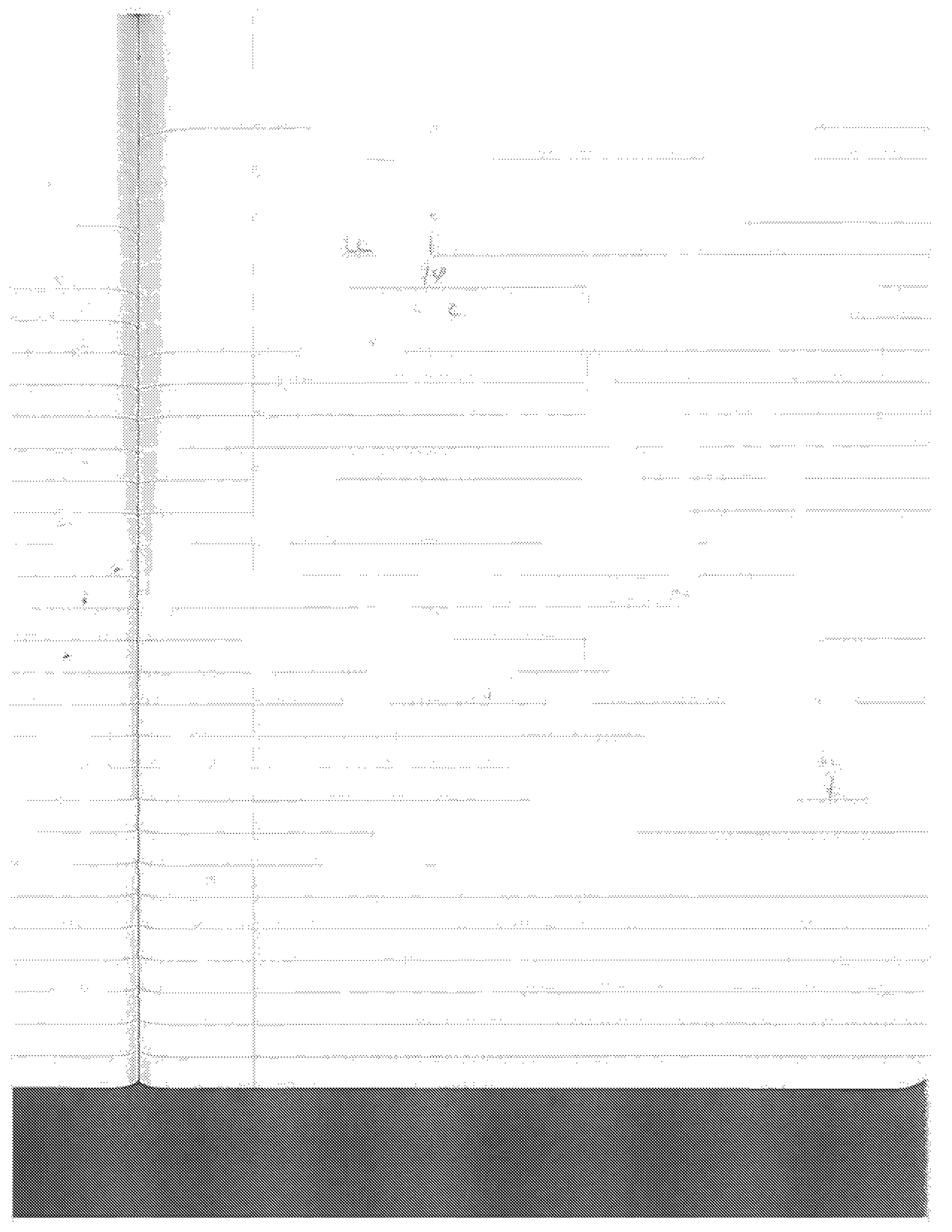


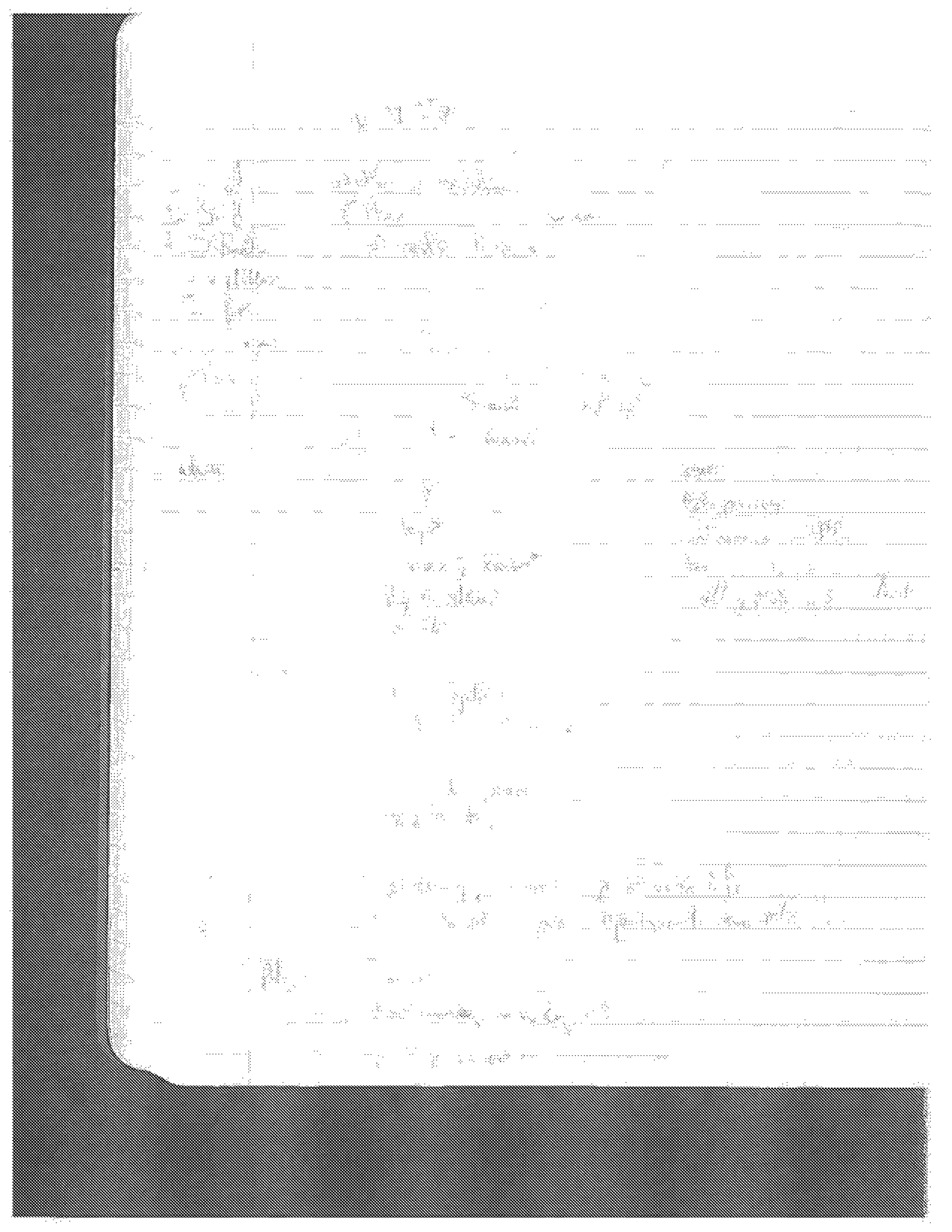


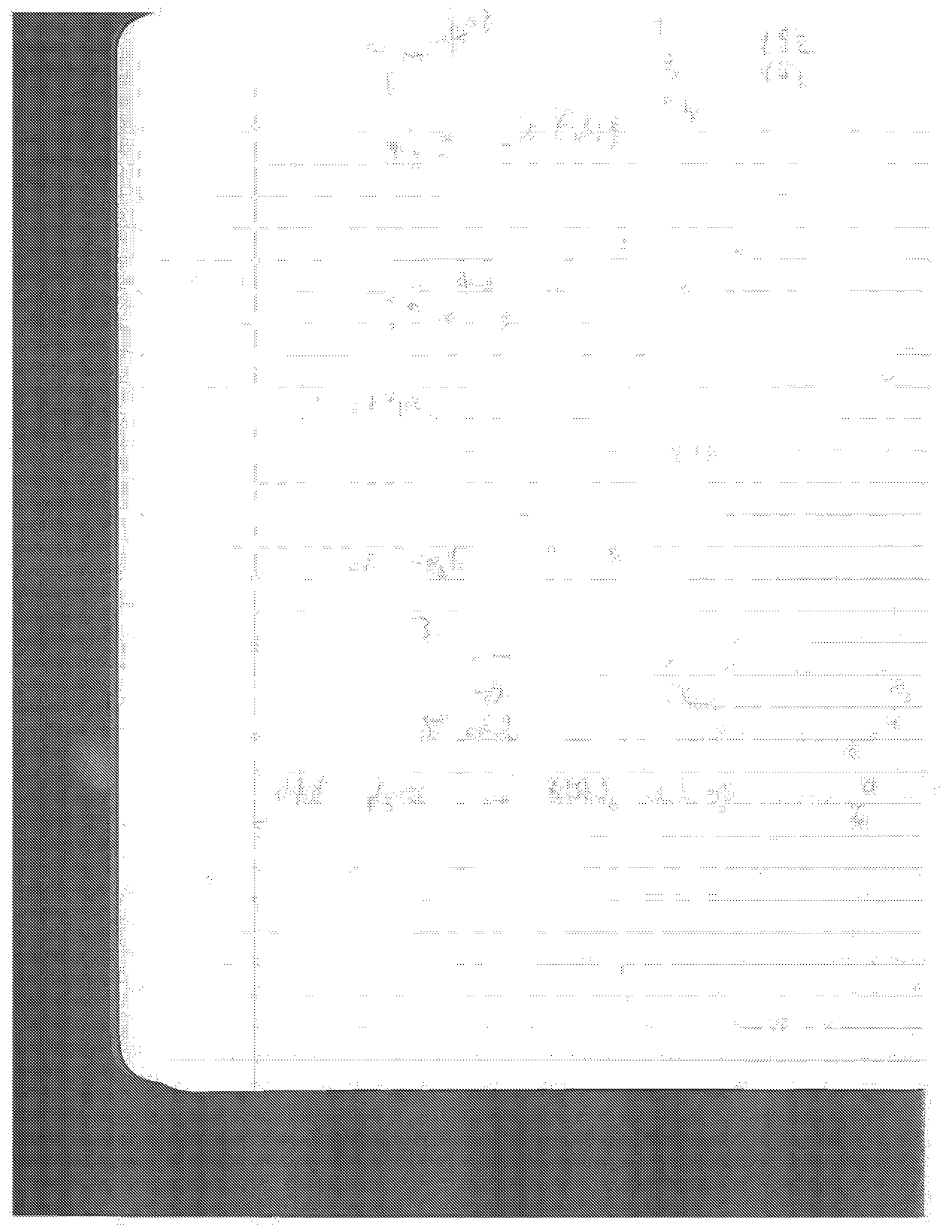


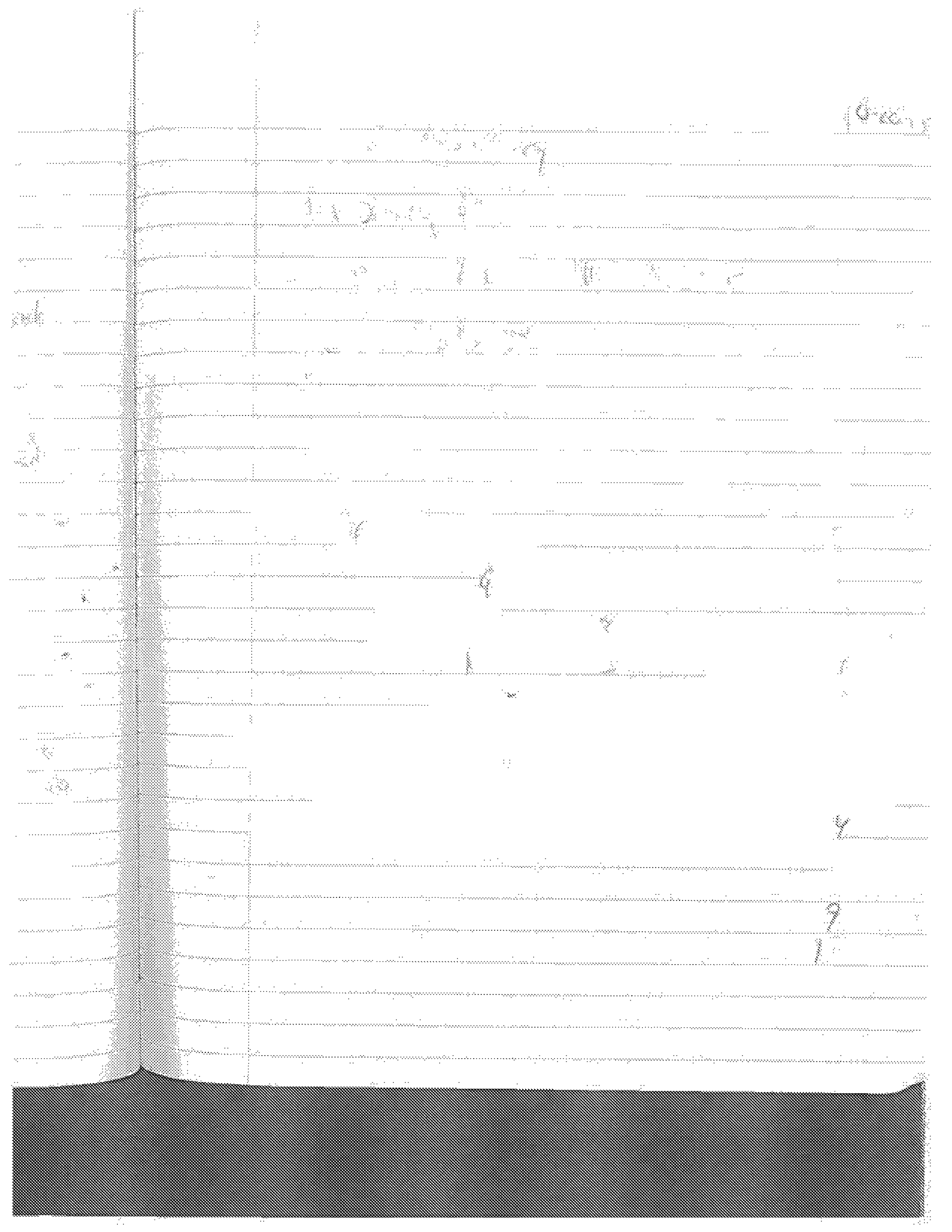


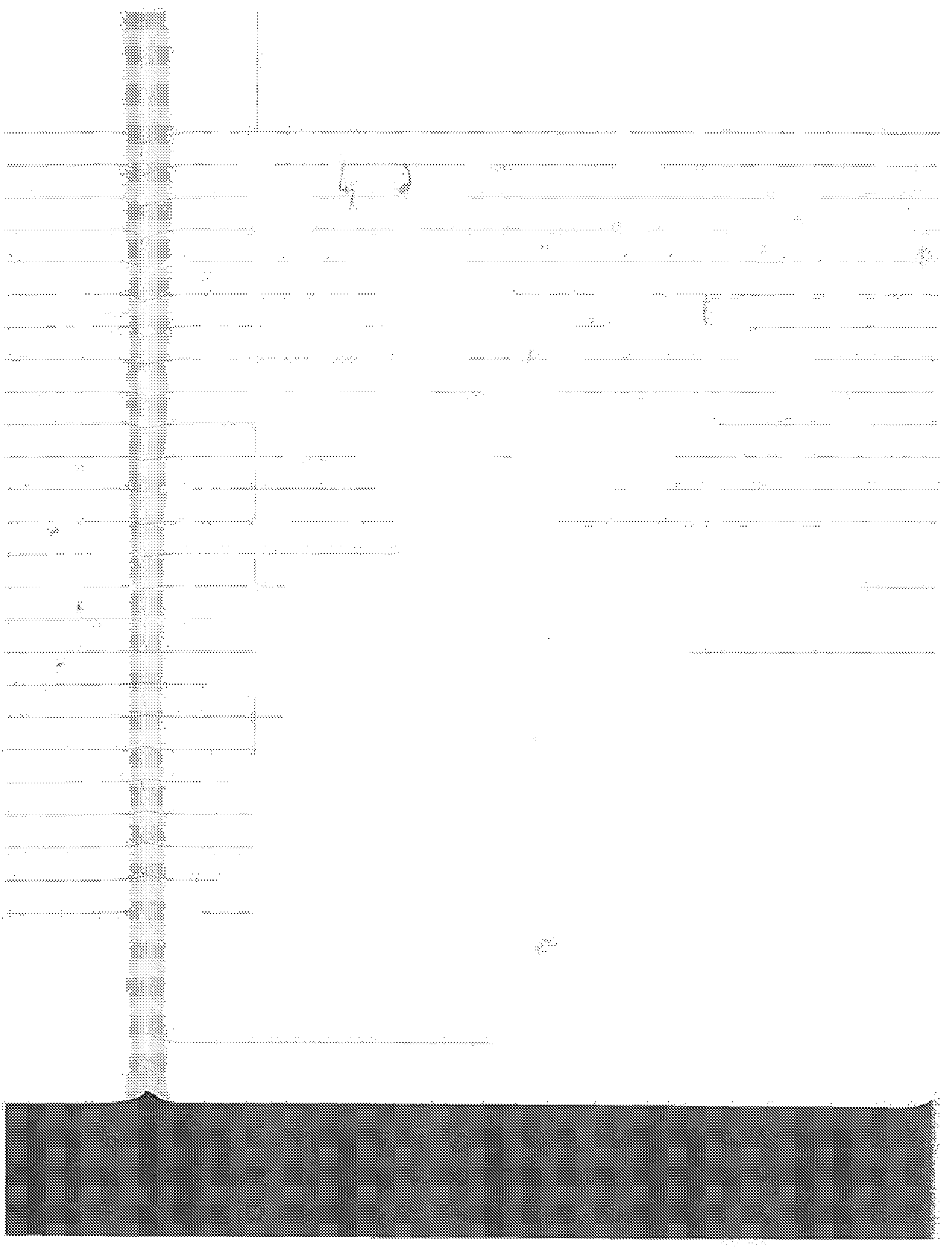


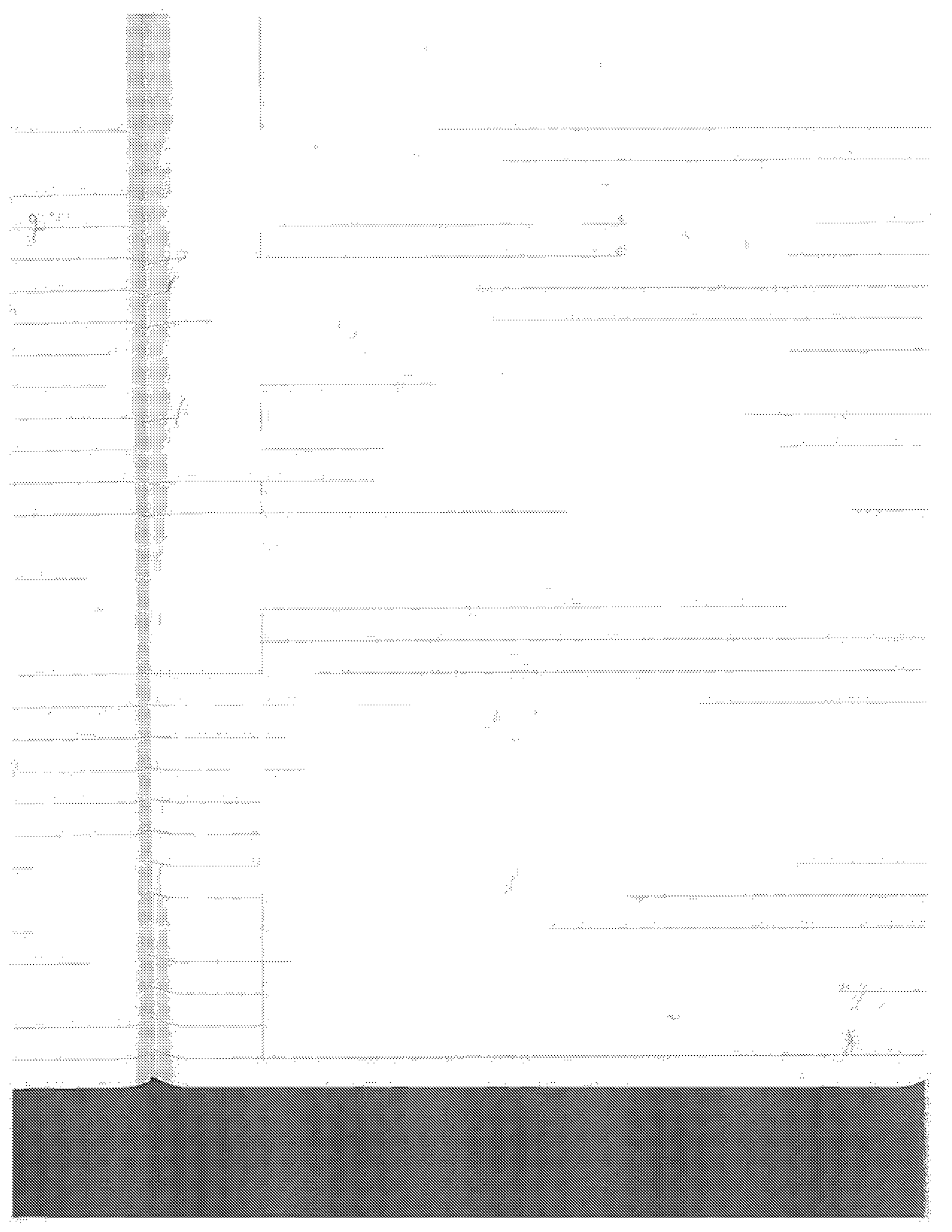


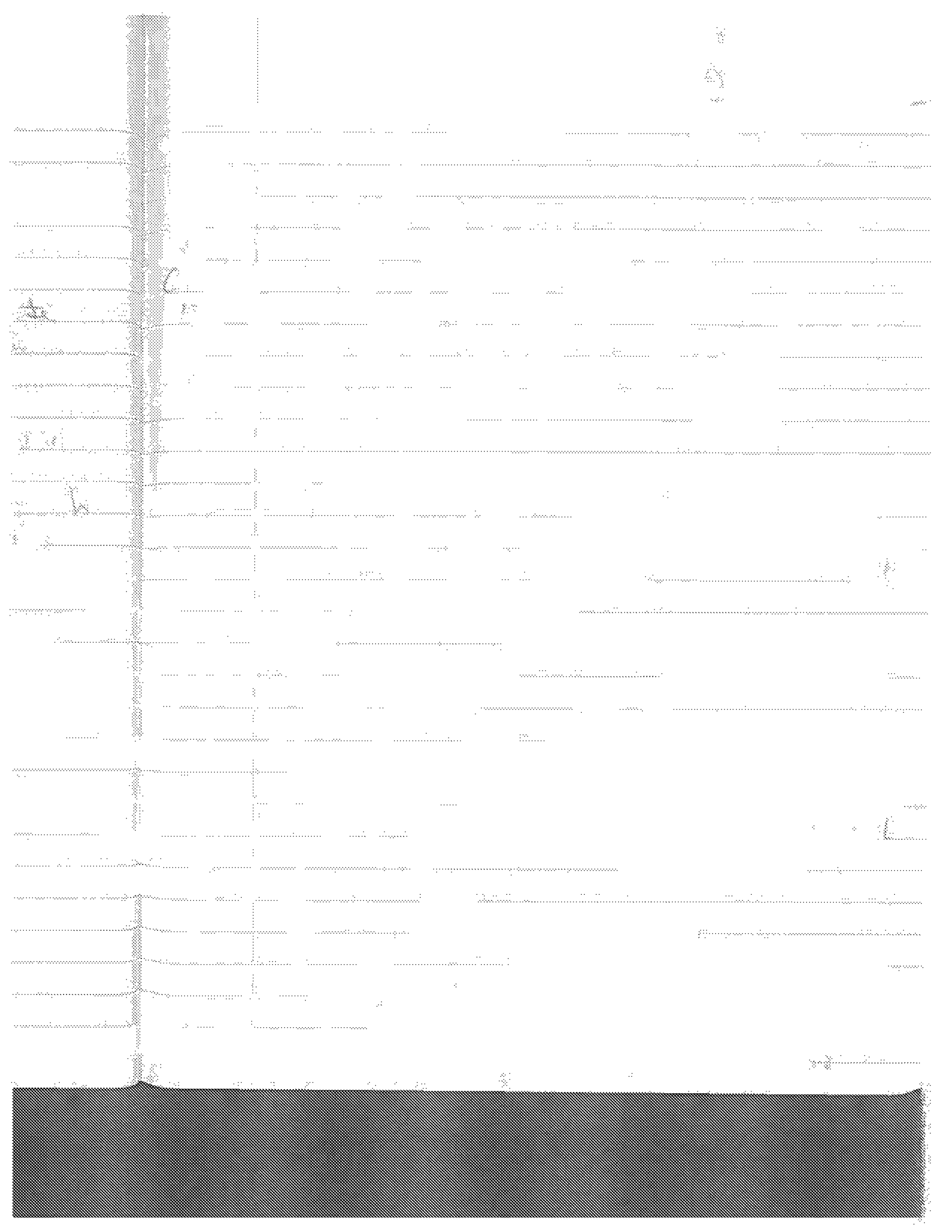












Weekly Report for Platt

10-29-15

Connie		
Patti	Performance measures	
Linda		
Wes	MPI	
Keith		
Bob	—	
Ken	Bldg	
Mich Lau	None	
Cant...	[illegible]	
	Something [illegible] but also [illegible]	
	Consistent [illegible] e.g. [illegible]	[illegible]
		[illegible]
	[illegible] (legislation?)	" continued
	* Cyp [illegible]	[illegible]
	View Redux	[illegible]
	Non CCL	[illegible]
	Hap - [illegible]	[illegible]
	Contract [illegible]	
	P/C ✓	
	[illegible] Call after [illegible]	
		ZIP Code Map [illegible]
Living	* Call Patti tomorrow	* Which [illegible] have the most [illegible] needs?

GCHD EA

Scoping [illegible]

11-2-15

Karen
Bob
Dawn
Andrew
Jeri

Question [illegible]

[illegible] Talk w/ Nancy [illegible] Tiffany or [illegible]

proposed [illegible]

Yes w/c, but do you have other suggestions?

WHLCxx [illegible]

Contact Attempt [illegible]
Chose [illegible] result
comment, if helpful

Home Visit - various
Chose Complete
add comment
ADD Notes?

Referrals?

EBL [illegible] Enrollment

others?

What goes in Address sides?

11-4-15

Staff

11-4-15

* 10 page [illegible] ? (Healthy [illegible], MIHP, NFP, Early Head Start, Healthy [illegible], WIC

— [illegible] to provide some more feedback on the list.

Marsha Hawley [illegible] Monday
what are the implications [illegible] networks.

* Print out your questions for [illegible]

1pm tomorrow

When could we meet?

Monday the 16 at [illegible]
Monday the [illegible] [illegible] + [illegible] Tues [illegible] Wed for AL

150 to 244 explain

Auto trans

ONE	7 V	not open	
Two	15 Cap	not open	
THREE	open	11 V	open — this has events
Four	22 V	open	
FIVE	9 V	not open	
SIX	12 V	open	

GCHD training

11-10-15

ETC
Matt Duncan
Melissa Reich
Tracey Wahl
Sherry Taylor
Kim N.
Jas Westram

Get DCH file transfer
access to Matt, Melissa, Tracey

4 hrs per week

Courtney recommendation including Prevention

* send ... to Courtney
* send ... docs to Martha
* get ... at ...
* ... talk to Sherry about ... due dates

Having CBL forms

" enrolled in LSHP

How many contacts?

15:02 - 31

What are the roles for the Access?

Final #EH Data

11-17-15

Change ID to Child [illegible]

[illegible]

NACPSC ID

Maybe the DMV group [illegible] NACPSC [illegible] Report

[illegible] [illegible] of [illegible] [illegible] Ch. 1310 [illegible]

[illegible] NEBI [illegible] [illegible] [illegible] [illegible] [illegible]
[illegible] [illegible] address
relocation [illegible] yes/no

[illegible] on an [illegible]

[illegible] [illegible] the top one of [illegible]

1-7-2015

Flw V

make cert. attempts [illegible]

HV to Open: Complete

- Unable to locate — Home Visit Attempt

- Refused

CLAP

11-24-15

Martha
Jessie
Karen
Bill

. check w/ Report Writer

Bring laptops to Key/ing meeting
Sedro WHLPSS

① Let Martha know about any FAIL children 20+ or other
special circumst...
② Jessie will CC Martha
on all CAL emails to Karen

* Call Nate re Report Builder
** Budget justification w/ Martha
** CDC - Macomb

Flight Data Management

1/30/15

Lisa
Randy
Martha
Courtney
Bill

Fole exchange
finally
anything 65+10 years old
check them

//

Flint Weekly brief 11-30 4:15pm

Kim
Sherry

Call ?? ??

Below 5 → ok
no ?? – not ??
?? ?? – fixed

12/2 12pm

Karen ??
?? ??

?? Khal

Staff

12-2-15

Karen will copy me on GCHD reporting

* Send changes to Media List, send to Heather on Mondays

put in outlook ← * make an external email list of Carolyn, Karen & Heather

* Write procedure for updating the Media list, sending to GCHD, receiving their files

* reschedule ~~[illegible]~~ next meeting
include Courtney

Final Data

12-3-15

"TUBK"

Other fields

① Date of 1st contact attempt

② Case closed? [illegible]

Why? _Reason [illegible] <5

[illegible]

③ Date of 1st Visit

Parent refused

Move

④ Date closed

⑤ Reason closed

① [illegible]

② [illegible]

To Match file

[illegible]

Child's

Mo's last Name

HH Case # [illegible]

* [illegible]

Flat EBL Database

12/8/4

✓ Compare CM rpt vs prev week

✓ ZIP code issue – [illegible] SBLL code ? yes

✓ Add [illegible]
[illegible] CM hyphen [illegible] [illegible] data dictionary, add edit as new
& add new CM fields

CLMP stuff

12-9-?

2 epi positions (?)
12-level and 10-11-level

[illegible]

[illegible] yet?
continue reports at age 6, others may be added case by case
[illegible] Zips

✓ * email / Nancy re [illegible] list

[illegible] original [illegible] on [illegible]

✓ * [illegible] calendar w/ Karen

✓ * [illegible] out list of [illegible]

[illegible]

Dr M-A

12-9-15

Sept 15 →

I said [illegible] by Thursday pm...

CLAPP Flint Track Base

12-12-15

Bill
Kay
Keith
Mary
Cathy

GCHD Tuesday call

12-15-15

Lindsey
Tammy
Jessi
Jan
Sherry
Ken
Ned
Karen
Emily
Nancy

New nurse starting in January

Add all ran for kids 6+ to Weekly Report

[illegible] say OK with [illegible] cap/renew forms

A

Try to determine when you first ran numbers,
& when they went up the admin line?

Had surveillance data

① What is the time period?

② What is the water sampling?
③ What do the the Bible look like?

EPA
DEQ house and rule specific
V Tech

404 348-6495 Black
770-988-7992 Home (Tinsley)
Mary Jean Brown

APL treaty -
water/lead levels went
down within 4 months

We can't put numbers of lead
in comparison with
each other. Children
will ...
We have to reduce all
sources of exp.

[illegible]

[illegible] slightly diff [illegible]

[illegible]

[illegible]

2[illegible] [illegible]

6:15 7:00 8:00 [illegible]

Leslie — [illegible] Questions [illegible]

5-8928

Send to Rashmi

copy Leslie

	2314 2038
Ingred	
Genesee Co	Meredith
WIC -5	
program	Lenawee Co.
	27
$35,000	hosp
810-237-6167	Brill
ifisk@gchd.us	Wayne Co.
	mmackey@hline.org
517-335-8034	5890
	403
	2
	12
	4
	6311

20+ YR
~~2014~~
10-19 201
914

924

Two Default Files

Summary of by Norm

how many · Working
" Med?
" " < 2 yr
" " by ZIP code

how many only 1 call?

graph showing
decrease

57 by proper
Method

$350
-100
$250

10/26/15

782045

9

810 257-3833

Weekly
Summary
9 new results for Plant

W [illegible]
training
[illegible]
held records

@ [illegible]
[illegible]
248-424-7177

2916637 [illegible]
2911404
Giasson, Brayden

2747 [illegible]

[illegible]
4 8533

Restak	C 5¼	76
	C 1⅝	0
C-S	V 5¼	65
	V 1⅝	6
Time [illegible] 7	N ¼	55
	[illegible]	1

[illegible]
9/13/10
7/15/13
3 V
4 C

(1) Lori L.

734-544-6832

294
54

227

Lynn [illegible] w/ others [illegible]

Meeting tomorrow

Kerry 5-9935
[illegible] Michelle 5-8984

Court people

[illegible]
[illegible] 9/28/15
[illegible] 9/[illegible], 2015

Zero [illegible] since last report

For each time
[illegible]
[illegible]
GOLL [illegible]
[illegible]

9/28/15 [illegible] ↑
[illegible] →
[illegible] ↓

~~[illegible]~~

Finish

Book 1 -

in W: Drive

Korey Ardetsch DC

~~225-9935~~

Courtney - GD

Medical - ~~BLI~~ - ~~[illegible]~~

~~Catherine Miller~~

~~5~~

① 3616 Fenton Rd 48507

② 531 Seymour St. 48502

③ 6308 Torrey Rd 48507

④ 3366 Corunna Rd 48502

⑤ 2132 Davison Rd 48506

⑥ 555 Seymour St 48502

William Downey

Jim Caplan

2018 Brandy Crawford-Johnson

Thomas Crawford

7/26/18
79

815 N Park(J)
1200

How many Flint EBLLs before Apr 2014?

Genesee " outside Flint?

~~Create and Import [illegible] file~~

~~Update the list [illegible]~~ 79

74

153

Fix the Access to import text files?

Bring laptop, projector, folder w/ paper

~~Put away message on email and phone~~

0-2

by Pay R — Need Card 514 — 83
. . . 154 — 1

5-9 — Need Text 514 — 66
10+ — . . . 154 — 7
Venus MPH - [illegible]
[illegible] web plan — NH day — 6
Low — 8

Prevm [illegible] file 0459
cropped out of record #?
Find out, carve out, & re-import

~~Read HL7 doc, [illegible]~~ — Remove Karen Archer

~~Need to get file to Sherry~~ — add Sdr Ad. [illegible]

3160400

Comm Rep
Re
Detroit
Detroit Health Dept.
313/876-0133

Reschedule
Training

Midwest

HHLESS Test

Re 819

Rodriguez Brown Mejia

Retest HHLESS
Check Sheet

John Lynn DCG

~~Edit - Dated~~

Sue Keen
Bryann
Rhyd
Kelly
Teci

7-17-2013
Luke
Chrislyn

Tammy Dell

tammy.dell@
2etc.com

Zelek, William	Flint Water into
	the home
4344 1st St	CLPCC responds with
Clarkston	data, tracking & TA
	to GCHD nurse
C 48346	

Jan 11

Cheryl Celestin 984-8063
wants to take water to Flint
I gave her Sherry Taylor's phone#

Lorie Fo
Washtenaw
HHCOS help

January 12, 2016

Marlene R. [illegible]

Kim Noble
810 227-4578
[illegible]

Karen Cichowski
Chippewa Co
17 v 1 v

Wed Jan 20 2016

Jeri J.
810-237-4543 —
Pass
Call her for leadcare

Called Kim at Hamilton - left message

Called Tracy @ Linden
gave her J.J.'s name/number

Sue Keen @ Mana 4/08 pull
run reports to MDCH Called
Dob, children 616.494-5577

gave to Jeri

Sally Abdul MD
Lead test at WIC
has called to MCIR
reporting
313.876.0247
Jerry to call
email a template to pediatrician

Leadcare/Lead
810.964.9032
2303 Stonebridge
2303 Stonebridge Dr
Flint 48532
Mustafa G. Akpinar MD
Akpinar Children Clinic
810.235-8571

January 25

Perry Rutledge
re [illegible]

[illegible]

810.227-[illegible] . [illegible]

[illegible] tomorrow [illegible]
left message, - Try [illegible]

Dr [illegible] [illegible] [illegible]

tomorrow PM [illegible]

[illegible]

[illegible] - recommended

734.355-0027

Called back, left detailed message
[illegible] recommendations

Jan 26

call
Shirley W. - Kent
old lab results

5-9 cases
old results

Message
Kim
810-237-4571

New case

call Lori - Allegan
[illegible] / [illegible]

Debbie Garcia
[illegible]
[illegible]
will [illegible] call
[illegible]

Pat Beach Monroe 11:45
734-240-7864
HHLBSS [illegible]
[illegible] by email

January 24

Kim Noble
Moline
9 kids of 47 not on our list
5 kids not in UNLPSS?
Kim will add 4 to list
will fax other 5 names

Renee Hughes 3:00
called
re conversation re Nestle and budget

message 12:46
Andy Such 487-8543
use Lansing as a model
replacing lead service lines

message
Joe at Hopkins 4:30
517 335-8265
508 755-8754
7304
William from ? Las
PAMEL
Pathol.

Feb 2

Walter MSP

(3) Kim N 1/9/12
810-237-4571
275-1843
1414 Lakefan! Dr
48504

(4) Diane Clark
58521

Kim Noble
Dwayne Powell
201 W Philadelphia Dr
48503

Prut ... on
email
Kopy Game
May Sea
...

Vicki Cathy -
all cases
Zayden Reed -
...

Cathy about ...
Jackson ...

Monica Vasquez

Feb 4

MedDir Quest Dayport 3/4

offering free training sessions

Dr Steve Amandoll

248-860-0830

conf. call today to discuss

would like to hear before the call

ODDB 11/5

Nancy P. called

Content language

Rob 11/19

Mobile Pilot dts

248-327-1754 called

Angie Wayne State

GHR? Fab18

313 577-8911

Feb 11

deanne@michaelappmd.com

616.323.3227

Informal Medium e Recs of Word Mail

Note Cards

100 records

Jen Strathern

case mgrs

(1)

Kim - Hamilton Comm Health Network

FQHC

Lead cares

810-687-1008 x 4510

kwarden@hamiltonchn.org

Linda Scott

Jerry Curtis

CHCA

2,4 v 25

Of Blend ... Cap 25

who what ? ... 25

Feb 12 1:30

Jackie & Linda Scott 1 kept message

# of new 25 children for ARUP

PH majority 801-583-2787

x 2745

11 zip #6

6-17

Rob D

Tom H.

Request Negotiate Access

① message
Rob - 248-327-1759

Maybe?

② Rob regain negotiating offer

Inge Blair

Offer
151 hrs

regarding CM

Feb 18

Melissa - ARUP
Bunker
Compliance Dept
801-583-2787 x 2495
bunkerm@aruplab.com

ID HIV

① Data 526
Karen Buell
Milwaukee
414-524-3138

① Kurt Krause - Defendant
3-8010 / in lawsuit
AG

① Kim Gerarse
police

①

Susan Keen Ottawa

Nicholas Cotter
appeared Lt.
5 282-7765

Lenora Foster

Marsha Ottawa

49423

2013-to-2015
address, age 10

CW10 sandman
test late, recent

all ages

mmansaray@
miottawa.org

March 2

3:37 [illegible]

Sue Moran FY2015

0-3 [illegible]

[illegible] [illegible]

[illegible]

Sue Keen - Ottawa [illegible]

[illegible]

Marlene

$200,- 2016

Alex Hill - Medicaid - [illegible]

313 876 0387 118190

205711

272017

(1) Ingr-Blair

open up Carter, [illegible]

3047059

March 7

~~[illegible]~~

Linda Scott 1:33 Mar 8

335-8823

Calls [illegible]

~~[illegible]~~

[illegible] 3/24/16

[illegible]

Alex Hill 12:28 March 4

[illegible] 2019 [illegible]

313 826 0387

Marchs

Ingerllar

Ra S

5-19-14

3220299

Mr.

421086

Myle 3074873

cell 313. 880-4632

Tom H. 976

MCCB peudl

130 - 3 ortheman

5-3861

Nancy P 945

rep. to check

Veronica report

allegations # under 21

declined

allegations / contacts

150

Stan Kephart III

353-9119

1-3

7 March 09

called Christian Orgs
Re legal docs

Richard Kuhl

Paul Haan
multi-year
by trusts in GR — [illegible] 2.16
rental property [illegible]
building permit
pool

left 2nd message for Debbie Kelly

Pool Assoc
Jane

March 31

Mary Scobl[illegible]
[illegible] [illegible] 421 McPherson
214-4807 [illegible]

Jamie [illegible]
248-559-7958

April 1

Colleen Bana
SMILES MACAUL 2:30
3190642
713.826.2028

Tim Dignam 11:31
[illegible] Richard [illegible] McCRAE
Keep in native format

Brenda Rojas

ELLCM contact

[illegible] Lorelle Penny

O Erik Frail

Legal office

Morgan McNabb

1½

1.5726 [illegible]

O Jodi

Oak[illegible] Co. 11 D. [illegible]

248-424-7120

[illegible] plus [illegible]

[illegible]

[illegible]

Christine Dwyer

lawsuit look out for notice [illegible]

Nappier v Snyder CVB > [illegible]

Immediately send to Charter 10 [illegible]

[illegible] email [illegible]

alc.

Class action lawsuit

against [illegible] Charter

① Tina Scott

Lead paper

Talked to [illegible] about 2 [illegible] children

[illegible] provider

Apr 11

CHAP [illegible]

Date Contacted

HHCPSS, [illegible]

[illegible]

Andrew Canas

Flint - change in work-ins

Compare EOLL before & after

1 family

April 2014

May 2013 - April 2014	May 2014 - April 2015
Visits	Visits
29	11 less
58	194 more
K<6 visits	K<6 (visits)
22	100 less
49	136 more
	NEW
7	11
3	8

CDC update (5 minutes):

Flint: has gained national attention, has increased attention to lead poisoning in general statewide. Has also gained attention of our administration, resulting in a tremendous increase in internal demand for lead data—on Flint especially, and more recently other areas of the state--but also an increase in our program's staff—two new analysts and an epidemiologist soon.

Not directly related to Flint:
MICLPS – replacing old Lotus Approach database software with a new .Net system—still troubleshooting, trying to get from Test to Production

HHLPSS – in Production, but always trying to move forward—main thing now is trying to improve reporting. If anyone out there has had success using Microsoft SQL Server Report Builder to create new reports, please let me know.

HL7 and HIE – creating new HL7 message for blood lead; creating a pathway for labs to report HL7s through Michigan's HIE, landing automatically in MICLPS.

Trying to develop a detailed but efficient log of all data requests, whether routine (summary, de-identified) or complex (identified info requiring data use agreements and IRB approval).

1.) What is currently being done to assist children, in Flint, who have been exposed to lead?

a.) Ages 0 -6 years

Children with blood lead levels (BLL) => 5 ug/dL are offered case management (nursing visits to the home for education and assessment, and coordination with the primary care provider), an environmental investigation by a State-certified investigator (to identify lead hazards), and enrollment in the Lead Safe Home Program (to remediate lead hazards that were identified).

b.) Ages 6-14 years

Same as above

c.) How many children in these age groups are actually being affected by elevated blood lead levels and the current means for assistance?

Since 4/1/2014 (approximately the time when Flint's water source was switched), 201 children age 0-5 and 25 children age 6 to 17 have been identified with BLLs => 5 ug/dL.

2.) What is currently being done to prevent more children from lead exposure?

Distribution and installation of water filters, bottled water, nutrition education, [other??]

3.) Is there consistent blood lead testing currently ongoing in Flint? For what ages?

Typically all children enrolled in Medicaid or WIC, or having some other risk factor, should be tested at age 1 and 2. The CDC has called for all children in Flint age 0-5 to be tested by spring of 2016. Between April 1, 2014 and March 25, 2016, 7115 children in Flint less than six have been tested.

a.) Who pays for this testing and approximately how much does it cost?

Medicaid pays for the test for children who are enrolled. Some private insurances also pay for a test, otherwise it is self-pay. [or are all children tested for free at health department?] Many blood lead testing events have been held in the city, with sponsors picking up the tab for testing.

Medicaid pays $xx for drawing the blood and $xx for the analysis. Some private laboratories charge more for the analysis, but we don't know the specific prices.

4.) There are other low-income cities around the country who also show elevated blood lead levels, especially in children. Some even with higher levels than Flint. What can Flint learn from other cities where the children have higher blood lead levels?

[I don't have an answer for this.] We are looking at this issue.

a.) Have there been any known evidence based practices that have worked well in other areas with high lead exposures?

1. Removal of lead hazards, especially lead paint and dust in the home, and soil outside the home.
2. Education of families on the dangers of lead.
3. [other?]

HHLPSS ID
Child ID
Most Recent Specimen Date
Most Recent PB Result
Most Recent Sample Type
Last Name
First Name
Date of Birth
Guardian Last Name
Guardian First Name
Phone
Original House Number
Original Street Name
Original Apt
Original Patient City
Original Zip
Most Recent House Number
Most Recent Street Name
MR Apt
Most Recent Patient City
MR ZIP
Re-locate
Provider Name
Date Child was Added to List
Date New Test Added
Testing Status
Original Specimen Date
Original Pb Result
Original Sample Type
Status Code
PHN Assigned
1st phone call
2nd phone call
3rd phone call
Contact Successful
Date Letter Mailed or Delivered
Water Filter Initially
Water Filter Delivered
PCP Follow up
First Home Visit to Open for CM
Medicaid Form Sent to Accounting
Second Home Visit
Medicaid Form Sent to Accounting
Dropby Visit One
Dropby Visit Two
Certified Letter

GCHD
edits

12.8.15 – CM Status call with Sherry, Kim, Andrew, Jim?, Nancy, Karen.

GCHD info about challenges/barriers with CM in Flint:

- CM staff have another 6 scheduled, not seen yet.
- Some families with multiple kids, but GCHD has been counting the family, not # of children. So numbers look low.
    - *Follow up: Genesee staff will discuss with their Supervisor including count of children (in columns F and H), not count of families. Both parties understand that the # of Medicaid claims filed will not match the # of children.*
- Many of these are old tests – so families are choosing to get a new test, want to see what those results are before they have someone come out.
- Some families have moved, are not at the same address as when the child had the EBL, therefore do not want someone to come out.
- Some people have asked for more information, so they can think about whether they want someone to come out.
- Some people live with other people, so need to loop others into the decision to accept CM or invite the EBL investigator into the home.
- Currently offering both CM and EBL when they call; some families don't want a 6 hour visit. Also the nurses are trying to go out with the EBL investigator, which holds up the CM visits.
    - *Follow up: Are we comfortable with the two services being offered separately, in case the family will accept one but not the other? We will review this here with Wes and Courtney; Genesee will review this with Jori to get her input.*
- Some families are convinced that the water is the only problem, so they are not feeling the need for CM and/or EBL investigation that looks at the house. Some have accepted filters, but not CM/EBL.
- Some children have a history of even higher EBLs, so a 5 or even a 10 now is not a big concern to the family.

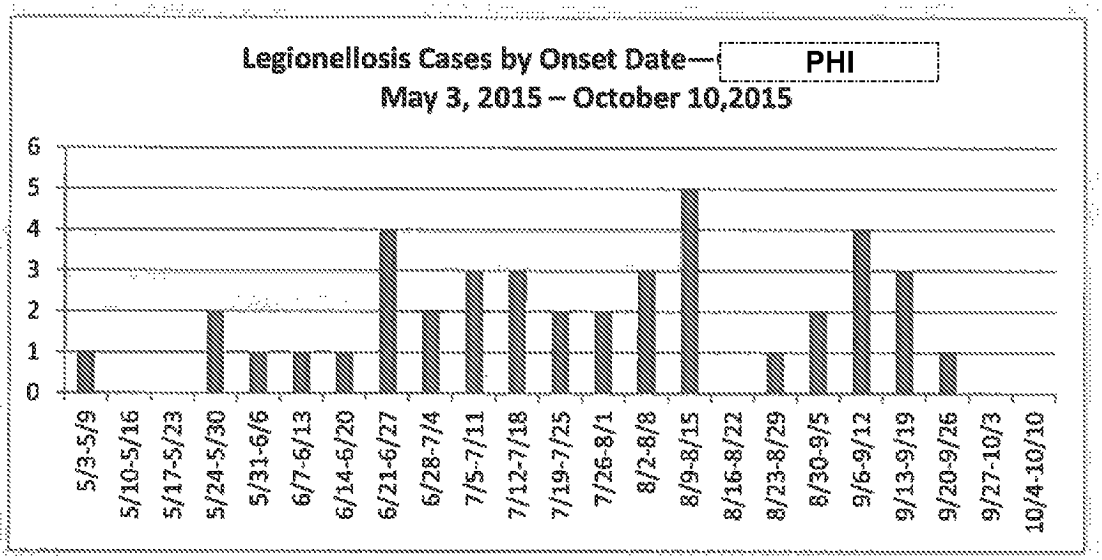
PPI

October 22, 2015

Update on PHI Legionellosis cases —May-Oct, 2015

Current Case Count

- 41 cases reported since 5/1/2015 (40 Legionnaires disease, 1 Pontiac Fever)
- 37/41 (90%) interviewed with supplemental questionnaire
- Onset dates: PHI



- 21 (51%) male; median age 66 years (range 35–89 years)
- 41 patients were hospitalized; 2 deaths

Lab Results

- 41 (100%) were Legionella Urinary Antigen positive
- 11 respiratory specimens received at BOL for culture/typing
  - 8 were culture confirmed; all *L. pneumophila* SG1
    - 3 specimens unsuitable for PFGE: 2 no growth, 1 specimen overgrown with mold
    - 8 specimens were able to have PFGE performed
      - 6/8 specimens had unique patterns:

Onset date	Hospitalization within 2 weeks prior to onset?	Residence on City of Flint water?
PHI	No	No
	No	No
	No	No
	No	No
	No	Yes
	No	No

-2/8 specimens had matching patterns:

Onset date	Hospitalizations within 2 weeks prior to onset?	Residence on City of Flint water?
PHI	Yes- McLaren	No
	No	No

Exposure History

- Cases with hospitalization during the 2 weeks prior to onset: 20*/41 (49%)
  - 19/20 (95%) were hospitalized at McLaren in the 2 weeks prior to their onset
    - The last case with a hospitalization exposure to McLaren during the 2 weeks prior to onset occurred mid-August; last date of hospitalization: PHI
  - *1/20 (5%) was not hospitalized, but spent significant time at Hurley during the 2 weeks prior to onset
- 21/41 (51%) of cases have no prior hospitalization reported during their incubation period
- Outpatient visits and visitations to hospitals have not been assessed

- 30/41 (73%) case residences NOT on City of Flint water system
- 10/41 (27%) case residences on City of Flint water system
  - 6/10 cases (60%) with residence on City of Flint water system also had a hospitalization at McLaren during the 2 weeks prior to onset

Actions McLaren Flint has taken/is taking (per GCHD)

- Hospital has been testing monthly at various locations since Fall of 2014
- McLaren is now working with a consultant, The Legionella Experts, Special Pathogens Lab, headed up by Dr Janet Stout, University of Pittsburgh, Swanson School of Engineering
- Hospital has been hyperchlorinating ~~since last fall~~, but recently switched to monochloramine
- Upgrades have been made to the infrastructure (details unknown)
- McLaren is preemptively treating symptomatic patients who have been previously hospitalized in 2-week period prior to onset
- Staff receiving additional education about Legionella
- Using bottled water during time concerned about leg. unsure status
- Monitoring water temperatures / testing water temps
- Communication is now with Risk Management team

- Continuing monthly test
- test results
- one test result were differe
- using bottled water

- testing prev consultant grp did, different

switch prev. consult grp maybe 30 June/15?

Oct 14 hyperchlorination, monitoring monthly

- aug 15 hyperchlorination previous 800 sample Special Pat

Marc Edwards - doing additional testing / performed last week

community, residences?

Bug Fuzz

September 11, 2015

Agenda

Welcome

Introductions

Seth Eckel- Flu Updates

Local Health Department

- Case Count Updates
- Community vs Hospital
- Investigations
- Future Actions

Hospital Updates/Action Plans

- Hurley -
- Genesys -
- McLaren -

- special pathogens lab reviewed water system
  jsbar
- water-temp unk.
- esc leg. sampling guidelines

PHI

FAX COVER SHEET

Hurley Medical Center

INFECTION CONTROL

DATE: 2/9/15

TO: Dr. Shannon Johnson

FAX NUMBER: 517-335-8263

FROM: Ann Nurdy

PHONE NUMBER: (810) 262-9459, (810) 262-9533, (810) 262-4894

FAX NUMBER: (810) 762-7268

PAGES (including cover sheet): 3

COMMENTS: Line list of cases you had requested on Friday. Let me know if you need anything else

Ann

The information contained in this facsimile message is privileged and confidential information intended specifically for the use of the individual or agency named above. If the reader of the message is not the intended recipient, or the employee or agent responsible to deliver it to the intended recipients, you are hereby notified that any dissemination, distribution, or copying is strictly prohibited. If you have received this communication in error, please call us immediately.

Line list from Hurley

Report 1: Line list of Disease Cases for a Given Timeframe and Geographic Location
Report generated: 02-09-2015
Time Period: 01/01/2014 - 02/09/2015
Case Status: Confirmed, Confirmed-Non Resident, Not a Case, Probable, Suspect, Unknown
Investigation Status: Active, Canceled, Completed, Completed - Follow Up, New, Review, Superceded

Reportable Conditions: Legionellosis
Counties: Genesee

Invest. ID	Name	Address	Age	DOB	Race	Ethnicity	Sex	Condition	Status	Onset	Referral

There are 13 cases listed in this report.

PHI

PHI

PHI

PHI

PHI

PHI

PHI

PHI

Not to be released to
unauthorized persons
protected by MCL 331.533

PHI

PHI

PHI

PHI

PHI

PHI

PHI

PHI

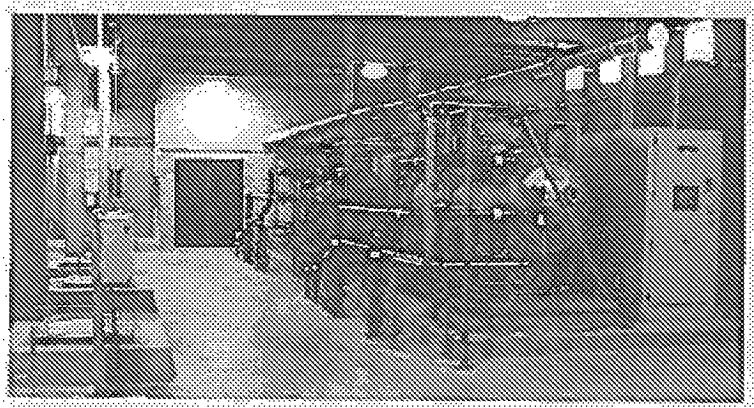
Operational Evaluation Report

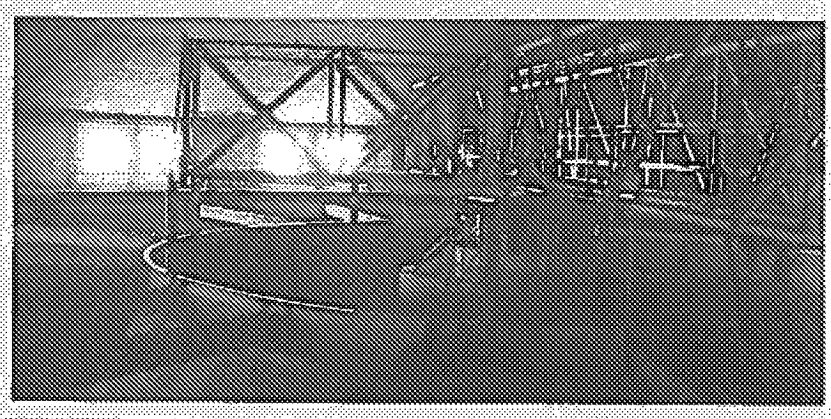
City of Flint

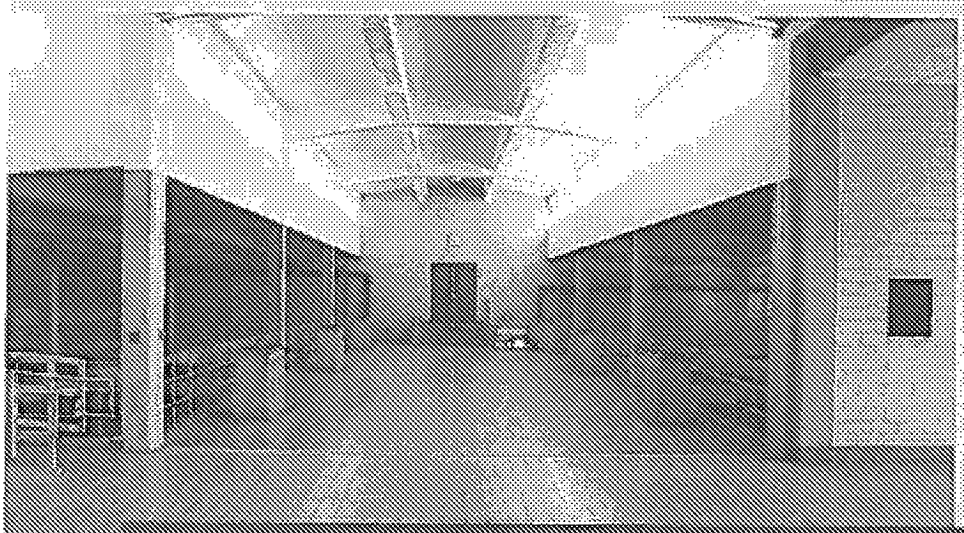
DRAFT

Trihalomethane Formation Concern

November 2014







Lockwood, Andrews & Newnam, Inc.
A CDM SMITH COMPANY

TABLE OF CONTENTS

Executive Summary 1

I. Background 3
A. Water Supply Transition 3
1. Detroit Water & Sewer Department 3
2. Karegnondi Water Authority 3
3. Flint River – Interim Period 3
B. TTHM Pending Violations 3
C. WTP Recent Improvements and Status 4
1. Phase I WTP Improvements 4
2. Past Pilot Study & Testing 4
3. Phase II WTP Improvements for Full Time Operation 5

II. Source Water Evaluation 6
A. Data Analysis 6
B. Conclusions 6

III. Treatment Process Evaluation 7
A. Existing Process Description 7
1. Intake 7
2. Ozone 7
3. Rapid Mix 7
4. Coagulation / Flocculation 7
5. Settling 7
6. Softening 7
7. Recarbonation 8
8. Filtration 8
9. Disinfection 8
10. Clear Well and Pumping 8
B. Jar Testing / Experiments 8
1. Approach 8
2. Protocol 8
3. Considerations 10
4. Results 10
5. Conclusions 10

IV. Distribution System Evaluation 11
A. Infrastructure 11
1. Piping 11
2. Storage 11
3. Pump Stations 11
B. Operations & Maintenance 11
1. Pump Station & Storage Operations 11
2. Booster Disinfection Practices 11
3. Changes in System Demands 11
C. Water System Hydraulic Modeling 12
1. Simulation of Existing System 12
2. Identification of Deficiencies 12

TABLE OF CONTENTS

V. Recommendations to Minimize Future OEL Exceedances 13
A. Source 13
1. Watershed Management 13
2. Monitoring 13
3. Intake Operations 13
4. Seasonal Strategies 13
5. Upstream Contamination Issues 13
B. Treatment Process 14
1. Operational Recommendations 14
2. Infrastructure Change Recommendations 14
C. Distribution System 15
1. Manage Water Age 15
a. Storage Tanks 15
b. Residence Time in Pipes 15
2. Reduce Disinfectant Demand 15
a. Flushing 15
b. Cast Iron Pipes 15
3. Water Modeling of Recommendations 15
D. Booster Disinfection 15
E. Categorization of Actions 15

VI. Figures
1. Flint WTP Process Diagram
2.
3.
4.
5.

List of Tables

1. 2014 DBP Test Results
2. 2002 WTP Treatment Recommendations
3. Flint River Water Quality Characteristics
4. Bench Scale Test Mixing Intensities
5. Bench Scale Test Chemical Feed Rates
6. Action Plan
7.
8.
9.

DRAFT

EXECUTIVE SUMMARY

Environmental Protection Agency (EPA) and Michigan Department of Environmental Quality (MDEQ) regulations require that public water suppliers test drinking water quarterly throughout the distribution system for disinfectant by-products (DBP's). Two categories of DBP's, tri-halomethanes (THM) and halo-acetic acids (HAA5), are regulated and must be tested for. The City of Flint began operation of their water treatment plant (WTP) full time with the Flint River as the source on April 25, 2014. Since that time, two quarters of samples taken indicate that future violations are inevitable for total THM without some modifications to the water system. In response, the City hired Lockwood, Andrews & Newnam, Inc. (LAN) to complete this Operational Evaluation Report (OER) in conformance with EPA guidelines with the goal to determine the cause(s) of high levels of THM and evaluate possible solutions.

The EPA promulgated the Stage 2 Disinfectants and Disinfection By-Products Rule (DBPR) in January 2006 which set maximum contaminant levels (MCLs) for total trihalomethanes (TTHM) and HAA5 based on an annual running average, tested quarterly, for a given sampling location. The City of Flint reports levels from 8 sampling test locations. Of the two quarterly sampling cycles since Flint began operating the WTP full time, HAA5 levels have been acceptable but TTHM levels have been high at all 8 sampling sites.

According to the Stage 2 DBPR, the annual average value requires 3 quarters of sampling data with the most current period counting twice. Therefore, the City of Flint has not yet experienced a violation of the TTHM MCL because only 2 quarters of data have been obtained. However, levels recorded indicate the likelihood of an MCL exceedance later this year.

A number of issues have been identified as possibly contributing to the high THM levels measured.

1. Inefficient ozone system operation which has resulted in increased chlorine feed.
2. Sewer leak discovered upstream of intake causing high total Coliform levels, increased chlorine demand, and resulting need to increase chlorine feed.
3. Bypass stream around softening contributed to chlorine demand.
4. Unlined cast iron pipes in the distribution system contributing to chlorine demand.
5. Recirculating water in the distribution system due to less than ideal configuration of Cedar Street and West Side pump stations.
6. Broken valves resulting in stagnant water in some areas.
7. High chlorine demand in filters.
8. High THM formation potential (THMFP) in source water.
9. Less than optimal removal of THM precursors.

ACTION PLAN

The City of Flint has signed an agreement with the Karegnondi Water Authority (KWA) to purchase raw water drawn from Lake Huron. The KWA system is currently under construction and expected to be operational by late 2016. The water supply from Lake Huron will have entirely different water quality characteristics from the Flint River and those characteristics are expected to yield drastically reduced DPB formation. With that, non-structural options to help reduce THM levels are much preferred over solutions requiring new construction. Therefore, two categories of actions have been devised: Stage 1 being actions that can be completed relatively quickly without major construction and Stage 2 consisting of either long term actions or solutions requiring major construction. The City has completed or intends to complete Stage 1 Actions by February 16, 2015, the week in which the next

quarterly sampling is to be done. Stage 2 actions are to be implemented only if Stage 1 actions are ineffective in adequately reducing TTHM levels and therefore Stage 2 is contingent upon the outcome of Stage 1.

Stage 1 – Immediate Actions

- Hire ozone system manufacturer to troubleshoot ozone system
- Bench scale jar testing
  - Match existing process and access possible areas of improvement
  - Simulate potential modifications to treatment process
  - Evaluate coagulation and flocculation polymer aid feeds to assist with TOC removal
- WTP operational changes
  - Discontinue softening bypass stream to reduce chlorine demand
  - Disinfection of filter beds to reduce chlorine demand
  - Possibly begin coagulation and flocculation polymer aid feeds to assist with TOC removal depending on bench scale test results
- Increase water main flushing efforts to minimize stagnant water
- Water system modeling to identify areas with high water age and potential solutions
  - Cedar Street Pump Station potential recirculation
  - West Side Pump Station potential recirculation
  - Storage tank volume use
  - Possible broken closed valve locations
  - Locations in need of flushing
  - Lower high water levels in storage tanks

Stage 2 – Contingent Actions

- Fix ozone system
- Start feeding coagulation and flocculation polymer aids to lower TOC, if not completed in Stage 1
- Convert to lime and soda ash softening
- Change disinfectant to chloramine or chlorine dioxide until KWA
- Install pre-oxidant feed at intake to optimize ozone disinfection
- Implement advanced treatment for THM precursor removal
- Increased main flushing based on water modeling results
- Continue valve replacements with water model assistance
- Emphasize cast iron pipes on water main replacement priority list

I. BACKGROUND

The City of Detroit Water and Sewer Department (DWSD) has historically provided drinking water for the City of Flint and Genesee County. In the late 1990's growing concern regarding the reliability of the DWSD supply prompted the City of Flint to upgrade their existing water treatment plant (WTP). Those improvements, defined as Phase I, were completed in 2005 and were intended to allow the Flint WTP to operate, using the Flint River as the source, for an extended period of time in the event that supply from the DWSD was temporarily interrupted. Additionally, the Phase I improvements set the stage for Flint to break free from dependence on the DWSD supply and water charges over which they had no control.

A. WATER SUPPLY TRANSITION

1. Detroit Water and Sewer Department (DWSD)

Until recently the Genesee County and Flint region had been provided drinking water by the DWSD. However, due to excessive cost increases and reliability issues with the DWSD system other options had to be explored.

2. Karegnondi Water Authority (KWA)

In 2010 the Karegnondi Water Authority (KWA) was formed for the purpose of developing a new water supply from Lake Huron to serve the region in lieu of the DWSD supply and the City of Flint elected to join. The KWA expects the new system which is currently being constructed to become operational in the fall of 2016.

3. Flint River – Interim Period

With a water supply agreement between Flint and the DWSD set to expire in early 2014 and the KWA system not expected to be operational until late 2016, the City of Flint decided to initiate operation of the existing WTP full time utilizing the Flint River as the interim water source. A variety of WTP improvements were necessary for the Flint plant to become a full time plant. For purposes of this report, Phase II improvements to the Flint WTP are improvements which have been made to allow the plant to operate full time with either the Flint River as the source or the KWA supply as the source.

B. TTHM PENDING VIOLATIONS

The calculation for determining if the MCL has been violated for TTHM is:

(2 x current quarter value + previous 2 quarter values) / 4

Flint has completed tests for 2 quarters and therefore has not violated an MCL limit to date. However, the third quarter of sample data is likely to provide MCL exceedances at all 8 sampling sites. Test results are tabulated below.

TABLE 1 – 2014 DBP TEST RESULTS						
Sample Location	TTHM			HAA5		
	1st Qrt 5/21/14	2nd Qrt 8/21/14	3rd Qrt	1st Qrt 5/21/14	2nd Qrt 8/21/14	3rd Qrt
3719 Davison - McDonalds	162.4	145.3		64	43	
822 S. Dort Hwy - BP Gas Sta.	111.6	112.0		52	40	
3302 S. Dort Hwy – Liquor Palace	96.5	127.2		48	31	
3606 Corunna – Taco Bell	106.4	181.3		55	24	
2501 Flushing – Univ. Market	75.1	196.2		38	17	
3216 MLK – Salem Housing	82.2	112.4		41	25	
5018 Clio – Rite Aid	88.2	144.4		49	30	
6204 N. Saginaw – N. Flint Auto	79.2	118.3		50	37	

TTHM MCL = 80 ug/l
HAA5 MCL = 60 ug/l

C. WATER TREATMENT PLANT RECENT IMPROVEMENTS & STATUS

1. Phase I WTP Improvements

Since 1965, the Flint WTP has remained a secondary or backup supply system to the DWSD primary supply. Typically the secondary supply for a public water system is expected to be needed only during emergency situations and normally is designed for short term operation such as providing the average daily demand for a few days. Conversely, Phase I improvements were designed with the intent to upgrade the Flint WTP in order to allow for an extended short term period (6 weeks) because of the perceived high risk that the DWSD supply would fail and remain out of service for an extended duration. Regardless, the Flint WTP was still intended to serve as a standby plant and as such the Phase I improvements lacked redundancies that would be required for a primary supply WTP.

2. Past Pilot Study & Testing

During design of the Phase I improvements a treatability study was completed by Alvord, Burdick & Howson, LLC (AB&H) in 2002. The Treatability Study evaluated the current treatment processes that are in place at the Flint WTP today with the Flint River as the source. The report recommended the following:

TABLE 2 – 2002 WTP TREATMENT RECOMMENDATIONS			
Treatment	Purpose	Point of Application	Dosage (mg/l)
Sodium permanganate	Zebra mussel control	Intake	0.3
Ozone	Taste & odor removal, disinfection	Diffusor basin	1.5
Ferric chloride	Coagulation	Rapid mix	40
Coag aid polymer	Turbidity & TOC removal	Rapid mix	2.0
Floc aid polymer	Turbidity & TOC removal	Floc basin	0.05
Lime	Softening	Softening basin	178
Soda ash	Softening	Softening basin	52
Carbon dioxide	pH adjustment	Recarb basin	37
Media filters	Filtration	Na	Na
Chlorine	Disinfection	Filter effluent	1.0

Of the recommended items, zebra mussel control, coagulant and flocculation polymer aids, and soda ash feed have not been incorporated into the treatment process.

3. Phase II WTP Improvements for Full Time Operation

Phase II WTP improvements are those needed to convert the Flint WTP from a back-up supply to a primary supply plant. A number of improvements have already been constructed as they were necessary to operate full time, treating water from the Flint River. The improvements under the title of Phase II that have been completed or are nearly complete include upgrades to the lime sludge lagoon, the lime sludge lagoon decant and disposal system, decant pump station and force main, installation of mid-point chlorination before filtration, and upgrade of the electric feed sub-station.

Additional improvements to the Flint WTP that are to be completed to become part of the normal treatment process using water supplied by the KWA are:

- New oxygen and nitrogen storage facilities for the ozone system
- New coagulant feed system
- Electrical
  - Pump Station #4 upgrades
  - Plant 2 improvements
  - Filter press building feeder
  - SCADA and controls upgrades
  - Filter transfer pump station feeders
- Installation of the future raw water feed connection point for the KWA
- Pump replacements and VFD installation in the low and high service pump station
- Filter transfer pump station to Dort Reservoir
- Facility security improvements

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II. SOURCE WATER EVALUATION

A. DATA ANALYSIS

Based on past data collected and the 2002 Treatability Study by AB&H, the Flint River water quality varies seasonally with higher hardness and alkalinity experienced in the winter. Higher magnesium concentrations are also experienced in the winter, adding difficulty to the settling process due to neutrally buoyant floc. General water quality average characteristics recorded for the 2002 Treatability Study as compared with average characteristics recorded this year are shown in Table 3 below.

TABLE 3 – FLINT RIVER WATER QUALITY CHARACTERISTICS

Period	Turbidity NTU	TOC Mg/l	Alkalinity Mg/l	Hardness Mg/l as CaCO3	pH	Total Col. Count/day
2001 Apr–Oct	7.9	9.4	215	272	8.1	870-1230 (7300 max)
2014 May–Oct	8.3	10.3 5/22/14	207	252	8.2	1900-9000 (48,300 max)

Other than total Coliform, the Flint River characteristics do not appear to have changed significantly over the past 10+ years. Note that further investigation by City staff revealed a sewer leak upstream of the plant that likely was contributing to the total Coliform count.

B. CONCLUSIONS

Considering the minor changes in Flint River water quality, much of the information contained in the 2002 Treatability Study by AB&H remains relevant today. Data from that report assumed to be consistent today include the following:

- Flint River is influenced by groundwater from a dolomitic aquifer
- Hardness varies seasonally with higher hardness and alkalinity in the winter
- Hardness, alkalinity, magnesium concentrations tend to be reduced by run-off
- Total THMFP is likely 380-440 micrograms per liter as measured between April 2001 and January 2002. The City intends to re-test the raw water to confirm the THMFP has not changed. Results are pending.

In development of the 2002 Treatability Study, processes were simulated which resulted in low THMFP. Therefore, information contained in that report will be used to assist with establishing a baseline jar testing procedure discussed further in Section III.

III. TREATMENT PROCESS EVALUATION

A. EXISTING PROCESS DESCRIPTION

The existing WTP consists of an intake with screening from the Flint River, low lift pumping, ozonation, rapid mix, flocculation, settling, softening, recarbonation, filtration, storage and high service pumping. A process diagram is shown as Figure 1.

1. Intake

A 72" diameter pipe draws water from the Flint River through 2 traveling screens to the low lift pump structure. No chemicals are currently fed for Zebra mussel control or pre-oxidation as recommended by the 2002 Treatability Study. Manual removal of zebra mussels proved to be more economical than installation of chemical feed equipment considering the short term need.

2. Ozone

There are 2 ozone generators designed to provide adequate ozone for a WTP flow of up to 36 mgd. There are 3 ozone contact basins. The ozone generators were designed to produce 900 lbs/day at 10% concentration and up to 1300 lbs/day at 6% concentration each. Recent readings have indicated a production rate of approximately 700 lbs/day at 4% concentration. While serving the purposes of taste and odor control and disinfection, it is possible the current ozone feed might not be optimized to realize additional TOC removal benefits demonstrated by previous tests. Also, less than optimal ozonation has led to increased chlorine feed.

3. Rapid Mix

East and West rapid mix chambers allow chemical feed prior to the flocculation basins. Each rapid mix chamber is equipped with a 5 hp mixer.

4. Coagulation / Flocculation

The WTP contains two equally sized flocculation basins, east and west, and each basin provides tapered or gradually slowed mixing from inlet to outlet. There are fifteen 2 hp mixers for each basin with VFDs to control mixing speed. The 2002 Treatability Study recommended feeding both coagulation and flocculation polymer aids. Neither polymer aid is being used today because turbidity and TOC removals have been sufficient to meet regulatory requirements.

5. Settling

Primary clarification takes place within 3 basins containing plate settlers. The settlers are operating as designed.

6. Softening

Again, there are two basins for softening: east and west. Each basin is 120' in diameter and contains a solids contact softening unit. Each softening basin/unit has a design capacity of 18 mgd. Low lift pumping limitations, flow control to the basins, and fluctuating demands have made it difficult for WTP staff to stabilize the softening process. Softening is accomplished by feeding lime. The decision was made by the City not to feed soda ash in order to remove non-carbonate hardness because acceptable hardness levels could be achieved with lime feed only and softening is short term until Lake Huron water becomes available.

7. Recarbonation

Recarbonation for pH adjustment is accomplished in east and west recarbonation basins between and to the north of the softening basins. Carbon dioxide storage and feed equipment is located west of the recarbonation basins.

8. Filtration

Filtration is accomplished with 12 dual media filters, equally sized and designed to filter 3.0 mgd each. Media consists of 12" of sand and 18" of anthracite. The filters have been operated intermittently over the years due to the standby nature of the WTP and until recently, chlorine injection took place downstream of the filters. It is possible some microbial growth has developed in the filters.

9. Disinfection

Limited disinfection is provided by ozonation, but the primary form of disinfection is chlorine fed prior to filtration and prior to finish water storage / high service pumping. The intermediate chlorine injection location was recently constructed under the Phase II, Segment 1 contract.

10. Clear Well & Pumping

The pump building sits adjacent to a 3 MG clear well and contains both low and high service pumps.

8. JAR TESTS / EXPERIMENTS

1. Approach

There are several well practiced methods by which DBPs can be reduced. First, the disinfectant can be changed to an alternate that has a lower tendency to form DBPs. Second, additional treatment systems such as activated carbon or air stripping (depending on the nature of the precursors) can be added to remove DBP precursors. Lastly, the existing treatment processes can be optimized to remove as much DBP precursor as possible. Of these options, optimizing existing treatment processes is the only strategy that does not require the construction of new and expensive facilities. It is anticipated that Flint will be receiving Lake Huron water in approximately two years and this water will have a completely different chemistry from the Flint River. Major process changes instituted to address THM levels using Flint River water are likely to be unnecessary for Lake Huron water and may even be inappropriate. Therefore, those options which require addition of new treatment processes are undesirable at this time. In recognition of this upcoming change in water source, this study will concentrate on improving the existing processes, rather than adding new ones. New treatment processes will only be recommended if operational changes to the existing treatment train prove ineffective.

Recent sample test results suggest that most of the DBPs are formed in the distribution system rather than within the treatment plant. Therefore, the most logical approach is to reduce the DBP formation potential (DBPFP) rather than simply lowering the levels of DBPs leaving the plant. During bench scale testing, formation potential (FP) levels will be the primary indicator of success or failure of any proposed process modifications.

2. Protocol

Bench scale pilot testing is intended to reflect actual plant operating and hydraulic conditions so the bench scale treatment units will be sized based on various dimensionless factors to ensure the pilot treatment matches the actual system. Bench scale ozonation is not practical due to time and cost limitations. Therefore, water

samples will be withdrawn following the plant ozone basin. These samples will be transported to the laboratory where they will be dispensed into square testing jars. The jars will act as rapid mix, three-stage flocculation, and settling. Rapid mix and flocculation conditions will be matched to the plant based on "Gt" values. The "G" value is a measure of the mixing intensity and is a function of mix time, viscosity of the liquid, and mixing power applied to the water. "Gt" then, is a size scaling factor where time has been accounted for. Settling time will be scaled to match the shorter settling depth of the testing jars. After settling, samples will be decanted from the test jars. The decanted samples will then be lime softened; softening conditions will be similarly matched on the basis of "Gt". Fluoride will be added and carbon dioxide sparged into the samples to reduce the pH. The water will then be vacuum filtered through filter paper, sized to simulate the plant's dual media filters. The samples will be dosed with excess chlorine and allowed to react for seven days before testing for DBPs to determine the formation potential.

Although these conditions may be refined based on new information, we anticipate the following:

TABLE 4 – BENCH SCALE TEST MIXING INTENSITIES

Process	G	Duration
Ozonation	Plant	
Rapid Mix	350	25 sec
Flocculation, Stage 1	50	9 min
Flocculation, Stage 1	25	9 min
Flocculation, Stage 1	12	9 min
Settling	na	10 min
Softening	TBD	10 min
Recarbonation	na	na

It is expected that the primary variables during the testing will be chemical additions and chemical dosages. Specific chemicals and dosages used for initial testing conditions will be selected to reflect current plant usage and the recommendations of the 2002 Treatability Study:

TABLE 5 – BENCH SCALE TEST CHEMICAL FEED RATES

Chemical	Current Usage	2002 Study
Ozonation	4.66 mg/l	1.5 mg/l
Ferric Chloride	7.7 mg/l	40 mg/l
Coagulant Aid Polymer	Not used	2.0 mg/l
Flocculation Aid Polymer	Not used	0.05 mg/l
Lime	120 mg/l	175 mg/l
Soda Ash	Not used	52 mg/l
Cationic Softening Polymer	3.13 mg/l	Not used
Anionic Softening Polymer	0.88 mg/l	Not used
Fluoride	0.45 mg/l	1 mg/l
Carbon Dioxide	32 mg/l	37 mg/l
Chlorine	6.3 mg/l	1 mg/l

3. Considerations

The 2002 Treatability Study did not note significant formation of DBPs. This may be a function of different Flint River water chemistry at that time. However, recognizing the considerable differences in chemical usage and dosages between that study and current operations, those differences in chemical use and dosage are an obvious starting point for optimizing treatment to prevent DBP limit exceedance.

Although it is believed that optimization of current treatment can correct the DBP issue, should optimization of present treatment prove insufficient, alternate residual disinfectants (chloramines and chlorine dioxide) will be investigated as additional treatment measures.

4. Results

To be completed following jar testing and experimentation.

5. Conclusions

To be completed following jar testing and experimentation.

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IV. DISTRIBUTION SYSTEM EVALUATION

EPA guidance for the distribution evaluation portion of an OER is focused on identification and isolation of a specific portion of the distribution system that led to the exceedance. The circumstances of Flint's apparent pending TTHM exeedances are unusual in that a new supply has been implemented which clearly corresponds to the high TTHM sample results. Despite obvious implications to the primary cause of increased TTHM levels, value remains in evaluating the distribution system as there may still be distribution improvements that can be made to help alleviate the problem.

Evaluation of the distribution system, including modeling, was recently added to LAN's scope of services. When finished, information will be provided to complete the following topics in this section.

A. INFRASTRUCTURE

1. Piping
Main break history information available?
List pipe data for system... age, material, size

2. Storage
Considering drop off in demands in recent years, are storage tanks oversized?
Do they have mixing, baffling, other, to prevent stagnant water?
Are tanks in good condition?

3. Pump Stations
Condition of pump stations?
Pumps oversized?
Are valves working properly to maintain pressure zones?

B. OPERATIONS AND MAINTENANCE

1. Pump Station & Storage Operations
Are pressure districts set up properly?
Cedar Street Pump Station – no established pressure zone? Talk to Flint
West Side Pump Station – no established pressure zone? Talk to Flint
High and low levels in tanks optimally set? Should they be adjusted to use less storage volume?

2. Booster Disinfection Practices
They don't have any, do they?

3. Changes in System Demands
Long term decline in demands
Short term fluctuations – max day in winter due to large number of main breaks

C. WATER SYSTEM HYDRAULIC MODELING

1. Simulation of Existing System

Match existing conditions, particularly chlorine residual. We have chlorine feed data at plant and residuals at 10 locations in each MOR, May-October.

2. Identification of Deficiencies

Specific issues to look at:

- Worst case at minimum daily demands
- Water age in entire system
- Recirculating water through pump stations
- Use of storage tanks
- Indications of broken valves

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V. RECOMMENDATIONS TO MINIMIZE FUTURE OEL EXCEEDANCES

A. SOURCE

The City of Flint has already committed to the change from the Flint River as the water source to Lake Huron under the KWA system, planned for late 2016. The risk of future TTHM limit violations will decline substantially with the use of water from Lake Huron due to much lower DBP precursors. It is important to recognize that the Flint River will become strictly an emergency supply when the KWA supply becomes available and any investments toward the Flint River should be contemplated accordingly. Recommendations discussed below in this section apply to the Flint River as the source.

Reverting to supply from the DWSD until the KWA supply is available as an option. However, the DWSD has stipulated that a $4 million connection fee would apply and current water rates would include approximately $900,000 / month flat fee plus usage charges. Therefore, utilizing the DWSD for interim supply is cost prohibitive under the terms defined by the DWSD.

1. Watershed Management

A volunteer group entitled the Watershed Coalition performs various tasks related to managing the Flint River watershed such as spring cleanups and annual benthic studies to evaluate the river 'health'. No additional action is recommended at this time.

2. Monitoring

The City documents typical raw water characteristics as part of standard preparation of Monthly Operating Reports (MOR). No changes are recommended at this time.

3. Intake Operations

The 2002 Treatability Study recommended pre-oxidation in the form of sodium permanganate as a feed at the intake. However, pre-oxidation with sodium permanganate is unlikely to provide significant oxidizing of organics beyond that provided by ozonation. It is possible the addition of hydrogen peroxide would enhance the ozone process.

4. Seasonal Strategies

Past data indicates the Flint River is influenced by groundwater and in particular, dolomitic spring water. The result is hard water with high concentrations of magnesium and sulfate. Also, hardness and alkalinity are higher during the winter. Upon initiation of supply from the Flint River, the City made the decision to soften with lime only to focus on removal of carbonate hardness. One potential modification that could assist with TOC removal and thus decrease THMFP would be lime and soda ash softening. If implemented soon, the procedural change would be timely as it would also address increased hardness expected going into this winter.

5. Upstream Contamination Issues

Upstream contamination issues are extremely difficult to prevent and even if detected are difficult to locate. Evaluation of raw water data collected for MORs is the easiest manner in which to detect upstream contamination issues because the data is already collected for treatment purposes. In fact, high total Coliform readings signaled a potential issue recently that the City found to be a sewer leak, which was subsequently repaired.

An upstream monitoring and warning system could be established to attempt to detect spill event type contamination early enough to cease intake prior to the contamination reaching the WTP. However, given the imminent conversion to the KWA supply, the period of full time use would likely be far too short to achieve payback on the capital expenditures.

B. TREATMENT PROCESS

1. Operational Recommendations

- Coagulation and flocculation polymer aids: The 2002 Treatability Study suggested the use of coagulation and flocculation polymer aids. These polymer aids were shown in the 2002 Treatability Study to increase TOC removal and thereby reduce THMFP. Further evaluation will be completed during jar testing. (what would need to be done to the system to allow feed?? Could it be done easily??)
- Discontinue softening bypass: The City was previously bypassing a portion of flow around the softening basins because hardness levels did not warrant softening of the full stream. However, this practice was discontinued because it was believed the bypass stream was contributing to chlorine demand and preliminary data has supported that belief. Chlorine demand dropped 0.5 – 1.0 mg/l following elimination of the bypass stream in early November 2014.
- Soften with lime and soda ash: Research has shown that enhanced softening with both lime and soda ash may provide additional TOC removal. The efficacy of this option will be evaluated during jar testing.
- Disinfection of filter beds: In case there has been microbial growth it is recommended the filters be 'shock' treated with chlorine and rinsed. A chlorine injection point was added upstream of the filters during the first segment of Phase II so future growth in the filters should not be an issue.
- Optimization of all existing treatment processes: Depending on bench scale testing conditions and results, slight modifications to all treatment processes might in order to replicate lower DPBFP.

2. Infrastructure Change Recommendations

- Fix and/or replace faulty ozone equipment: Since the ozone equipment was installed it has not been used extensively so the hope is that major components remain in good condition and the system can be easily modified to restore proper functionality. The City has scheduled the equipment manufacturer to field inspect the system on December 15, 2014.
- Change disinfectant to chloramine or chlorine dioxide: If other options prove to be ineffective, conversion to another disinfectant should be fully evaluated. Various characteristics of chloramination indicate an advantage over chlorine dioxide, but a full analysis would provide clarity as to which would be preferred.
- Install pre-oxidant chemical feed: Hydrogen peroxide as a pre-oxidant can enhance the activity of the ozone. This option is listed as a consideration only if problems continue with ozonation.
- Repair upstream sewer leak: a sewer leak upstream of the WTP intake was discovered and has already been repaired by the City.

C. DISTRIBUTION SYSTEM

Recommendations will be incorporated into this report when available. It is anticipated details will be provided for the following topics.

1. Manage Water Age
   a) Storage Tanks
   b) Residence Time in Pipes

2. Reduce Disinfectant Demand
   a) Flushing
   b) Cast Iron Pipes

3. Water Modeling of Recommendations

Determine best flushing locations to reduce water age
Changes to storage tank operating levels to reduce water age
Valves to close/add to improve pressure zones, reduce recirculation
Optimization of pump station use – smaller pumps? Shut down?

A number of actions have already been taken in terms of the distribution system. Water main flushing efforts were increased until late November when freezing weather became prevalent. Also, numerous valves that were broken in the closed position and believed to have been contributing to stagnant water were replaced.

D. BOOSTER DISINFECTION

Decreasing chlorine feed at the WTP and adding booster disinfection in the distribution system is an alternative intended to reduce the reaction time at higher concentrations of chlorine to reduce DPB formation. Extensive looping and branching within the existing system would require numerous booster feed points and water system modeling to determine the most effective feed point locations. As a result, booster disinfection would likely not be cost effective. Further discussion and details will be provided when the distribution evaluation results are available.

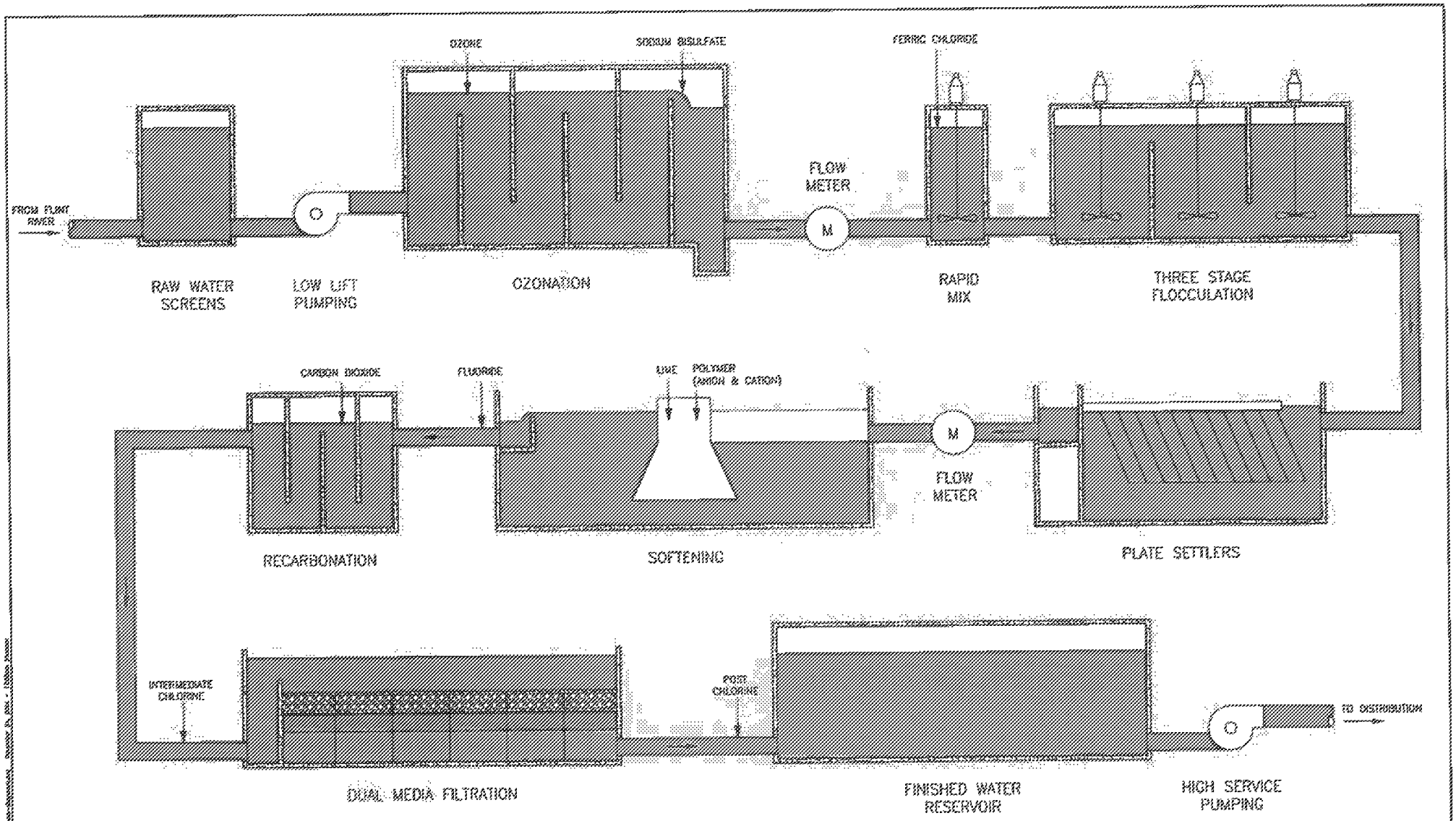
E. CATEGORIZATION OF ACTIONS

Considering that the Flint River is being used as the water source only until the KWA supply is available (expected late 2016), options to address high THM formation that require new construction or extensive time to implement are not preferred. On the other hand, the City understands THM sample results to date dictate that some action is necessary. Two categories have been developed to assist the City in prioritizing actions to take. Stage 1 consists of actions that can be completed relatively quickly without major construction and Stage 2 actions are either long term actions or solutions requiring major construction. Stage 1 actions are to be completed first followed by evaluation of the results prior to consideration of Stage 2 actions. Grouping of actions are shown in the table below.

TABLE 6 – ACTION PLAN		
	Action	Purpose
Stage 1	Troubleshoot ozone feed system	Reduce chlorine feed and increase TOC removal
	Bench scale jar testing	Optimize treatment process and evaluate possible modifications
	Discontinue softening bypass	Reduce chlorine demand
	Disinfect filters	Reduce chlorine demand
	Increased water main flushing	Reduce water age / stagnant water
	Water system modeling evaluation	Determine areas with high water age and reasons
	Implement coag. & floc. polymer aids	Increase TOC removal
	Lower high water level in storage tanks	Decrease water age
Stage 2	Repair ozone system	Reduce chlorine feed and increase TOC removal
	Continue increased water main flushing	Reduce water age / stagnant water
	Convert to lime and soda ash softening	Increase TOC removal
	Continue valve replacements based on water model	Reduce water age / stagnant water
	Change disinfectant to chlorine dioxide	Reduce THMFP
	Install pre-oxidant feed at intake	Optimize ozone disinfection, reduce chlorine
	Place priority on replacing cast iron water mains	Reduce chlorine demand

Samples were taken the week of November 17th for the 3rd quarter of testing. Although the City has begun implementation of Stage 1 actions, THM results are not expected to be noticeably affected since there has not been enough time for a response. The next quarter of sampling is due to be completed the third week in February. It is the City's intent to implement Stage 1 actions prior to the 3rd quarter of THM sampling. [need to make sure Flint is good with this]

DRAFT



CITY OF FLINT
WATER TREATMENT PLANT

WATER TREATMENT PLANT
PROCESS DIAGRAM

Sheet
FIG 1

City of Flint

Water System Questions & Answers

January 13, 2015

* CITY HALL, 1101 S. SAGINAW STREET, RM S108, FLINT, MICHIGAN 48502 (810) 766-7135 Fax (810) 766-7349 *

CITY OF FLINT

Department of Public Works

Dayne Walling
Mayor

Gerald Ambrose
Emergency Manager

Howard Croft
Director

TO: City of Flint Residents

RE: Water Questions

DATE: January 13, 2015

Prelude

The decision to switch to the Karegnondi Water Authority as the City's permanent water source was made following extensive research and in-depth engineering studies. After entering into a contract with KWA and the subsequent termination of the existing water service contract by the Detroit Water and Sewerage Department, the same diligence was given in determining what source water to use while waiting for the community supported KWA water to arrive. The City concluded from this work that the Flint River presented a safe and financially responsible alternative water source. The decision to use the Flint River as an intermediate water source was approved by state regulatory officials in 2014 whereby the City was permitted by the Michigan Department of Environmental Quality to proceed with treatment of water from the Flint River.

The following questions were presented by concerned citizens, and the City's responses follow. This document will be put on the City's website for public viewing within the next several days.

1. What was the process by which the decision was made to switch from Detroit water to Flint River water? Who was responsible for what decisions?

On March 25th, 2013, after evaluating cost comparisons for a permanent water source, the Flint City Council, with support from the Mayor, voted 7 – 1 approving a resolution to purchase water from the Karegnondi Water Authority (KWA). On March 29th, resolution 2013EM041 was signed, authorizing the City of Flint to enter into a contract with the KWA.

On April 16th, 2013, then Emergency Manager Ed Kurtz, signed the contract effectively purchasing 18 MGD of capacity from the KWA.

On April 17th, 2013 Detroit Water and Sewerage Department (DWSD) sent a letter terminating the existing water service contract between the City of Flint and Detroit. With the termination set to take effect 12 months later on April 17th, 2014, a gap was created between the end of the DWSD contract and the start of the KWA.

On June 29th, 2013, following many preliminary discussions on how the City would fill the interim gap, a formal, all day meeting was held at the Flint Water Plant with all interested parties including City of Flint Officials (COF), representatives from the Genesee County Drain Commissioners Office (GCDC), the Michigan Department of Environmental Quality (DEQ), and the design engineers from the previous plant upgrade Lockwood, Andrews, and Newnam (LAN).

The purpose and agenda of the meeting was to determine the feasibility of the following items:

1. Using the Flint River as a Water Source
2. The ability to perform the necessary upgrades to the Treatment Plant
3. The ability to perform quality control
4. The ability for Flint to provide water to Genesee County
5. The ability to meet an April/May 2014 timeline
6. Development of a cost analysis

The conversation was guided with focus on the engineering, regulatory, and quality aspects of each item listed. The resulting determinations were made.

1. Yes, the Flint River would be more difficult to treat but is viable as a source.
2. Yes, it was possible to engineer and construct the upgrades needed for the treatment process.
3. Yes, with support from LAN engineering which works with several water systems around the state, quality control could be addressed.
4. No, the Flint treatment plant would not have the capacity needed to treat and distribute sufficient water to meet the documented needs of Flint and Genesee County.
5. Possible, it was determined that many obstacles needed to be overcome but completion by the April/May 2014 target was reachable.
6. Next steps from the meeting were for LAN to present the City with a proposal that would include engineering, procurement, and construction needs for the project along with cost estimates.

As a result of extensive evaluation, discussions with the professional engineers, and consulting the state regulators, the Department of Public Works along with the Finance Department recommended utilizing the Flint River as a temporary water source while waiting for the KWA to come online. The plan to accomplish this was accompanied with a construction timeline, a needs analysis for resources, and an FY 14 spending plan to complete the project.

2. Was it known prior to the switch that there would be problems managing total coliform and fecal coliform bacteria levels in the water?

It was understood that the Flint River would be subject to temperature variations, rain events, and have higher organic carbon than Lake Huron water and would be more difficult to treat. These facts were balanced against a licensed staff, LAN engineering's extensive experience in this field, advanced equipment that Flint has for treatment, and support from the DEQ.

3. What were the projected costs and benefits of the switch, and what have been the actual costs and benefits?

The engineered costs for upgrading the Flint Plant to treat KWA water from Lake Huron were projected to be ~$9,000,000. These upgrades need to be in place prior to KWA water reaching Flint and are coupled with an additional ~$3,500,000 in annual operational expenses for workforce additions, electricity costs, and process equipment for a total of ~$12,500,000.

The final year that the City of Flint purchased water from DWSD, the cost was $12,400,000 and that cost was projected to rise to ~$14,400,000 in 2014 and increase to ~$16,000,000 in 2015.

The financial benefit for switching to the river was the opportunity to divert that revenue towards capitalizing the upgrade expenditures needed to run the plant and the development of a capital improvement program for the aged infrastructure without a significant increase to the water bill. This aspect was figured into the cost analysis at the time of the recommendation.

Based on the current DWSD rate structure, it appears that the actual costs to purchase water this year would have been higher than projected, The fixed cost would have been ~$5,100,000 and the additional commodity or water costs would have resulted in another ~$11,000,000 given the City's current water usage. This would result in an estimated ~$16,000,000 in this year alone.

The upgrade expenditures stayed close to the engineered projections. The improvements at the water plant cost ~$7,000,000, the remediation and development of Bray Rd for lime disposal cost ~$1,700,000 and the increased operational costs so far this year are below the estimates and on target to finish the year at ~$3,000,000. These changes come to a total of ~$11,700,000 of necessary expenditures in the first year.

In addition to the ability to capitalize the upgrades, switching to the Flint River has allowed us to develop a Capital Improvement Plan for the Utility Department that will begin replacing pipe underground this spring and will account for overdue maintenance concerns such as valve replacements, and pipe lining extending the useful life of the system and allowing us to deliver better quality water.

It would have required close to a 30% raise in the water and sewer bill to accomplish this without using the Flint River as a source.

4. What were the causes of increased levels of trihalomethanes? Have those causes been sufficiently addressed? If not, what needs to be done to prevent this from occurring again in the future?

Just as low levels of chlorine can produce coliforms, high levels of chlorine can result in Disinfectant Byproducts (DBP) generating increased levels of trihalomethanes (TTHM). The DEQ requires this testing to occur once every three months at each of the testing sites and looks at an average over four quarters (one year) to determine the level to compare against the maximum contaminant level (MCL).

Research by the Science Advisory Board, the National Academy of Sciences, and the USEPA's Carcinogen Assessment Group predicts risk estimates associated with high levels of TTHM at an incremental risk of 3 to 4 people out of 10,000 that consume 2 liters of water over the MCL daily for 70 years.

The required remedy for this violation is to present the DEQ with an Operational Evaluation Report that assesses what caused the violation and what the proposed remedy is. The City generated a report to the DEQ in November 2014, which assesses each area of the Flint water system including water source, treatment process, and distribution system. The evaluation was complete with short and long term recommendations to optimize each area and the belief that the items listed would correct the violation and give Flint an increased ability to manage the system. Continued repairs on valves and colder temperatures have created a more consistent chemical footprint, and we have been producing a more consistent water quality.

5. What were the causes of increased levels of total coliform and fecal coliform bacteria levels? Have those causes been sufficiently addressed? If not, what needs to be done to prevent this from occurring in the future?

What we discovered is that as water travels through the 600 miles of the City's distribution mains it will, at times, reside in the system for up to 3 or 4 weeks. Water purchased from DWSD is drawn from Lake Huron, chlorinated, and then travels over 80 miles to reach the City. By the time the water reaches Flint it is stable and capable of withstanding this type of residency time within the system. Water drawn from the Flint River, specifically in summer months when the temperature is fluctuating, is more susceptible to being impacted by variables such as high residency times and increased chemical reaction.

The DEQ requires that a minimum of 100 tests be performed monthly for chlorine residuals at various locations throughout the system. When residual levels are too low, it creates an environment in which bacteria such as fecal coliform can grow. After switching sources, we encountered testing sites in June, 2014 that were consistently returning low residual levels. Several of these sites became areas that total coliform was eventually detected and ultimately boil water notices issued.

Low residual levels can sometimes trigger a positive test result for total coliform which is an indicator of a poor water environment but does not generally require a boil water notice. The normal course of action in these situations is to flush hydrants and introduce fresh water into the defined area. In certain areas this was successful and in other areas it was not. In a second course of action, the EPA also allows for water systems to increase the residual disinfectant, including chlorine, to a level and for a time necessary to protect public health. This information can be found in the EPA manual (40 CFR 141.65 & 141.130(d)). In contending with the low residual levels which represent a more immediate health concern along with the potential for tier 1 violations and boil water notices, we increased the chlorination treatment at times in order to combat the low residuals. This was also was an unsuccessful remedy and only after we located and replaced valves that were broken in the closed position on major transmission lines in these areas did the residual levels return to normal and have remained that way since.

There is still one test site, in the 2500 block of Flushing Rd. where we continue to experience low residual levels and we are actively pursuing efforts to locate more expected valve failures. The development of a hydraulic model of the system and the ability to use unidirectional flushing are tools that will assist us in mitigating areas where low residuals surface. Both of these are in progress of being developed by the engineering firm LAN and Potter Consulting who was also the author of our Water Reliability Study.

6. What are the public reporting requirements for these sorts of problems, and has the City met those requirements? What can be done to communicate in a more timely manner useful information about a public health threat such as the presence of cancer-causing chemicals in our drinking water?

The EPA 2010 "Revised Public Notification Handbook" has a specific breakdown of the elements required in public notifications and includes usable templates. The EPA has three different tiers associated with community water systems (CWS), each with specific timeframes and requirements that trigger upon issuance of the violation.

- Tier 1. CWS must provide public notification within 24 hours of a violation and continue this as directed by the primary agency.
- Tier 2. CWS must provide public notification within 30 days of a violation and continue this every three months until the violation is resolved
- Tier 3. CWS must provide public notification within one year and the EPA recommends repeat occurrences be provided in an annual notice

The current EPA violation is classified as a tier 2 violation and was issued December 16th, 2014.

Moving forward, the City of Flint is striving to increase communication with the public in a variety of ways.

- The city's new website will have current news and information updated on a regular basis.
- Increased data collection will be transitioned into real time ability to communicate with the residents through the Public Works area of the City's new website.
- Timely reporting of current test results on the new City website.

The establishment of these tools is in progress and expected to be implemented in the near future along with evaluating other avenues of communication.

7. **Is there any reason to think that these or similar problems will continue even after the shift is made to water from Lake Huron?**

The water coming from Lake Huron via KWA will be more consistent in temperature, have lower organic carbon, and will be less susceptible to variations but will have its own chemical footprint. The construction upgrades to the Flint Treatment Plant give us the ability to draw water from either source and should provide Flint the opportunity for testing and thereby streamlining the treatment process to match the Lake Huron chemical footprint before fully introducing it into the distribution system.

In addition to new source water, following the recommendations contained in the Operational Evaluation Report and the City's Water Reliability Study is the roadmap to being able to provide quality water.

Continuing to identify integrity issues and making preemptive repairs within our antiquated infrastructure are needed to maintain and provide a healthy system. Leak detection which is scheduled for the spring, hydraulic system modeling which includes unidirectional flushing is in progress now and will give us the information and tools to accomplish these goals.

8. **Who is responsible for making sure we don't have these sorts of problems, and did that person or those people fail to meet their responsibilities?**

The Utility Department is a Division underneath the Department of Public Works. The Public Works Director along with the Utilities Administrator will continue to work hand in hand with professional engineers, consultants, and the state regulatory agency DEQ in order to manage increased public communication and address any issues that arise going forward.

The DEQ requires that public water systems with population over 20,000 must have an F-1 state licensed operator in charge that oversees the operation of the treatment process. This license is the highest classification in the state that specializes in "complete treatment" The City of Flint has such a person on staff at the water plant and that person's responsibility is to determine the correct levels of chemical treatment, monitor the system, submit official test results to the state regulatory agency, and make necessary adjustments when contaminant levels are breached. All of these steps were followed and acknowledged by the DEQ.

The following is the list of supporting documents that will be available on the City's website for public viewing.

Cost Comparisons (the ROWE Study)

Upgrade Construction Timeline

EPA Chlorinating Information

Risk Assessment Information

Operational Evaluation Report

EPA 2010 revised Public Notification Handbook

The Current DEQ Violation Letter

Flint Water Reliability Study

Respectfully submitted,

Howard D. Croft
Public Works Director

Dayne Walling
Mayor, City of Flint

Gerald Ambrose
Emergency Manager

Leanne Schreiber Smith

Search

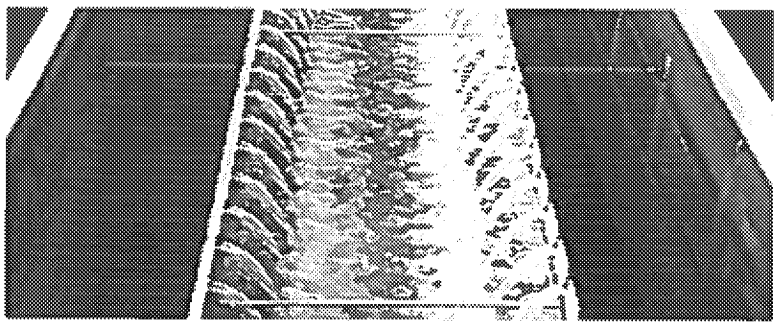
Stephen Busch (517) 648-2314
Dist Supervisor

Marcel
Jean Ann
Bonnie
Suzanne
Sharon

Switch end April/early May

Addressing Flint's Water Concerns: Water System Questions & Answers and Related Documents.

Posted by: Jason Lorenz



15 JAN

Documents listed below. Keep checking back for updated information.

Addressing Flint's Water Concerns

Recent events have raised concerns among many as to the safety and quality of the water provided by the City's utility system. The City is and continues to be committed to assuring that residents and visitors know that the water is safe and that those responsible for providing water are working every day to improve the quality of the water. The quality of the water does need improvement, but that is not to be confused with safety of the water. The recent notice by MDEQ clearly stated that the water provided by the utility system is safe to drink, but cautioned that some vulnerable groups may want to consult with their health care provider if they have concerns. The City remains committed to their efforts to assure that the water is safe for everyone and that quality is both improved and improving.

To date, the City has taken the following actions:

- As an integral part of the transition to the Flint River on a temporary basis, the MDEQ was consulted about the City's plans, and ultimately issued necessary permits to proceed. The City also engaged the services of the LAN engineering firm to guide the city in installing the necessary equipment to treat the water on an ongoing basis. This resulted in the development of a comprehensive drinking water plan.
- The City monitors its water quality on a daily basis to assure that water quality remains within established guidelines. With the variances in water temperature and the leakage and infiltration problems arising as the result of failure of parts of the distribution system, water quality did exceed, for a time, some of the established guidelines. This resulted in the issuance of the recent notices to the public. Upon receipt of information that some guidelines were exceeded, the City's priority focus was to bring water quality back within guidelines. Efforts taken to address non-compliance included increasing water flow through valve replacements and hydrant flushing and optimizing treatment processes.
- The City has committed to increasing communication with the public in order to inform water users factually of the issues which have arisen, to alleviate unnecessary concern and to identify the steps being taken to address the issues. This is being implemented through detailed and easy to understand educational materials being made available both online and at City Hall, as well as through ongoing public

Recent Posts

- HUD Awards $500,000 Choice Neighborhoods Grant in Flint January 16, 2015
- Addressing Flint's Water Concerns: Water System Questions & Answers and Related Documents. January 15, 2015
- Flint City Hall will be Closed Monday, January 19, 2015 in Observance of the Martin Luther King, Jr. Holiday January 15, 2015
- Jerry Ambrose Takes Place of Darnell Earley as Emergency Manager January 14, 2015
- City of Flint Launches New Website January 8, 2015
- Flint Takes Proactive Measures to Improve Water Distribution System and Address Compliance Issues January 7, 2015
- Flint Emergency Manager Seeking Candidates for Third and Sixth Ward City Council Vacancies November 26, 2014
- Flint Water Plant Prepares for KWA Pipeline November 26, 2014

informational meetings.

- Most recently, in light of recent concerns raised by resident groups over the quality and safety of water, Department of Public Works Director Howard Croft and his staff collected questions from citizens during a recent public meeting. After reviewing these questions, DPW Director Croft and his staff set out to answer them in concise detail; the result of that work is a full Water System Questions and Answers document is available online. Along with the detailed information within, the document also contains links to other source documents and regulatory statutes found online which were used as reference. **"We want the residents, businesses and visitors of Flint to know that the water in Flint is safe and that we are working every day to make improvements to our system to ensure that," said Croft. "Our goal is make sure we get people the information on our efforts and assure them that we are on the right track with them."** More documentation, including regular water quality monitoring reports, will be made available.
- Additionally, a number of public meetings have and will continue to take place. Two of the most recent of these took place at the Antioch Baptist Church and the Mott Community College Regional Technology Center. These meetings were held by concerned neighborhood groups and were attended by Mayor Walling and DPW Director Croft. At both meetings, citizens voiced their concerns and asked questions about water quality and the recent violation notice. Director Croft offered detailed answers to common questions, but also offered to investigate specific water issues raised by residents in which the City could offer assistance. Those in attendance came away with a better understanding of the issues surrounding the drinking water in their community.
- The City of Flint will be hosting a water presentation on **Wednesday, January 21, 2015 at 7pm. That presentation will be held in the City Hall Dome** and will feature information detailing water treatment, water distribution and the steps being taken to ensure that citizens get water that meets all regulatory safety and quality standards. City DPW Director Howard Croft and Daugherty Johnson, Utilities Administrator, will be joined on a panel by representatives from the Genesee County Drain Commissioner's office, the Michigan Department of Environmental Quality and LAN engineering. Written questions from the audience will be collected during the presentation and answered by the panel after the presentation.
- The City of Flint has also determined that in light of the serious concerns raised, it will secure the services of an external firm with expertise in managing drinking water quality to assess the steps that the city has taken, to make recommendations as to other steps to be taken, to oversee their implementation, and to monitor operations until the City's water source becomes the KWA. A Request for Proposal was issued on January 15, 2015, with proposals due back on January 26.

The DWSD Question:

As a result of the concerns raised, several community members have suggested that the City reconnect to the Detroit Water and Sewer Department (DWSD). DWSD has advised that they would be willing to allow such a reconnection without a hook-up fee. However, the City would be obligated to pay a fixed monthly charge of $846,700 plus the $14.92/Mcf cost of water itself and agree to a long term arrangement. The City's analysis of the DWSD proposal concludes that the City's cost would increase by more than $12 million per year at the proposed rates, and could increase even more as proposed rates are subject to change after July 1, 2015. This increase in costs would not be in the best interests of the City or its water users, as the City is committed to assuring safety and improving water quality by following its current plan, and reconnecting to DWSD would likely require deferment of existing capital improvements or an additional increase in rates.

The attached document contains questions presented to the City of Flint by concerned residents and the concise and detailed answers to them provided by our Department of Public Works.

CoF Water System Q&A

The following documents are referenced within the above Questions and Answers report. Keep checking the website for more information as it becomes available.

Revised-Public-Notification-Handbook-CWS

Operational Evaluation Report

City of Flint Violation Notice – MCL TTHM 12_16_14

Approved Construction Permits

[EPA 141.165 Chlorination Guidlines]

[TTHM Level Chart 2014]

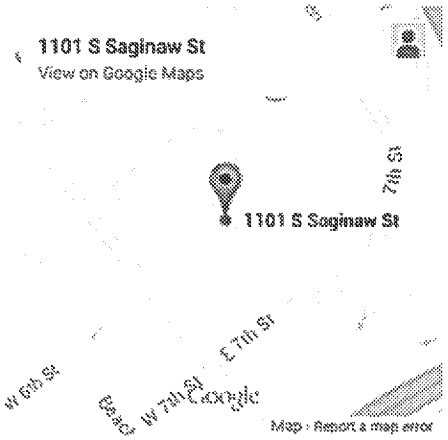
[Request for Proposal: Water Quality Consultant]

[Public Water Presentation 1.21.2015]

ABOUT THE AUTHOR:

Jason Lorenz is the Public Information Officer for the City of Flint as well as a proud Flint resident.

NEED DIRECTIONS?



CONTACT INFORMATION

1101 S. Saginaw St.
Flint, MI 48502
Phone Number: (810) 766-7418

QUICK LINKS

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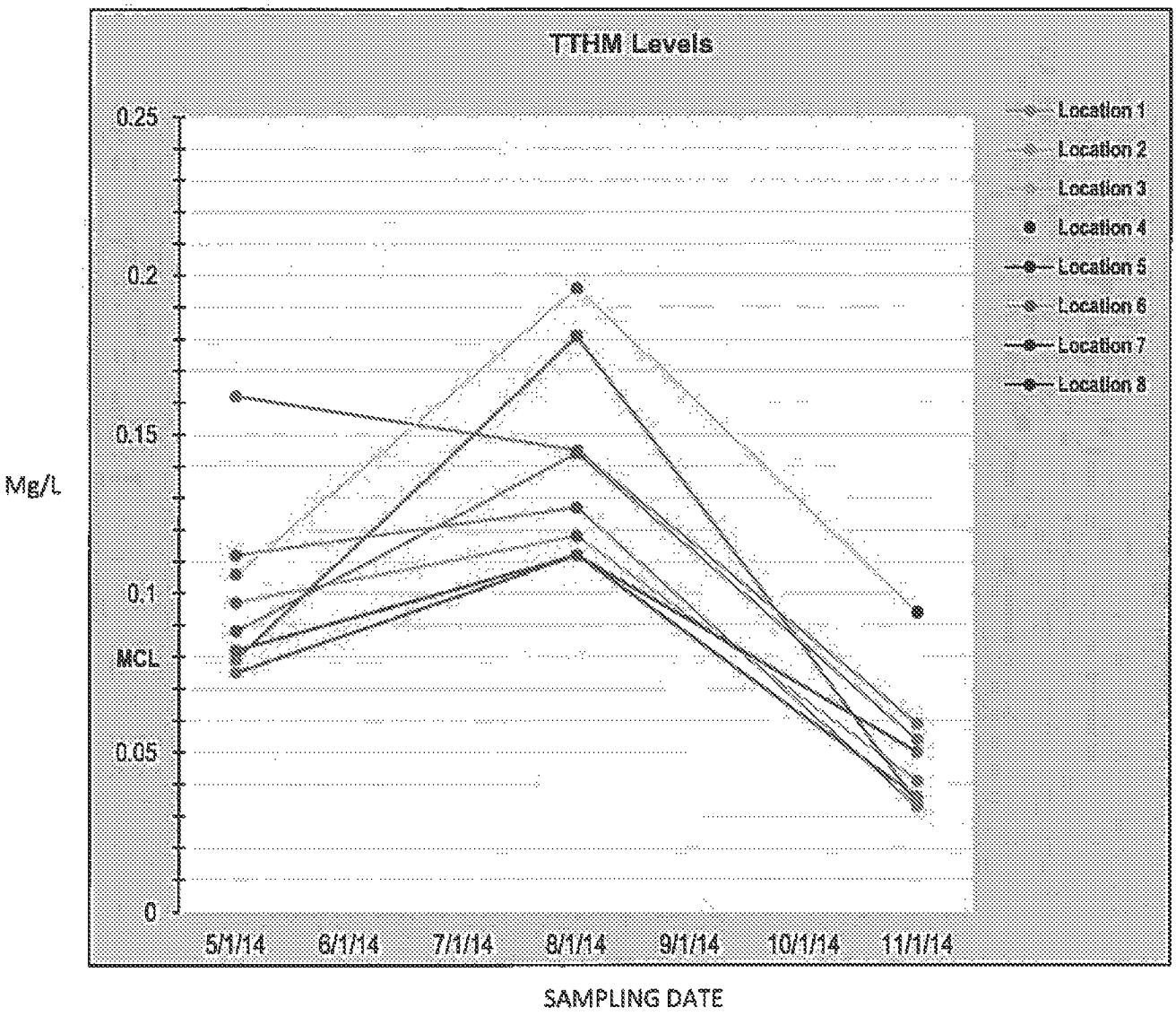
City of Flint
TTHM Level Chart



LEGEND

TTHM = Total Trihalomethanes
Mg/L = Milligrams per Liter
MCL = Maximum Contaminant Level
● = Sample above MCL
▒ = Sample below MCL

RICK SNYDER
GOVERNOR

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING DISTRICT OFFICE

DAN WYANT
DIRECTOR

December 16, 2014

Mr. Brent Wright, Operation Supervisor
City Of Flint - DPW
Flint Water Plant
4500 North Dort Highway
Flint, MI 48505

WSSN: 02310

Dear Mr. Wright:

SUBJECT: Violation Notice – Maximum Contaminant Level for Total Trihalomethanes
Operational Evaluation – Total Trihalomethanes
4th Quarter 2014 Monitoring Period

The Department of Environmental Quality (DEQ), Office of Drinking Water and Municipal Assistance (ODWMA), records show that the City of Flint is in violation of the Safe Drinking Water Act,1976 PA 399, as amended (Act 399); R 325.10610, *Maximum contaminant levels* (MCL) *for disinfection byproducts*, of the 1979 Administrative Code.

In accordance with R.325.10610, *MCLs for disinfection byproducts*, of the 1979 Administrative Code, the MCL for disinfection byproduct total trihalomethanes (TTHM) is 0.080 milligrams per liter (mg/L) as a Locational Running Annual Average (LRAA) at each monitoring location. As listed in the table below, our records show that the City of Flint's highest TTHM locational running annual average (LRAA), based on the last three quarters, ending November 30, 2014, is 0.099 mg/l which exceeds the standard, and that two of the eight sample site locations exceed the standard of 0.080 mg/L.

Further, in accordance with R325.10719l, *Disinfection byproducts: operational evaluation levels*, of the 1979 Administrative Code, when an operational evaluation level (OEL) at a monitoring location for TTHM exceeds 0.080 mg/L, a supply shall conduct an operational evaluation and submit a written report of the evaluation to the department not later than 90 days after being notified of the analytical result that causes the supply to exceed the operational evaluation level. As listed in the table below, our records show that TTHM operational evaluation levels for the City of Flint exceed 0.080 mg/L at four of the City's eight sample site locations.

TTHM Results (mg/L)					
	5/21/14	8/21/14	11/20/14	LRAA	OEL
DBP1 McDonalds 3719 Davison	0.162	0.145	0.059	0.092	0.106
DBP2 Liquor Palace 3302 S. Dort Highway	0.112	0.127	0.033	0.068	0.076
DBP3 North Flint Auto 6204 N. Saginaw St.	0.097	0.118	0.041	0.064	0.074
DBP4 University Market 2501 Flushing Road	0.106	0.196	0.094	0.099	0.122
DBP5 Taco Bell 3606 Corunna Road	0.079	0.181	0.034	0.074	0.082
DBP6 Rite-Aid Pharmacy 5018 Clio Road	0.088	0.144	0.054	0.072	0.085
DBP7 Salem Housing 3216 MLK Boulevard	0.082	0.112	0.050	0.061	0.074
DBP8 BP Gas Station 822 S. Dort Highway	0.075	0.112	0.036	0.056	0.065

Our investigation consisted of a review of ODWMA files for laboratory reports received for compliance monitoring. Our investigation is considered complete. This violation began on December 1, 2014, and will continue until TTHM LRAA is below the MCL at all sample sites.

We acknowledge and appreciate the city's cooperation with our recommendation to preemptively conduct an Operational Evaluation following the City's second quarterly round of monitoring in August. That Operational Evaluation report has identified possible causes and corrective measures for the elevated TTHM levels which we encourage the City continue implementing. These modifications have likely contributed in part to the reduction in TTHM levels reported in the most recent quarter, and suggest the City may be able to achieve compliance with the TTHM standard.

Our office is continuing to review the Operational Evaluation report that was submitted on December 1, 2014, and will provide the City and their consultant comments as needed to help address this MCL violation.

Water systems that exceed the OEL must complete and submit an Operational Evaluation in accordance with Administrative Rule 719l (R325.10719l) within 90 days of being notified of the violation. An updated Operational Evaluation report, which incorporates the most recent sample results, must now be completed and received by our office by no later than March 1, 2015.

If you have any other factual information you would like us to consider regarding the violation identified in this Violation Notice (VN), please provide them in a written response by January 16, 2015.

Administrative rule R 325.10403 of Act 399 requires that suppliers provide public notice (PN) as soon as practical, but no later than thirty (30) days after the supplier learns of this type of violation, by mail or direct delivery and by any other means reasonably calculated to reach customers not normally reached by mail. Enclosed is a sample PN

which contains the minimum required language. The City is encouraged to include additional information regarding its response to this violation. **Please notify your consumers by January 10, 2015, and send us a signed and dated copy of the notice that you issued within ten (10) days of distributing the public notice.** This violation must also be included in your 2014 Consumer Confidence Report (CCR), due by July 1, 2015. The PN must be repeated every quarter until you no longer exceed the TTHM standard. Failure to issue a PN for this violation will result in a fine of at least $1,000 per event, with a maximum of $5,000 per violation.

We anticipate and appreciate your continued cooperation in resolving this matter. If you have any questions regarding this VN, please contact us at the numbers below.

Sincerely,

Michael F. Prysby, P.E., District Engineer
Lansing District Office
Office of Drinking Water & Municipal Assistance
517-290-8817

Adam Rosenthal, EQA
Lansing District Office
Office of Drinking Water & Municipal Assistance
517-284-6644

mfp/ar/jlr
Enclosure

cc: Mr. Darnell Early, Emergency Manager, City of Flint
Mr. Daughtry Johnson, City of Flint
Mr. Howard Croft, City of Flint
Mr. Robert Bincsik, City of Flint
Ms. Jennifer Crooks, U.S. Environmental Protection Agency, Region 5
Genesee County Health Department
Ms. Liane Shekter Smith, P.E., DEQ
Mr. Richard Benzie, P.E., DEQ
Mr. Stephen Busch, P.E., DEQ

IMPORTANT INFORMATION ABOUT YOUR DRINKING WATER

City of Flint Did Not Meet Treatment Requirements

Our water system recently violated a drinking water standard. Although this incident was not an emergency, as our customers, you have a right to know what happened and what we are doing to correct this situation.

We routinely monitor for the presence of drinking water contaminants. Samples were collected for total trihalomethanes (TTHM) analysis from eight locations on a quarterly basis (May 21, August 21, and November 20 of 2014). The average of the results at ANY of the eight locations must not exceed the maximum contaminant level (MCL) for TTHMs, otherwise our water system exceeds the Maximum Contaminant Level (MCL). The standard for TTHMs is 80 µg/L. The location reporting the highest TTHM level was 99 ug/L; thus, our water system exceeds the TTHM MCL.

What should I do?

- There is nothing you need to do unless you have a severely compromised immune system, have an infant, or are elderly. These people may be at increased risk and should seek advice about drinking water from their health care providers.
- You do not need to boil your water or take other corrective actions. If a situation arises where the water is no longer safe to drink, you will be notified within 24 hours.

What does this mean?

This is not an emergency. If it had been an emergency, you would have been notified within 24 hours.

People who drink water containing trihalomethanes in excess of the MCL over many years may experience problems with their liver, kidneys, or central nervous system, and may have an increased risk of getting cancer.

What is being done?

We are currently working on solutions to correct the problem. We anticipate resolving the problem by 2015.

For more information, please contact Mr. Brent Wright at 517-787-6537 or the Flint Water Plant at 4500 North Dort Highway, Flint, MI 48505.

Please share this information with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail.

This notice is being sent to you by the City of Flint.

CERTIFICATION: WSSN: 02310

I certify that this water supply has fully complied with the public notification requirements in the Michigan Safe Drinking Water Act, 1976 PA 399, as amended, and the administrative rules.

Signature	Title	Date Distributed

Reminder to water supplier: This notice / certification must be sent to the DEQ.

§141.65 Maximum residual disinfectant levels.

(a) Maximum residual disinfectant levels (MRDLs) are as follows:

Disinfectant residual	MRDL (mg/L)
Chlorine	4.0 (as Cl_2).
Chloramines	4.0 (as Cl_2).
Chlorine dioxide	0.8 (as ClO_2).

(b) *Compliance dates*—(1) *CWSs and NTNCWSs.* Subpart H systems serving 10,000 or more persons must comply with this section beginning January 1, 2002. Subpart H systems serving fewer than 10,000 persons and systems using only ground water not under the direct influence of surface water must comply with this subpart beginning January 1, 2004.

(2) Transient NCWSs. Subpart H systems serving 10,000 or more persons and using chlorine dioxide as a disinfectant or oxidant must comply with the chlorine dioxide MRDL beginning January 1, 2002. Subpart H systems serving fewer than 10,000 persons and using chlorine dioxide as a disinfectant or oxidant and systems using only ground water not under the direct influence of surface water and using chlorine dioxide as a disinfectant or oxidant must comply with the chlorine dioxide MRDL beginning January 1, 2004.

(c) The Administrator, pursuant to Section 1412 of the Act, hereby identifies the following as the best technology, treatment techniques, or other means available for achieving compliance with the maximum residual disinfectant levels identified in paragraph (a) of this section: control of treatment processes to reduce disinfectant demand and control of disinfection treatment processes to reduce disinfectant levels.

§141.130 General requirements.

(a) The requirements of this subpart L constitute national primary drinking water regulations.

(1) The regulations in this subpart establish criteria under which community water systems (CWSs) and nontransient, noncommunity water systems (NTNCWSs) which add a chemical disinfectant to the water in any part of the drinking water treatment process must modify their practices to meet MCLs and MRDLs in §§141.64 and 141.65, respectively, and must meet the treatment technique requirements for disinfection byproduct precursors in §141.135.

(2) The regulations in this subpart establish criteria under which transient NCWSs that use chlorine dioxide as a disinfectant or oxidant must modify their practices to meet the MRDL for chlorine dioxide in §141.65.

(3) EPA has established MCLs for TTHM and HAA5 and treatment technique requirements for disinfection byproduct precursors to limit the levels of known and unknown disinfection byproducts which may have adverse health effects. These disinfection byproducts may include chloroform; bromodichloromethane; dibromochloromethane; bromoform; dichloroacetic acid; and trichloroacetic acid.

(b) *Compliance dates*—(1) *CWSs and NTNCWSs.* Unless otherwise noted, systems must comply with the requirements of this subpart as follows. Subpart H systems serving 10,000 or more persons must comply with this subpart beginning January 1, 2002. Subpart H systems serving fewer than 10,000 persons and systems using only ground water not under the direct influence of surface water must comply with this subpart beginning January 1, 2004.

(2) *Transient NCWSs.* Subpart H systems serving 10,000 or more persons and using chlorine dioxide as a disinfectant or oxidant must comply with any requirements for chlorine dioxide in this subpart beginning January 1, 2002. Subpart H systems serving fewer than 10,000 persons and using chlorine dioxide as a disinfectant or oxidant and systems using only ground water not under the direct influence of surface water and using chlorine dioxide as a disinfectant or oxidant must comply with any requirements for chlorine dioxide in this subpart beginning January 1, 2004.

(c) Each CWS and NTNCWS regulated under paragraph (a) of this section must be operated by qualified personnel who meet the requirements specified by the State and are included in a State register of qualified operators.

(d) *Control of disinfectant residuals.* Notwithstanding the MRDLs in §141.65, systems may increase residual disinfectant levels in the distribution system of chlorine or chloramines (but not chlorine dioxide) to a level and for a time necessary to protect public health, to address specific microbiological contamination problems caused by circumstances such as, but not limited to, distribution line breaks, storm run-off events, source water contamination events, or cross-connection events.

EXECUTIVE SUMMARY

Special Pathogens Laboratory (SPL) was contacted by McLaren Flint Health Care to assist the hospital in responding to an increase in the incidence of Legionnaires' disease due to *Legionella pneumophila*, serogroup 1. The Genesee County Health Department had also been in contact with the hospital regarding cases of Legionnaires' disease in patients that had been diagnosed and treated at the hospital. This increase in cases had been observed over the past year when water quality in Flint was adversely affected when the city switched from Detroit water to the Flint River last year.

SPL was asked to provide consultation services, including an on-site risk assessment, review of the facility's current Legionella policy, and development of a Water Safety Plan for the facility.

Assessments of McLaren Flint Hospital buildings were performed from August 11 – 13, 2015. The assessment including collection of samples for *Legionella* culture from distal hot water sites, distal cold water sites, hot water heaters, a hot water return, and the cold water entries. Physicochemical measurements, including pH, temperature, and free chlorine, were also taken.

Legionella pneumophila serogroup 1 was detected across all systems, with the majority of hot water distal sites (water outlets) showing some level of positivity.

McLaren Flint Hospital Administration, Infectious Diseases, Facilities Engineering and Infection Control acted aggressively to address the potential risk for hospital-acquired Legionnaires' disease. Staff worked with SPL to expedite both short and long-term approaches to prevention. This included recommendations for rapid identification and treatment of cases as well as recommendations regarding options for installation of secondary water treatment (disinfection).

The hospital staff performed a "shock" hyperchlorination disinfection in Buildings F, A, and B/C. The hyperchlorination disinfection for Building F Upper System was completed on August 14-15, 2015 and re-sampled for *Legionella* on August 17, 2015.

The "post-disinfection" culture results showed that *Legionella* concentrations were significantly lower—indicating the hyperchlorination disinfection was a successful short-term remediation which temporarily reduced *Legionella*.

Long-term secondary disinfection with monochloramine was recommended in patient care areas because of its proven efficacy and ability to rapidly reduce *Legionella* in hospital hot water systems. A Water Safety Plan is being developed to provide on-going risk management and to comply with the new ASHRAE 188 Legionella standard.

These efforts have resulted in successfully reducing *Legionella* in the hospital water systems. No cases of healthcare-acquired Legionnaires' disease were identified following these measures.

McLaren
FLINT

UPDATE

Aug 2014

Over the past several weeks, there has been an increase in the number of Legionella cases throughout Genesee County. Although a clear source for this increase has not been specifically identified, McLaren Flint is taking proactive and precautionary measures to ensure that we are implementing all recommended practices and safety measures in the prevention and elimination of Legionella in the water system at our facility. In this initiative, we are working in partnership with the Genesee County Health Department and have engaged with leading experts in this field.

Beginning Friday, August 14, we are taking the following steps:

1. Adding additional chlorine to our water supply, while still maintaining levels well within safe drinking standards;
2. Providing bottled water for drinking while we are implementing specific measures. Patients will receive bottled water with all meals, and it will also be available on the unit throughout the day. Employees will also have access to bottled water for drinking purposes.
3. Implementing hyperchlorination of our water system to reinforce the routine, twice-a-year hyperchlorination process that was last implemented in April.
4. Continuing surveillance testing of our water to ensure consistent quality standards.

We understand these implementations may interrupt daily routines and appreciate your support as we work together to maintain a healthy environment for our patients, visitors and staff.

As additional resources, we are including with this update information outlining frequently asked questions and facts about Legionella.

For any further information, please contact Infection Control at (810) 342-2290.

What is Legionnaires' disease?

Legionnaires' disease is a lung infection (pneumonia) caused by a bacterium named Legionella pneumophila. The name Legionella pneumophila was derived from the original outbreak at the 1976 American Legion Convention in Philadelphia. Pneumophila means "lung loving" in Greek.

Where do Legionella bacteria come from?

Legionella are natural inhabitants of water and can be detected in rivers, lakes, and streams. The bacteria are commonly found in the water systems of buildings and households, but pose little risk to healthy adults and children. One type of Legionella species (L. longbeachae) has been found in potting soil.

What are the most common symptoms?

Legionnaires' disease can have symptoms like many other forms of pneumonia, so it can be hard to diagnose at first. Signs of the disease can include: a high fever, chills, cough, and confusion. Some people may also suffer from muscle aches and headaches. Symptoms usually begin two to 10 or 14 days after being exposed to the bacteria.

Is Legionnaires' disease contagious?

Legionnaires' disease is not contagious. No special precautions, or isolation of the patient is necessary. The disease is transmitted via drinking water not by infected persons. It requires direct exposure to the bacteria – usually by aerosolized water mist that is inhaled or aspiration.

Who is at greatest risk for contracting Legionnaire's disease?

People at risk for contracting Legionnaires' disease following exposure to water that contains Legionella are usually 65 years or older, smokers, patients with chronic lung disease, and those with weakened immune systems. People who have had a bone marrow or solid organ transplant have the greatest risk of contracting Legionella pneumonia.

How is Legionnaires' disease treated?

Many antibiotics are highly effective against Legionella bacteria. The two most effective antibiotics are levofloxacin and azithromycin.

Legionella Facts

1. Legionnaires' disease is a form of bacterial pneumonia caused by the bacteria Legionella found in building water systems.
2. Legionella bacteria are naturally found in municipal cold water, but can grow in high numbers in warm water after entering a building's hot water system.
3. How much Legionella grows depends on the temperature. The ideal temperature range is between 95 and 110 degrees.
4. Brown water events and water pressure changes in pipes can increase Legionella in building water systems.
5. Legionnaires' disease causes a small percentage, only about 2 to 5% of the average 600,000 pneumonia cases that require hospitalization each year.
6. Even if the bacteria enter the lungs, either by inhalation or aspiration drinking water or water droplets, the majority of persons exposed won't become ill. The likelihood for illness is greatest for persons with chronic lung disease (smokers, COPD), those taking high dose steroids, diabetics, patients who have had transplants or persons with immunocompromised immune systems, i.e., cancer.
8. Diagnosis of Legionnaires' disease requires a specific test—urine antigen—which must be ordered by a physician. Cases are often missed when physicians don't consider Legionnaires' disease as a possible illness. It is often not diagnosed and is under reported for these reasons.
9. Rapid diagnosis and effective treatment are key to minimizing the severity of the disease and in preventing mortality.
10. Approaches to preventing exposure of at risk patient populations to Legionella bacteria in water include:
    - Using sterile water with equipment such as nasogastric and endotracheal tubes, TEE probes, etc.
    - Providing bottled water for drinking when cases of hospital-acquired Legionnaires' disease have been identified and until after water is treated to control Legionella.
    - Since there is no person-to-person spread of Legionella bacteria, disease prevention is accomplished by additional treatment of the warm water system to control and prevent the growth of Legionella.

October Flint Field Sampling Results

August Sampling Results

		Acanthamoeba polyphaga	***Vermamoeba vermiformis***	*Pseudomonas aeruginosa*	***Mycobacterium* spp.**	*Mycobacterium avium*	***Legionella* spp.**	
Flint Businesses Positive* (n=9)	Water	0	2	0	4	0	2	0
	Biofilm	1	2	0	5	0	1	0
Flint Homes Positive* (n=7)	Water	0	4	0	5	0	5	0
	Biofilm	2	2	0	3	0	1	0
Detroit Water Businesses Positive* (n=4)	Water	0	0	0	2	0	0	0
	Biofilm	0	2	1	3	0	0	0

- *Legionella* spp. in 47% Flint water sites
- High concentrations of 2500 gene copies/mL
- No *L. pneumophila* detected

Legionellosis Public Health Data

- 46 cases reported by 3rd week in November in Genesee
- On pace for 12.5 cases per 100k citizens
- Almost 10 times the national average of 1.3/100k
- African Americans have 50% higher incidence than whites

- Multiple concurrent LD cases in Flint hospitals
- Sources not traceable: no outbreak confirmed

- OPPPs were predicted to be a potential public health issue with the switch to Detroit water

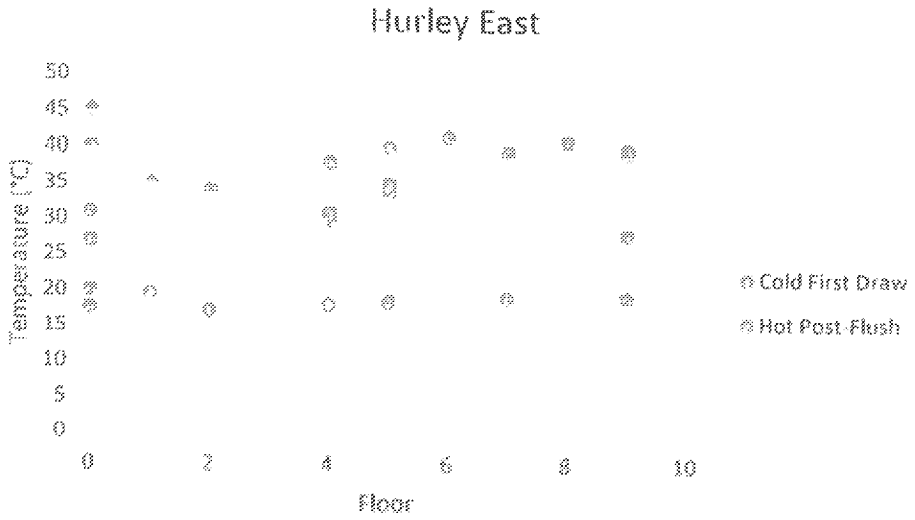
Sampling Regime

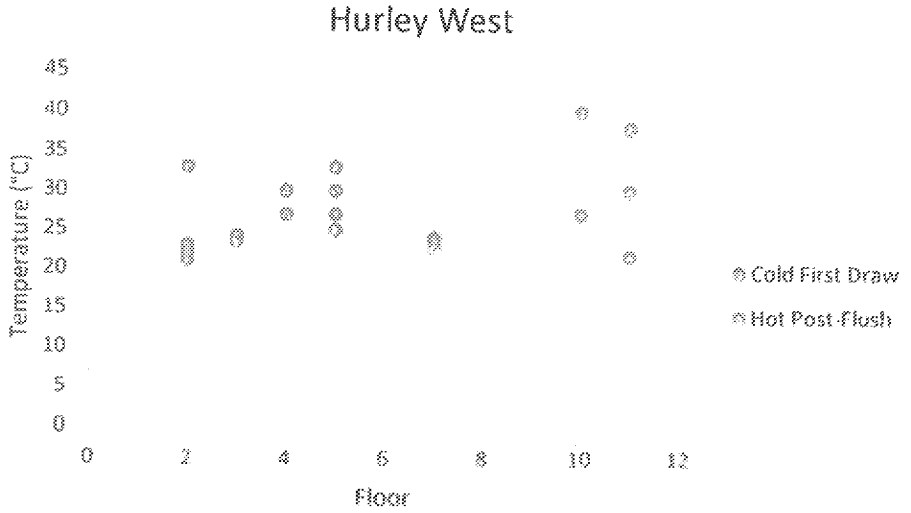
- 62 one liter water samples from public sinks
- Cold first draw followed by hot post-flush
- Sampled afternoon of 10/15 and morning of 10/16

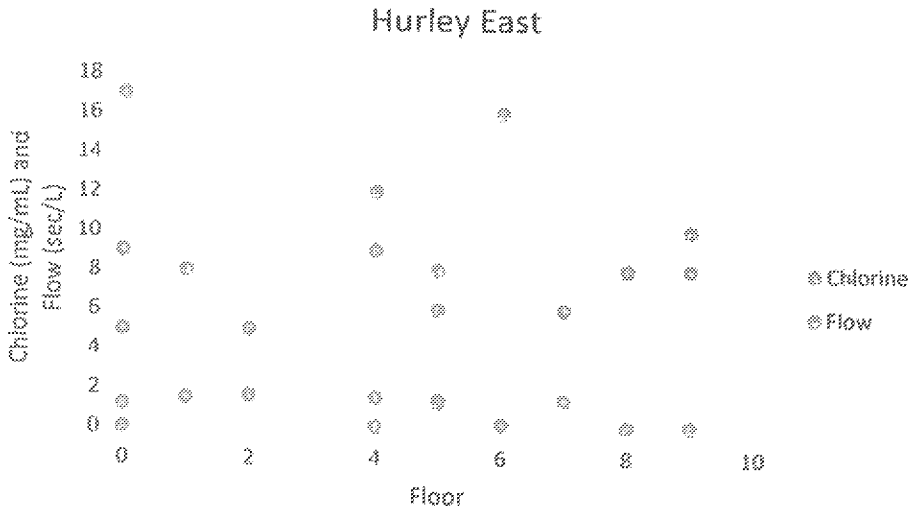
- Tested for wide range of metals on cold samples
- Measured flow, temperature, and chlorine on site
- Performed DNA based analysis for *Legionella* spp. and *L. pneumophila*

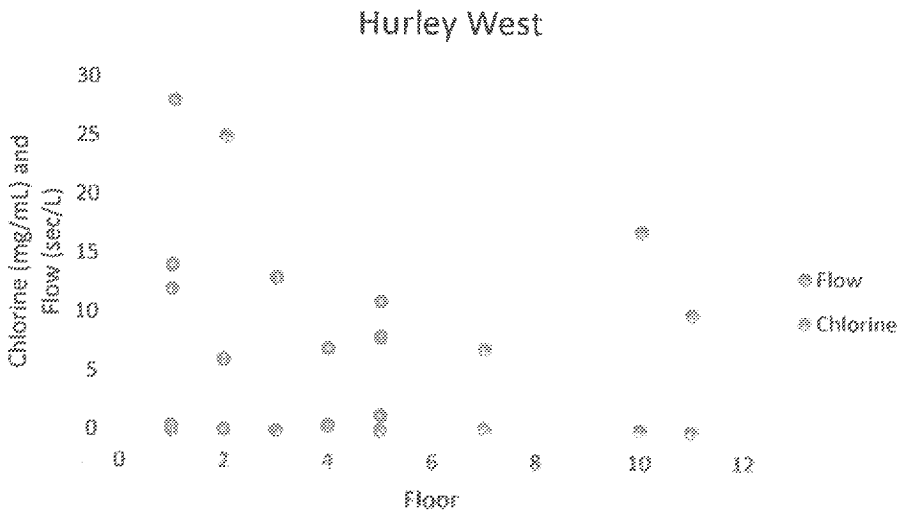
Physical Data

- No elevated levels of metals were detected
- 70% hot water temperature in ideal growth range
- 87% cold water temperature at/near growth range
- 60% taps under ideal chlorine residual
- 0% taps reached scalding temperatures


Hurley East
Temperature (°C)
Floor
Cold First Draw
Hot Post-Flush


Hurley West
Temperature (°C)
Floor
Cold First Draw
Hot Post-Flush


Hurley East
Chlorine (mg/mL) and Flow (sec/L)
Floor
Chlorine
Flow


Hurley West
Chlorine (mg/mL) and Flow (sec/L)
Floor
Flow
Chlorine

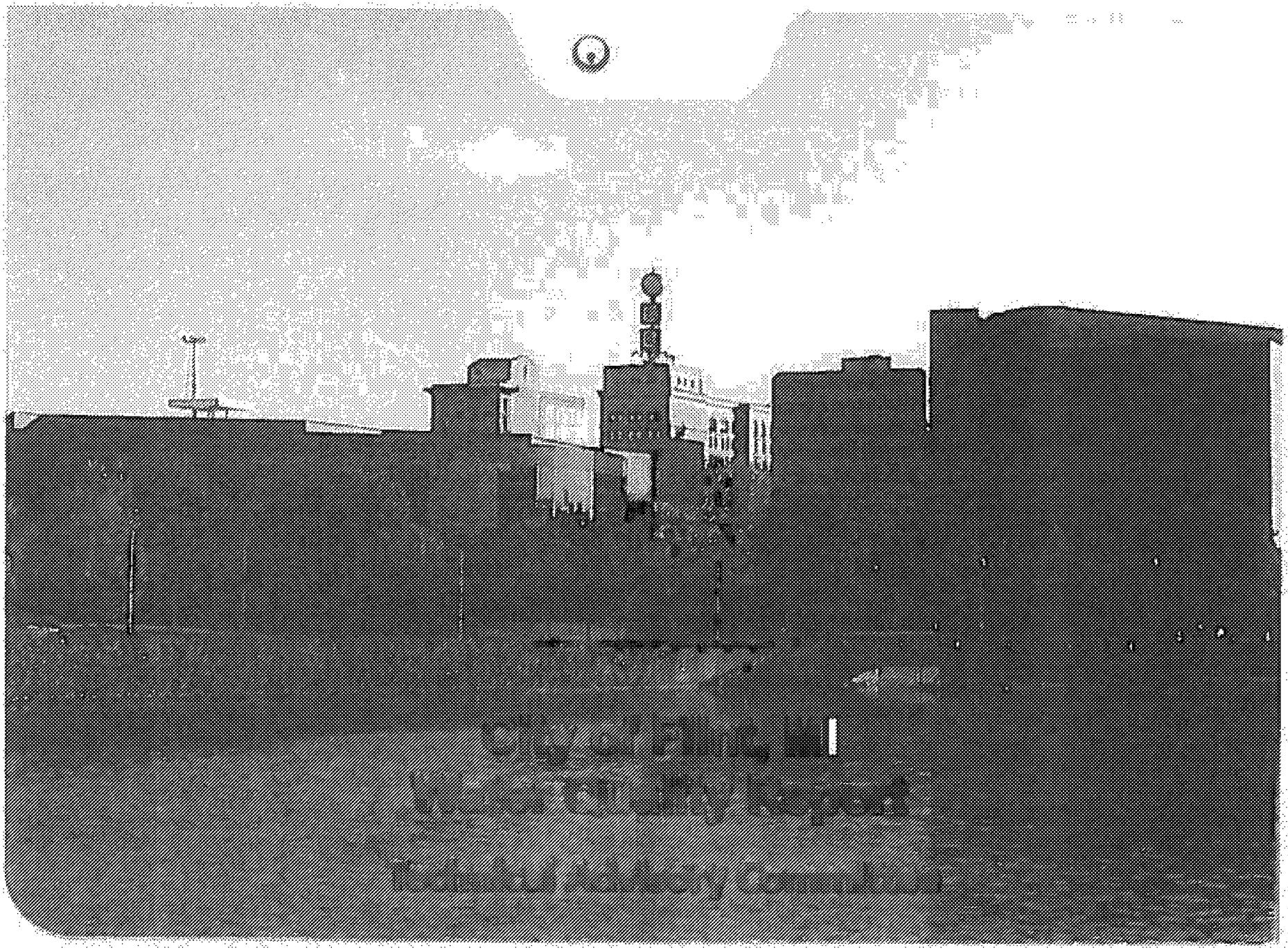
Microbial data

	Legionella	*L. pneumphila*
Hot % (n=29)	97	93
Hot Max Concentration	66018	5408
Cold % (n=30)	77	60
Cold Max Concentration	119028	4237
Combined % (n=59)	86	76
Combined Mean Concentration	14123	1969

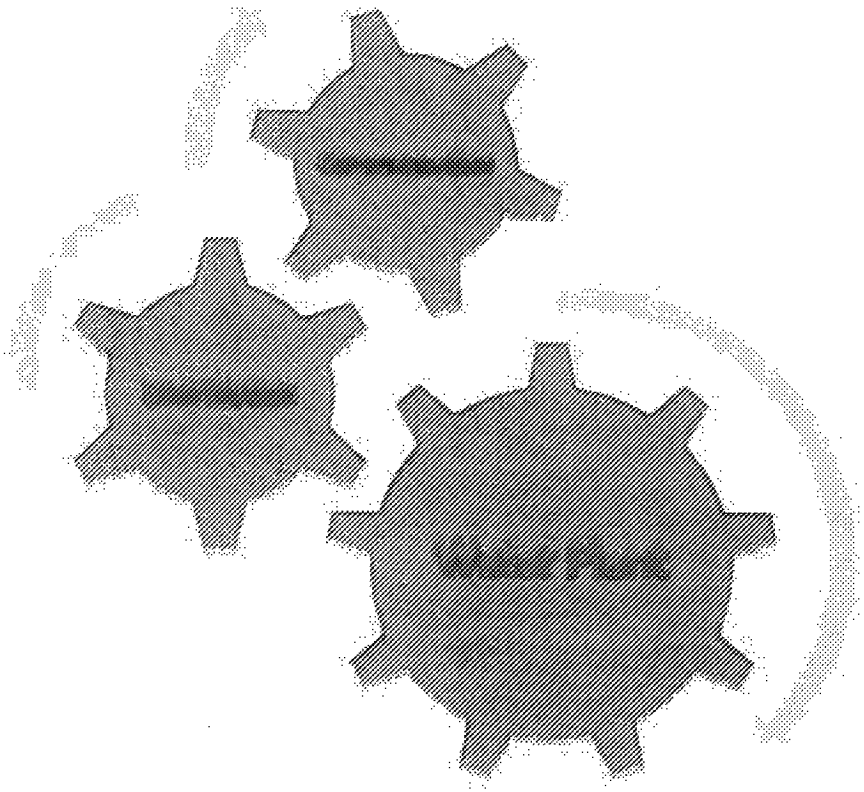
- Concentrations in gene copies/mL
- Samples have yet to be re-tested for assay inhibition
- Number of positives may increase with additional analysis

Summary

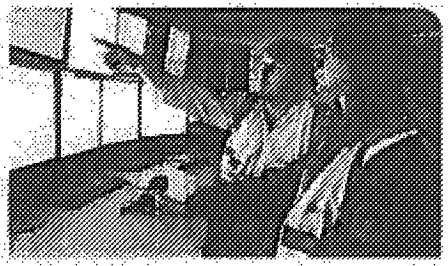
- High frequency and concentration of both *Legionella* and *L. pneumophila* measured



Solution Involves Coordination of 3 Activities

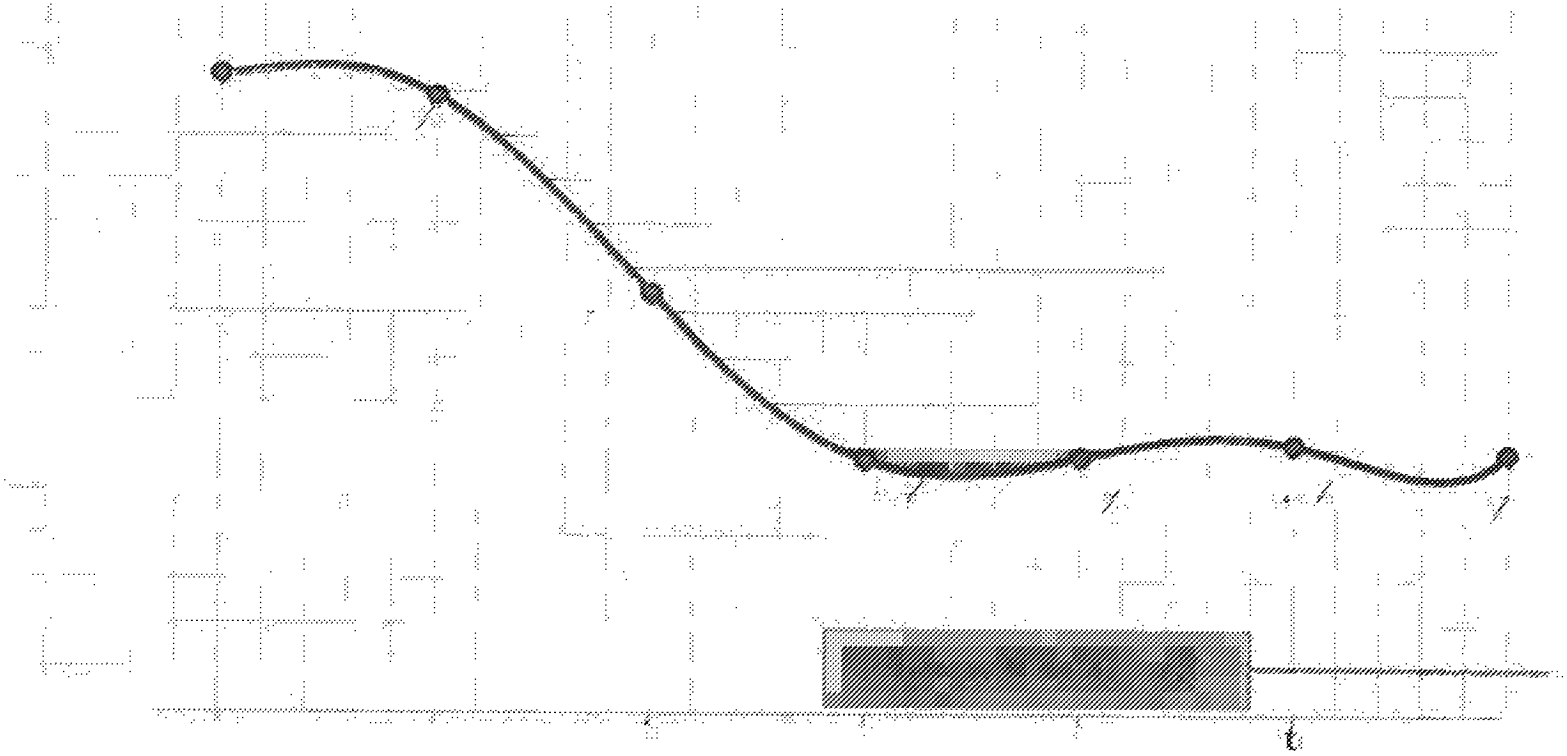


Optimize Plant Processes

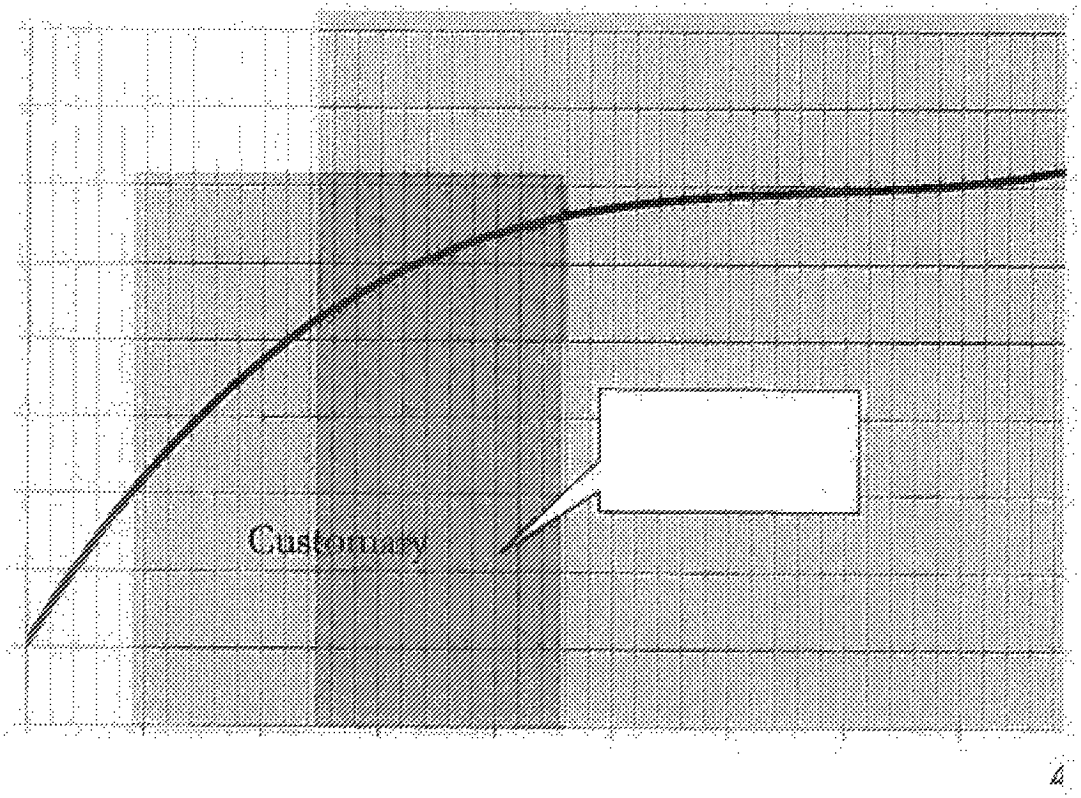


All dependent on implementing advanced managerial techniques at the plant

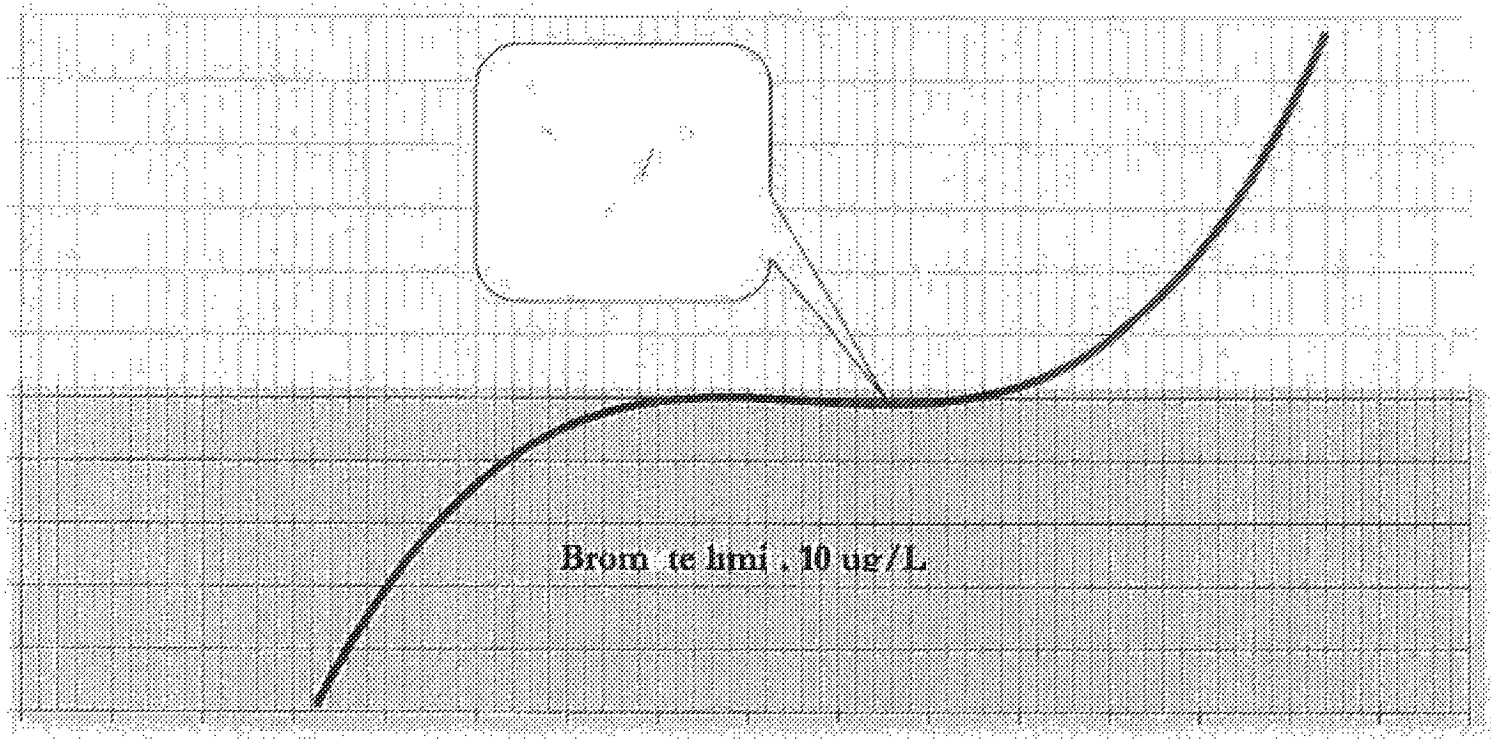
TOC Removal Efficiency Optimizing [illegible] urren [illegible] an



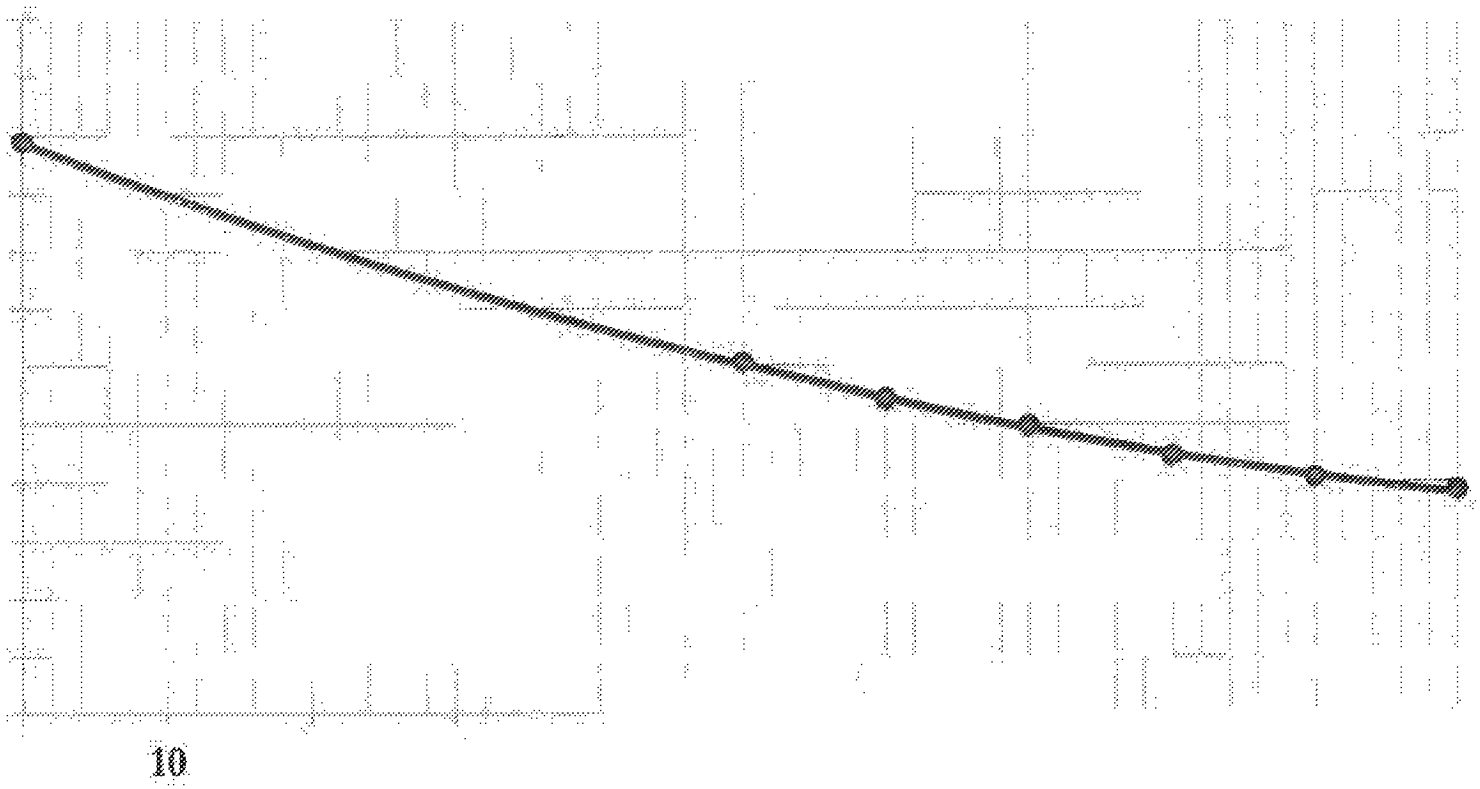
Potassium Permanganate Titration Graph



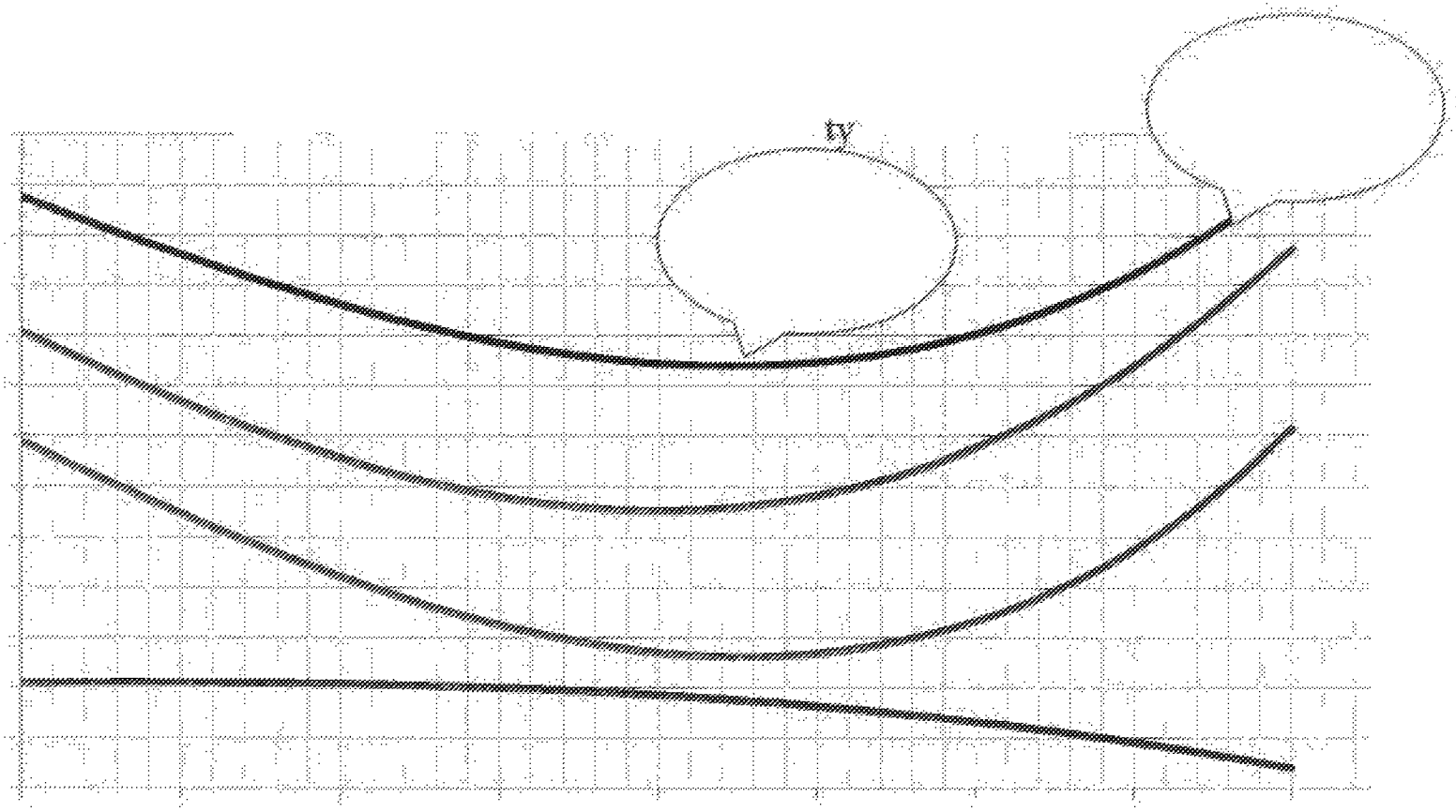
Bromate Action Stage



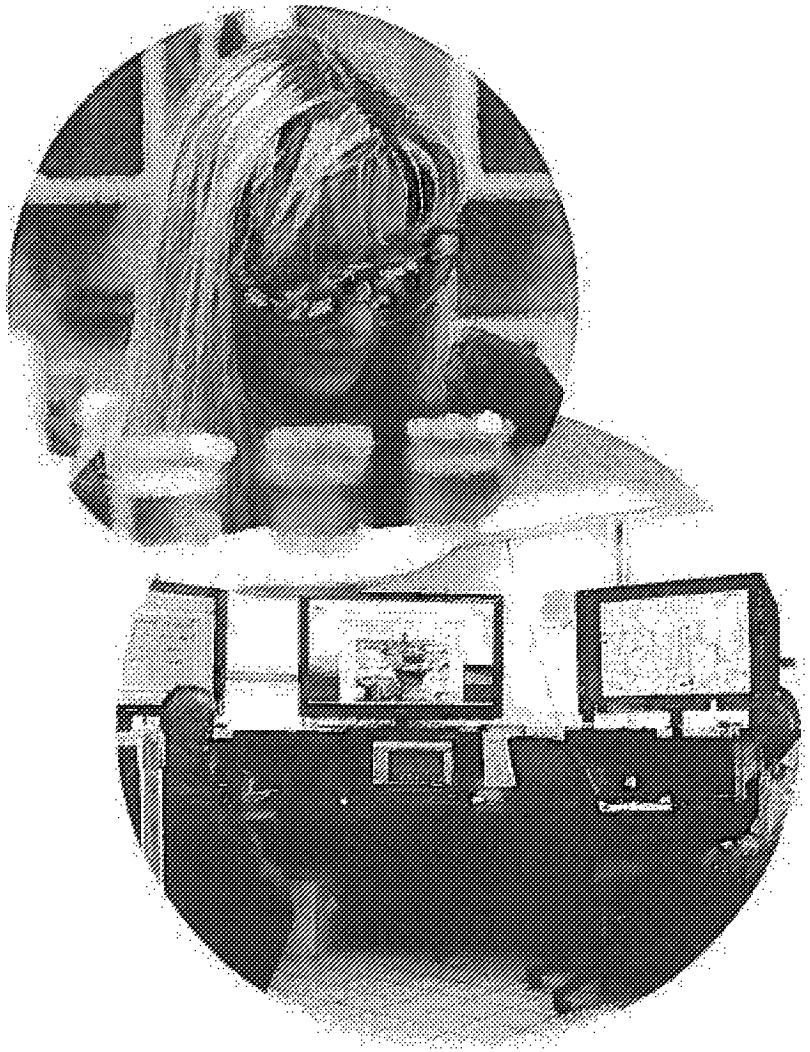
Dosage of Ferric Chloride

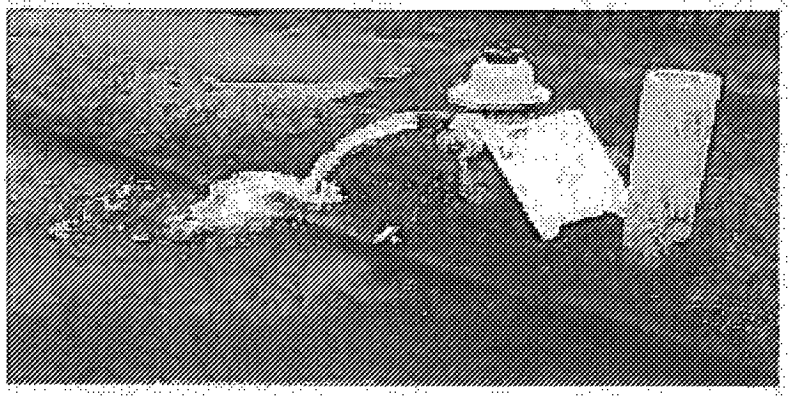


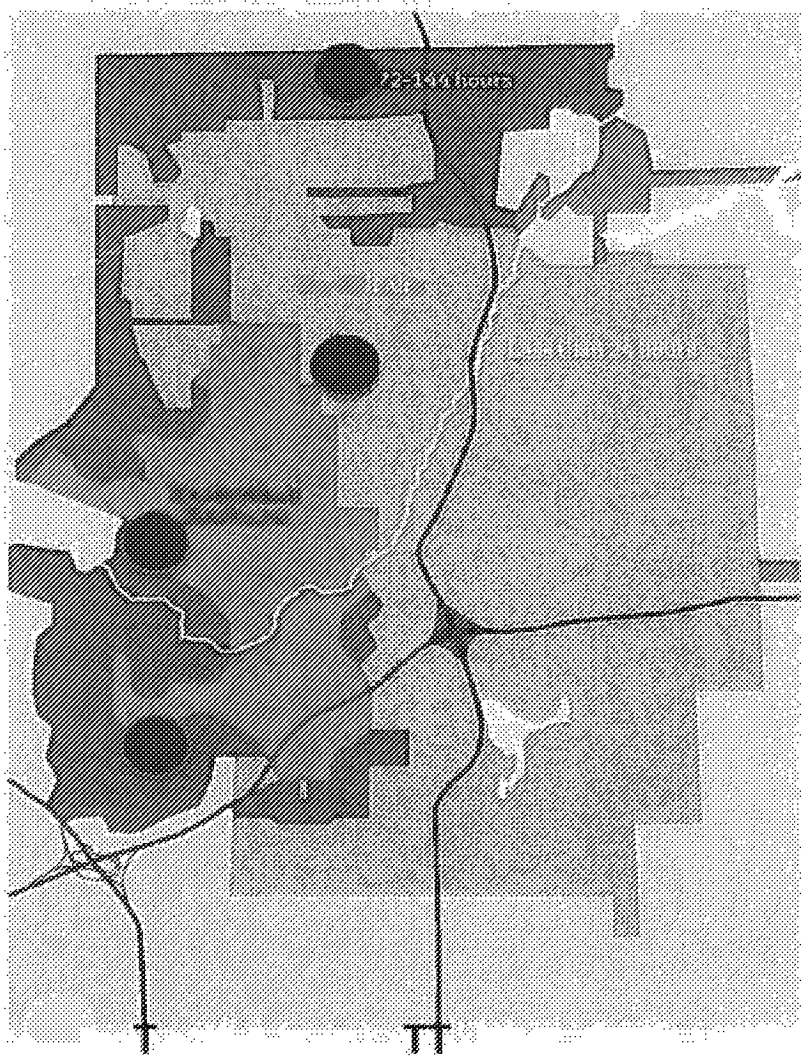
Lime Dosage Graph



Implement Best Manag[illegible]







Make It Easy to Access Information and People

Develop a proactive customer communication plan

- Create advisory committees to help direct efforts and improve flow of information
- Add additional communication personnel for the utility
- Develop a pro active communication program
- Establish a single point of contact to manage all water quality complaints
- Provide additional customer service training and tools to staff
- Expand neighborhood and community outreach
- Change monthly billing statements from card to envelope with information

VEOLIA

Questions?

	The concentration of a contaminant, which, if exceeded, triggers treatment or other requirements which a water system must follow.
	HAA5 is the total of bromoacetic, chloroacetic, dibromoacetic, dichoroacetic, and trichloroacetic acids. Compliance is based on the total .
Average	
Level	The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.
Level Goal	The level of contaminant in drinking water below which there is no known or expected risk to health.
Level	The highest level of disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.
Level Goal	The level of a drinking water disinfectant below which there is no known or expected risk to health. MRLDG's do not reflect the benefits of the use of disinfectants to control microbial contaminants.
Units	Measures the cloudiness of water.
billion)	The ppb is equivalent to micrograms per liter. A microgram = 1/1000 milligram.
million)	The ppm is equivalent to milligrams per liter. A milligram = 1/1000 gram.
	A required process intended to reduce the level of a contaminant in drinking water.
	Total Trihalomethanes is the sum of chloroform, bromodichloromethane, dibromochloromethane and bromoform. Compliance is based on total.

Department of Utilities

FLINT WATER PLANT

City of Flint
Water Plant & Facilities

2013 Consumers Annual Report on W

The City of Flint Department of Utilities is dedicated to providing residents of the community. The Consumers Annual Report on Water Q about your drinking water. This report includes information about the so a chart summarizing United States Environmental Protection Agency (U table giving explanations of important terms to understand when viewin & Facilities operates and maintains a certified drinking water laboratory federal regulations and is committed to prompt and thorough notificatio for concern about the quality of the drinking water.

& Sewerage Department, and the Michigan Public Health Institute performed
ssing the susceptibility of potential contamination. The susceptibility rating
ging to "very high" based primarily on geologic sensitivity, water chemistry,
source water intake is categorized as having a moderately low susceptibility
Huron water treatment plant has historically provided satisfactory treatment
ter standards. If you would like to know more information or a complete copy
ter Plant at (810) 787-6537.

nk to drink, the EPA prescribes regulations, which limit the amount of
by the public water systems. The Food and Drug Administration (FDA)
ons in bottled water, which must provide the same protection for public
bottled water, may reasonably be expected to contain at least small amounts of
ntaminants does not necessarily indicate that water poses a health risk. More
otential health effects can be obtained by calling the EPA's Safe Drinking

(tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs,
the surface of the land or through the ground, it dissolves naturally occurring
material, and can pick up substances resulting from the presence of animals or
may be present in source water include:

ruses and bacteria, which may come from sewage treatment plants, septic
ems, and wildlife.

ics and metals, which can be naturally-occurring or result from urban storm
astewater discharges, oil and gas production, mining, or farming.

ay come from a variety of sources such as agriculture, urban storm water

cluding synthetic and volatile organic chemicals, which are by-products of
oduction, and can also come from gas stations, urban storm water runoff,

ay be naturally occurring or be the result of oil and gas production and

ble to contaminants in drinking water than the general population. Immuno-
ancer undergoing chemotherapy, persons who have undergone organ
er immune system disorders, some elderly, and infants can be particularly at
seek advice about drinking water from their health care providers. EPA/CDC
the risk of infection by Cryptosporidium and other microbial contaminants
Hotline (1-800-426-4791).
ause serious health problems, especially for pregnant women and young
ily from materials and components associated with service lines and home
Utilities is responsible for providing high quality drinking water, but cannot
ishing components. When your water has been sitting for several hours, you

Nitrate	05/13/2013	ppm	10	10	0.32	n/a
Barium	6/9/2008	ppm	2	2	0.01	n/a

Disinfection By-Products – Monitoring in Distribution System

Contaminant	Test Date	Units	Health Goal MCLG	Allowed Level MCL	Highest LRAA	Range Detect
Total Trihalomethanes (TTHM)	2013	ppb	n/a	80	37.8	11.5 –
Haloacetic Acids (HAA5)	2013	ppb	n/a	60	17.0	6.0 – 1

Disinfectant Residuals Monitoring in Distribution System

Contaminant	Test Date	Units	Health Goal	Allowed Level	Highest RAA	Range Detec
Disinfectant Total Chlorine Residual	Jan-Dec 2013	ppm	MRDGL 4	MRDL 4	0.81	0.65-0

2013 Turbidity – Monitored every 4 hours at Plant Finished Water Tap

Highest Single Measurement Cannot exceed 1 NTU	Lowest Monthly % of Samples Meeting Turbid Limit of 0.3 NTU (minimum 95%)
0.26 NTU	100%

Turbidity is a measure of the cloudiness of water. We monitor it because it is a good indicator of the

2013 Microbiological Contaminants – Monthly Monitoring in Distribution System

Regulated Contaminant	MCLG	MCL	Highest Numbe Detected
Total Coliform Bacteria	0	Presence of Coliform bacteria > 5% of monthly samples	In one month 1
E.coli or Fecal Coliform Bacteria	0	A routine sample and a repeat sample are total coliform positive, and one is also fecal or *E. coli* positive.	entire year 0

2011 Lead and Copper Monitoring at Customers' Tap

Regulated Contaminant	Test Date	Units	Health Goal MCLG	Action Level AL	90th Percentile Value*	Number of Samples Over AL
Lead	2011	ppb	0	15	< 2.0	0
Copper	2011	ppm	1.3	1.3	0.10	0

*The 90th percentile value means 90 percent of the homes tested have lead and copper levels below value is above the AL additional requirements must be met.

Regulated Contaminant	Treatment Technique
Total Organic Carbon	The Total Organic Carbon (TOC) removal ratio is calculated as the rat

	The concentration of a contaminant, which, if exceeded, triggers treatment or other requirements which a water system must follow.
	HAA5 is the total of bromoacetic, chloroacetic, dibromoacetic, dichoroacetic, and trichloroacetic acids. Compliance is based on the total .
	The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.
	The level of contaminant in drinking water below which there is no known or expected risk to health.
	A milligram = 1/1000 gram 1 milligram per liter is equal to 1ppm
	The highest level of disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.
	The level of a drinking water disinfectant below which there is no known or expected risk to health. MRLDG's do not reflect the benefits of the use of disinfectants to control microbial contaminants.
	Measures the cloudiness of water.
	A measure of radioactivity. Picocurie (pCi) means the quantity of radioactive material producing 2.22 nuclear transformations per minute.
	The ppb is equivalent to micrograms per liter. A microgram = 1/1000 milligram.
	The ppm is equivalent to milligrams per liter. A milligram = 1/1000 gram.
	A required process intended to reduce the level of a contaminant in drinking water.
	Total Trihalomethanes is the sum of chloroform, bromodichloromethane, dibromoochloromethane and

Department of Utilities

FLINT WATER PLANT

City of Flint
Water Plant & Facilities

2014 Consumers Annual Report on W

The City of Flint Department of Utilities is dedicated to provid the residents of the community. The Consumers Annual Report on W information about your drinking water. This report includes informat health information, a chart summarizing United States Environmenta testing results, and a table giving explanations of important terms to results. The Flint Water Plant & Facilities operates and maintains a c to assure compliance with all state and federal regulations and is cor

...higan Department of Environmental Quality in partnership with the U.S. ...vvage Department, and the Michigan Public Health Institute performed a ...ine the susceptibility of potential contamination. The susceptibility rating is a ... to "very high" based primarily on geologic sensitivity, water chemistry, and ... water intake is categorized as having a moderately low susceptibility to ...ron water treatment plant has historically provided satisfactory treatment of ...dards. If you would like to know more information or a complete copy of ...lant at (810) 787-6537.

...o drink, the EPA prescribes regulations, which limit the amount of certain ...water systems. The Food and Drug Administration (FDA) regulations ...ter, which must provide the same protection for public health. Drinking water, ...pected to contain at least small amounts of some contaminants. The presence of ...nat water poses a health risk. More information about contaminants and potential ...EPA's Safe Drinking Water Hotline (800-426-4791).

...tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, ...he surface of the land or through the ground, it dissolves naturally occurring ...aterial, and can pick up substances resulting from the presence of animals or ...ay be present in source water include:

...ruses and bacteria, which may come from sewage treatment plants, septic ...tions, and wildlife.

... and metals, which can be naturally-occurring or result from urban storm ...wastewater discharges, oil and gas production, mining, or farming.

...come from a variety of sources such as agriculture, urban storm water

...luding synthetic and volatile organic chemicals, which are by-products ...n production, and can also come from gas stations, urban storm water

...n be naturally occurring or be the result of oil and gas production and

...to contaminants in drinking water than the general population. Immuno- ...ons undergoing chemotherapy, persons who have undergone organ ...immune system disorders, some elderly, and infants can be particularly at ...k advice about drinking water from their health care providers. EPA/CDC ...isk of infection by Cryptosporidium and other microbial contaminants ...Hotline (1-800-426-4791).

...serious health problems, especially for pregnant women and young children. ...nerable to lead in drinking water than the general population. It is possible ...ion at other homes in the community as a result of materials used in your

...ntrates	...8/13/14	ppm	...	...	...0.35	...n/a
Nitrate	5/13/14	ppm	10	10	0.31	n/a

Disinfection By-Products -- Monitoring in Distribution System Stage 2 Disinfection B

Regulated Contaminant	Test Date	Unit	Health Goal MCLG	Allowed Level MCL	Highest LRAA	Range o Detectio
Total Trihalomethanes (TTHM)	2014	ppb	n/a	80	33.0	10.0 - 48.(
Haloacetic Acids (HAA5)	2014	ppb	n/a	60	16.8	8.0 – 19.(

Disinfectant Residuals Monitoring in DWSD Distribution System

Regulated Contaminant	Test Date	Unit	Health Goal MRDGL	Allowed Level MRDL	Highest RAA	Range o Detectio
Total Chlorine Residual	Jan-Dec 2014	ppm	4	4	0.82	0.64-0.9
Regulated Contaminant	**Treatment Technique**					
Total Organic Carbon (ppm)	The Total Organic Carbon (TOC) removal ratio is calculated as the ratio be actual TOC removal and the TOC removal requirements. The TOC was r each month and because the level was low, there is no requirement for TC					

2014 Turbidity -- Monitored every 4 hours at Plant Finished Water Tap

Highest Single Measurement Cannot exceed 1 NTU	Lowest Monthly % of Samples Meeting Turbidit Limit of 0.3 NTU (minimum 95%)
0.19 NTU	100%
Turbidity is a measure of the cloudiness of water. We monitor it because it is a good indicator of the e	

2014 Microbiological Contaminants -- Monthly Monitoring in Distribution System

Regulated Contaminant	MCLG	MCL	Highest Numb Detected
Total Coliform Bacteria	0	Presence of Coliform bacteria > 5% of monthly samples	0
E.coli Bacteria	0	A routine sample and a repeat sample are total coliform positive, and one is also fecal or E. coli positive.	0

2011 Lead and Copper Monitoring at Customers' Tap

Regulated Contaminant	Test Date	Unit	Health Goal MCLG	Action Level AL	90th Percentile Value*	Number Sample Over Al
Lead	2011	ppb	0	15	< 2.0	0
Copper	2011	ppm	1.3	1.3	0.10	0

*The 90th percentile value means 90 percent of the homes tested have lead and copper levels below th is above the AL additional requirements must be met.

2014 Radionuclides

Regulated Contaminant	Test Date	Unit	Health Goal MCLG	Allowed Level MCL	Level Detected
Combined Radium	5/13/14	pCi/l	0	5	0.88 + or - 0.55

City of Flint 2014
Annual Water Quality Report

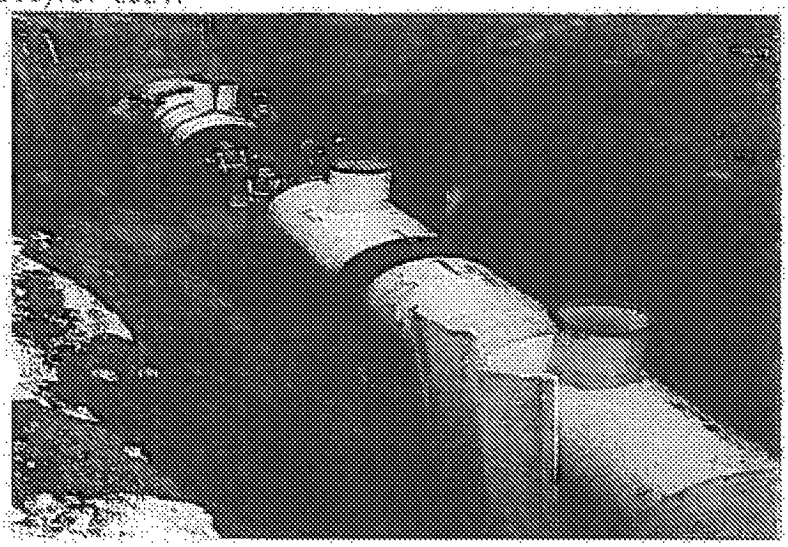
The Consumers Annual Water Quality Report provides important information about your drinking water. This report includes information about the source of the water, health information, charts that summarize regulatory required testing results, and a table giving explanations of important terms to understand when viewing the test results. The City of Flint Department of Utilities is dedicated to providing quality drinking water to the residents of the community. The Flint Water Plant operates and maintains a certified drinking water laboratory to assure compliance with all state and federal regulations, and is committed to prompt and thorough notification to the consumers if there is any reason for concern about the quality of the drinking water. Information about your drinking water is available on the City of Flint web page at www.cityofflint.com or by calling the City of Flint Water Plant at (810) 787-6537. The Safe Drinking Water Hotline at (800) 426-4791 is a resource for health related questions and water quality issues. General drinking water information can also be found on the U.S. Environmental Protection Agency (EPA) web site at www.epa.gov/safewater/.

Customer Service Center
City Hall
1101 S. Saginaw St.
Flint, MI 48501

Water Source

The City of Flint began using the Flint River as a water source in May of 2014. Flint is located roughly in the middle of the Flint River Watershed. The Flint River watershed includes Holloway Reservoir, C.S. Mott Lake, Kearsley Lake, and numerous streams and creeks that drain to these lakes or directly into the Flint River. The Michigan Department of Environmental Quality in partnership with the U.S. Geological Survey, and the City of Flint Utilities Department conducted a source water assessment in February 2004 to determine the susceptibility of potential contamination. The susceptibility rating is a seven-tiered scale ranging from "very low" to "very high" based primarily on geologic sensitivity, water chemistry, and contaminant sources. The Flint River source water intake is categorized as having a very high susceptibility to potential contaminant sources. If you would like to know more information or a complete copy of the report, contact the City of Flint Water Plant at (810)787-6537.

The use of the Flint River as a source water for the City of Flint Water Treatment Plant was a temporary move, driven largely by economics and the financial state of the City. The City of Flint joined the Karegnondi Water Authority (KWA) in 2010. The KWA consists of a group of local communities that decided to support and fund construction of a raw water pipeline to Lake Huron. The KWA will provide the City of Flint Water Treatment Plant with source water from Lake Huron. The KWA pipeline is currently under construction, and is scheduled to be completed by the end of 2016.



KWA pipeline construction

General Information

In order to ensure that tap water is safe to drink, the EPA prescribes regulations, which limit the amount of certain contaminants in water provided by the public water systems. The Food and Drug Administration (FDA) regulations establish limits for contaminants in bottled water, which must provide the same protection for public health. Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the EPA's Safe Drinking Water Hotline (800-426-4791).

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity. Contaminants that may be present in source water include:

- **Microbial contaminants**; such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.
- **Inorganic contaminants**; such as salts and metals, which can be naturally-occurring or result from urban storm water runoff, industrial or domestic wastewater discharges, oil and gas production, mining, or farming.
- **Pesticides and herbicides**; which may come from a variety of sources such as agriculture, urban storm water runoff, and residential uses.
- **Organic chemical contaminants**; including synthetic and volatile organic chemicals, which are by-products of industrial processes and petroleum production, and can also come from gas stations, urban storm water runoff, and septic systems.
- **Radioactive contaminants**; which can be naturally occurring or be the result of oil and gas production and mining activities.

General Information (cont.)

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-comprised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/CDC guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and other microbial contaminants are available from the Safe Drinking Water Hotline (1-800-426-4791).

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Infants and young children are typically more vulnerable to lead in drinking water than the general population. It is possible that the lead levels at your home may be higher than at other homes in the community as a result of materials used in your home's plumbing Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. The City of Flint Department of Utilities is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components. If you are concerned about elevated lead levels in your home's water, you can minimize your potential exposure to lead in your water by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline or at http://www.epa.gov/safewater/lead.

Current Drinking Water Issues

The City of Flint experienced drinking water issues in the summer of 2014. Issues began with areas of the city experiencing "rusty" water. This was largely due to the city distribution system, which contains hundreds of miles of cast iron pipe. As these pipes age and degrade, iron is released, causing the water to exhibit color. Other contributors to this issue include water main breaks and repairs, routine distribution system maintenance, and a source water change which exposed the pipes to a slightly different water chemistry.

The City of Flint received violations from the Michigan Department of Environmental Quality (MDEQ). A violations for total coliforms and E. coli in September, and a corresponding total trihalomethane (TTHM) violation in December. As routine sample site testing in the city distribution system began to detect bacteria, system flushing increased, and chlorine addition at the water treatment plant also increased. The resulting increased chlorine addition then resulted in the higher formation of THM's through the warm weather months.

While facing these issues, the City of Flint took steps to confer with industry professionals and state regulators in regards to treatment plant operation and distribution system operation. In the fall, as water temperatures dropped, and improvements were completed in the distribution system, THM levels were below the maximum contaminant level during routine November monitoring at 7 of the 8 monitoring sites.

Moving Forward

The City of Flint has taken many steps to help correct the underlying issues that resulted in drinking water violations. Water treatment plant and distribution system corrective actions that were taken or are currently in progress include:

- Limiting the use of storage reservoirs during the warm weather months.
  Warm water temperatures and water age are large contributors to the formation of THM's.

- Optimizing ozone pretreatment by updating control programming along with cleaning and inspection of the ozone generators. Ozone is a powerful oxidant that provides a level of disinfection along with a level of taste and odor [illegible]

Moving Forward (cont.)

- Currently finalizing the installation of granular activated carbon (GAC) to the filtration process, which should be complete by the end of July 2015. GAC will reduce THM's by removing the chemical precursors that react with chlorine to form the THM's.

- Increased water main flushing frequency in an effort to alleviate stagnant water, and reduce water age in the distribution system.

- Update of distribution system water hydraulic model, to determine possible problem areas.

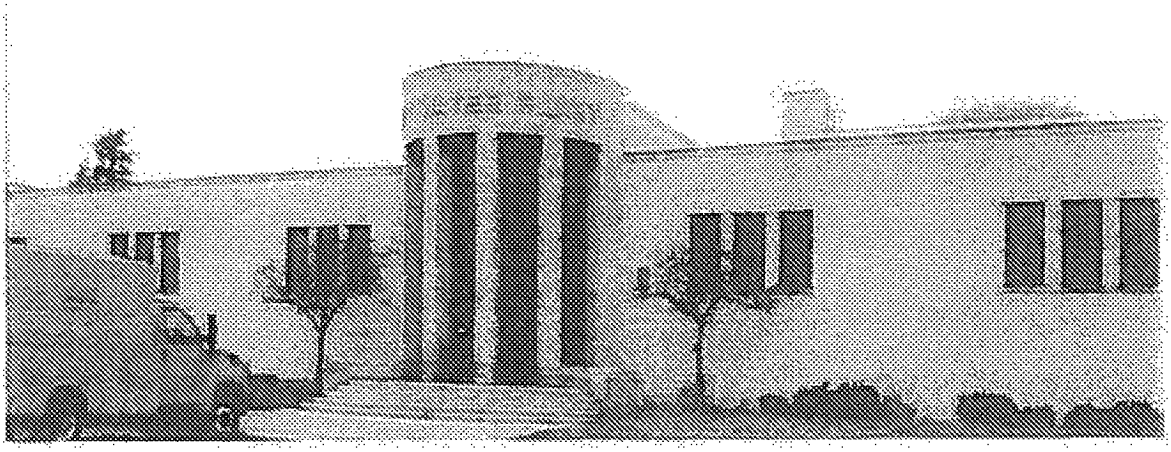
- Repaired and replaced several large water main valves, which were inhibiting the designed flow of water through the system.

- Currently finalizing plans for the replacement of a large section of a 24' transmission water main in an area of concern in the distribution system. This project should be complete by the end of 2015.

- Currently completing a distribution system evaluation of 7000 water main valves that control the flow of water throughout the city. This project will be complete in July of 2015 and will provide information to guide decisions with further repairs and future projects.

- Currently working on several upgrades at the water treatment plant in preparation for KWA.

The City of Flint is dedicated to resolving the issues that are facing the water system, and will continue to make positive steps forward as we prepare for the future. The City would like to thank all the residents and customers for their patience and understanding as we face the challenges ahead. The trials and tribulations that we have faced with the switch to the Flint River as a source water will prove to be important as we move ahead as a member of the KWA. Many of the distribution system issues experienced while using the Flint River may have been experienced with any change in source water. As we continue to address the issues, take steps to be proactive, and the transition to the KWA pipeline, we can assure a future of quality drinking water in the City of Flint.



The following pages of this report include the results of 2014 regulatory testing. If you have any questions about this report or other water related concerns please contact the City of Flint Water Plant at [illegible]

2014 Regulated Detected Contaminants

Monitored at Treatment Plant

Inorganic & Organic Chemicals, Metals, and Pesticides						
Regulated Contaminant	Unit of Measure	MCLG	MCL	Highest Level Detected	Range of Detection	Violation
Inorganic Chemicals						
Fluoride	mg/L	4	4	0.88	0.12 – 0.88	No
Nitrate	mg/L	10	10	0.5	ND – 0.5	No
Metals						
Barium	mg/L	2	2	0.03	0.02 – 0.03	No
Selenium	mg/L	0.05	0.05	0.001	ND – 0.001	No
Pesticides						
Atrazine	mg/L	0.03	0.03	0.0003	ND – 0.0003	No
Organics						
Total Xylenes	mg/L	10	10	0.0005	ND – 0.0005	No

More than 100 other chemicals were monitored quarterly throughout the year that were not detected. The various classification groups of these chemicals include metals, carbamates, herbicides, pesticides, organics, and radiologicals.

Total Organic Carbon, TOC			
Regulated Contaminant	Required Monthly % Removal	Minimum Monthly % Removal	Monthly % Removal Ranges
Total Organic Carbon	50	53	53 - 68

Finished water and source water samples are collected and analyzed monthly to calculate percent removal. Total organic carbon includes numerous chemicals that are found naturally in surface waters. Certain chemicals found in this group are precursors to the disinfection byproducts trihalomethanes and haloacetic acids.

Turbidity		
Highest Single Measurement (Cannot exceed 1 NTU)	Lowest Monthly % of Samples Meeting Turbidity Limit (0.3 NTU in 95% of samples)	Violation
0.22	100	No

Turbidity is a measure of the apparent cloudiness of water, usually attributed to particulate matter. The turbidity data in the chart above is measured from the water plant tap every 4 hours. Turbidity is monitored throughout each stage of the treatment process in 4 hour intervals. During a final stage of treatment, filtration, turbidity is monitored continuously with in-line meters, and verified every 4 hours in the laboratory.

In 2014, the EPA required the City of Flint and other communities to conduct further testing on unregulated contaminants. Samples were collected at the treatment plant and the maximum residence time location in the distribution system. The monitoring results will be utilized by the EPA to determine if these chemicals should be regulated. The unregulated contaminant monitoring that yielded results are presented in the chart below:

Unregulated Contaminant Monitoring			
Regulated Contaminant	Unit of Measure	Highest Level Detected	Range of Detection
Chromium	ug/L	0.40	ND – 0.4
Hexavalent Chromium	ug/L	0.40	0.34 – 0.40
Strontium	ug/L	130	120 – 130
Vanadium	ug/L	0.20	ND – 0.20

2014 Regulated Detected Contaminants

Monitored in Distribution System

Disinfectant Residuals						
Regulated Contaminant	Unit of Measure	MCLG	MRL	Highest Level Detected	Range of Detection	Violation
Total Chlorine Residual	mg/L	4.0	4.0	3.5	0.1 - 3.5	No

Microbiological Contaminants				
Regulated Contaminant	MCLG	MCL	Highest Number detected (in 1 month)	Violation
Total Coliform bacteria	0	The presence of coliform bacteria in > 5% of monthly samples	15	Yes
E. coli Bacteria	0	0	1	Yes

Disinfectant residuals and microbiological contaminants are monitored at 8 locations throughout the city distribution system, and at the 2 drinking water reservoirs and pump stations located out in the distribution system. At least 100 samples are collected and analyzed each month.

Lead & Copper						
Regulated Contaminant	Unit of Measure	MCLG	Action Level (AL)	90th Percentile Value	Number of samples over AL	Violation
Lead	ug/L	0	15	6	2	No
Copper	mg/L	1.3	1.3	0.11	0	No

Lead and copper monitoring was conducted from June through December 2014 with the collection of 100 samples. Samples were collected by residents from the taps at their residence. Thank you to all who participated in collecting samples.

Disinfection By-Products						
Regulated Contaminant	Unit of Measure	MCLG	MCL	Highest Level Detected	Range of Detection	Violation
Total Trihalomethanes (TTHM)	ug/L	n/a	80	196	33.3 -196.2	Yes
Haloacetic Acids (HAA)	ug/L	n/a	60	64	5 - 64	No
Bromate	ug/L	10	10	23	ND - 23	No

Disinfection by-products occur as a result of the water treatment process. Bromate is formed as a result of using ozone as a treatment additive. Ozone is used to help control taste and odor issues, and as a pre-treatment disinfection. Naturally occurring bromide reacts with Ozone to generate bromate. Bromate is monitored monthly at the treatment plant, and compliance is based on a yearly average.

TTHM's and HAA's are formed as a result of utilizing chlorine in the treatment process. Naturally occurring compounds known as TOC's (total organic carbon) react with chlorine to form TTHM's and HAA's. The temperature and the age of water increase the formation of THM's and HAA's, and as a result, during the warm months of the year is when levels were at their highest. Samples are tested quarterly from 8 sites throughout the distribution system and compliance is based on a running annual average for each individual site.

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Key to the Detected Contaminant Tables		
Symbol	**Abbreviation for**	**Definition/Explanation**
>	Greater than	
AL	Action Level	The concentration of a contaminant, which, if exceeded, triggers treatment or other requirements which a water system must follow.
HAA5	Haloacetic Acids	HAA5 is the total of bromoacetic, chloroacetic, dibromoacetic, dichoroacetic, and trichloroacetic acids. Compliance is based on the total .
LRAA	Locational Running Annual Average	
MCL	Maximum Contaminant Level	The highest level of a contaminant that is allowed in water. MCLs are set as close to the MCLG's as feasible using the best available treatment technology.
MCLG	Maximum Contaminant Level Goal	The level of contaminant in drinking water below which there is no known or expected risk to health.
mg/L	Milligrams per Liter	A milligram = 1/1000 gram 1 milligram per liter is equal to 1ppm
MRDL	Maximum Residual Disinfectant Level	The highest level of disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.
MRDLG	Maximum Residual Disinfectant Level Goal	The level of a drinking water disinfectant below which there is no known or expected risk to health. MRLDG's do not reflect the benefits of the use of disinfectants to control microbial contaminants.
n/a	Not Applicable	
ND	Not Detected	
NTU	Nephelometric Turbidity Units	Measures the cloudiness of water.
pCi/L	Picocuries per Liter	A measure of radioactivity. Picocurie (pCi) means the quantity of radioactive material producing 2.22 nuclear transformations per minute.
ppb	Parts Per Billion (one in one billion)	The ppb is equivalent to micrograms per liter. A microgram = 1/1000 milligram.
ppm	Parts Per Million (one in one million)	The ppm is equivalent to milligrams per liter. A milligram = 1/1000 gram.
RAA	Running Annual Average	
TT	Treatment Technique	A required process intended to reduce the level of a contaminant in drinking water.
TTHM	Total Trihalomethanes	Total Trihalomethanes is the sum of chloroform, bromodichloromethane, dibromochloromethane and bromoform. Compliance is based on total.
ug/L	Micrograms per Liter	A microgram = 1/1,000,000 gram 1 microgram per liter is equal to 1ppb

Water Quality Update

Dear City of Flint Resident:

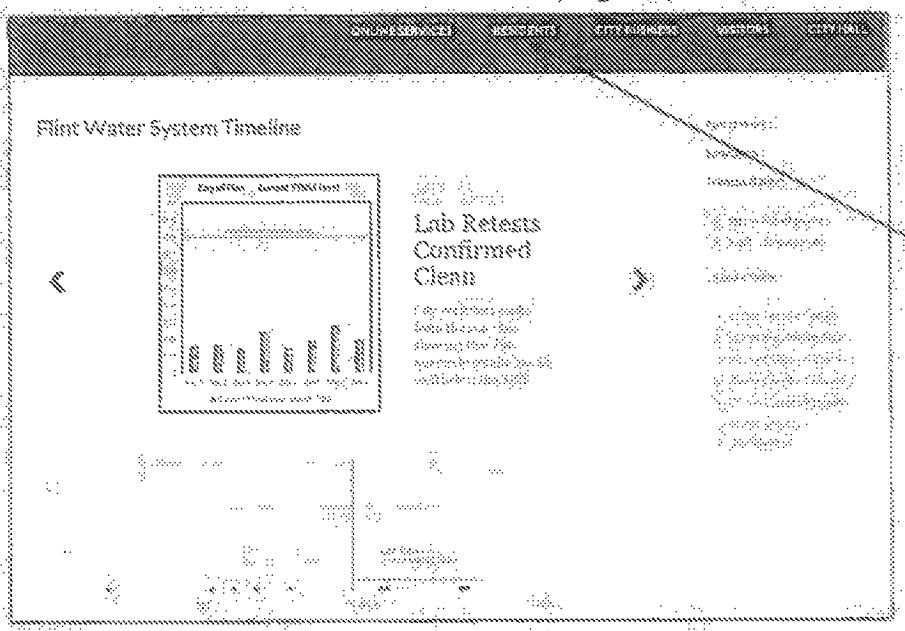
We are pleased to report that City of Flint water is safe and meets U.S. Environmental Protection Agency guidelines. For the second quarter of testing in a row, all eight testing locations in the city have proven to be below the maximum allowable levels for total trihalomethanes (TTHM). While we continue to work on improving aesthetic qualities, such as discoloration or odor, you can be confident that the water provided to you today meets all safety standards. Maintaining safety and quality in our water is a top priority of the City of Flint.

We accomplished this by:

- Upgrading the ozone treatment process at the Water Treatment Plant
- Increasing water main/hydrant flushing to reduce stagnation
- Conducting additional testing of treatment to identify areas of improvement
- Improving water circulation by repairing valves and adjusting reservoir levels

More improvements are being made every day to maintain a healthy system, provide quality water and inform residents of the progress made:

- So far 2100 of the City's 7000 valves have been exercised to determine functionality and if repairs are needed.
- The Granulated Activated Carbon (GAC) filter is on schedule to be installed by mid-July and will have a significant effect on further lowering TTHM.
- A new page has been developed for the City of Flint website designed to keep residents informed of water related stories and progress (shown below).



This page can be found at cityofflint.com under the Residents tab at the top of the page. Under Residents, click on Water to see all information, including the timeline seen here, related to Flint's water progress.

https://www.cityofflint.com/public-works/city-water-system-timeline/

Water Quality Update

The Michigan Department of Environmental Quality (MDEQ) has acknowledged our progress:

"We are encouraged by the results from the most recent round of compliance samples collected on May 18, 2015, which again show individual TTHM levels at/ below the 0.080 mg/L standard at all locations throughout the City's system. Operational Evaluation Reports from December 2014, February 2015, and May 2015 have identified possible causes and corrective measures for the previous elevated TTHM levels, which we encourage the City to continue implementing."
-MDEQ

Notification is based on four quarters of test results. Because of last year's test results, for the City's *annual* quarterly testing average is not yet below the state's allowable average and the City is required to issue the attached notice (***"Important Information about Your Drinking Water"***). There is currently one testing site in the city that is still above the average due to the high levels it experienced in 2014.

Sample Location	5/27/2014	8/4/2014	11/4/2014	2/17/2015	LRAA*	LRAA*
Water Treatment Plant Tap	56	86	33	8	26	41.8
1. 3719 Davison Rd. McDonalds	62.4	145.3	58.6	16.2	51.4	67.9
2. 822 S. Dort Hwy. BP Gas Station	75.1	90.8	36.2	19.9	46.1	53.6
3. 3302 S. Dort Hwy. Liquor Palace	103.6	82.7	33.3	16.8	63.5	80.2
4. 3606 Corunna Rd. Taco Bell	79.2	102.4	33.9	18.1	54.7	72
5. 2503 Flushing Rd. University Market	209.4	196.2	99.6	24.5	59.8	82.9
6. 3216 Martin Luther King Ave. Salem Housing	92.7	102.4	50.3	28.5	72.7	65.9
7. 5018 Clio Rd. Rite Aid	88.2	144.3	53.6	19.2	60.5	69.4
8. 6204 N. Saginaw St. North Flint Automotive	96.6	418.3	41.1	14.9	45.2	54.9

*Long Running Annual Average

Average is below Acceptable Level (80ppm) at all but one site

If you have any questions about this report or would like a test done at your home, free of charge, please call us at 810-787-6537.

Maintaining safe water and improving its quality is a top priority for all of us at the City of Flint, and we apologize for the concerns these notices have raised. We have taken many steps to improve the safety and quality of our water supply and will be taking more. Every day work is being done to ensure a well maintained water system for all of our customers. Please track our progress on our website cityofflint.com/public-works/water-quality-concerns/.

IMPORTANT INFORMATION ABOUT YOUR DRINKING WATER

City of Flint Did Not Meet Treatment Requirements

Our water system recently violated a drinking water standard. Although this incident was not an emergency, as our customers, you have a right to know what happened and what we are doing to correct this situation.

We routinely monitor for the presence of drinking water contaminants. Samples were collected for total trihalomethanes (TTHM) analysis from eight locations on a quarterly basis (August 21, November 20 of 2014, and February 17 & May 18 of 2015). The average of the results at ANY of the eight locations must not exceed the maximum contaminant level (MCL) for TTHMs, otherwise our water system exceeds the MCL. The standard for TTHMs is 80 micro grams per liter (µg/L). The location reporting the highest TTHM level was 94 ug/L; thus, our water system exceeds the TTHM MCL.

What should I do?

- There is nothing you need to do unless you have a severely compromised immune system, have an infant, or are elderly. These people may be at increased risk and should seek advice about drinking water from their health care providers.
- You do not need to boil your water or take other corrective actions. If a situation arises where the water is no longer safe to drink, you will be notified within 24 hours.

What does this mean?

This is not an emergency. If it had been an emergency, you would have been notified within 24 hours.

People who drink water containing trihalomethanes in excess of the MCL over many years may experience problems with their liver, kidneys, or central nervous system, and may have an increased risk of getting cancer.

What is being done?

We are currently working on solutions to correct the problem. We anticipate resolving the problem in 2015. Our most recent individual sample results were all less than the 80 µg/L standard, however since compliance is calculated using a locational running annual average (LRAA) of the most recent four quarters, we are still out of compliance with the MCL at one of eight locations.

For more information, please contact Mr. Brent Wright at 810-787-6537, or the Flint Water Plant at 4500 North Dort Highway, Flint, Michigan 48505.

Please share this information with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail.

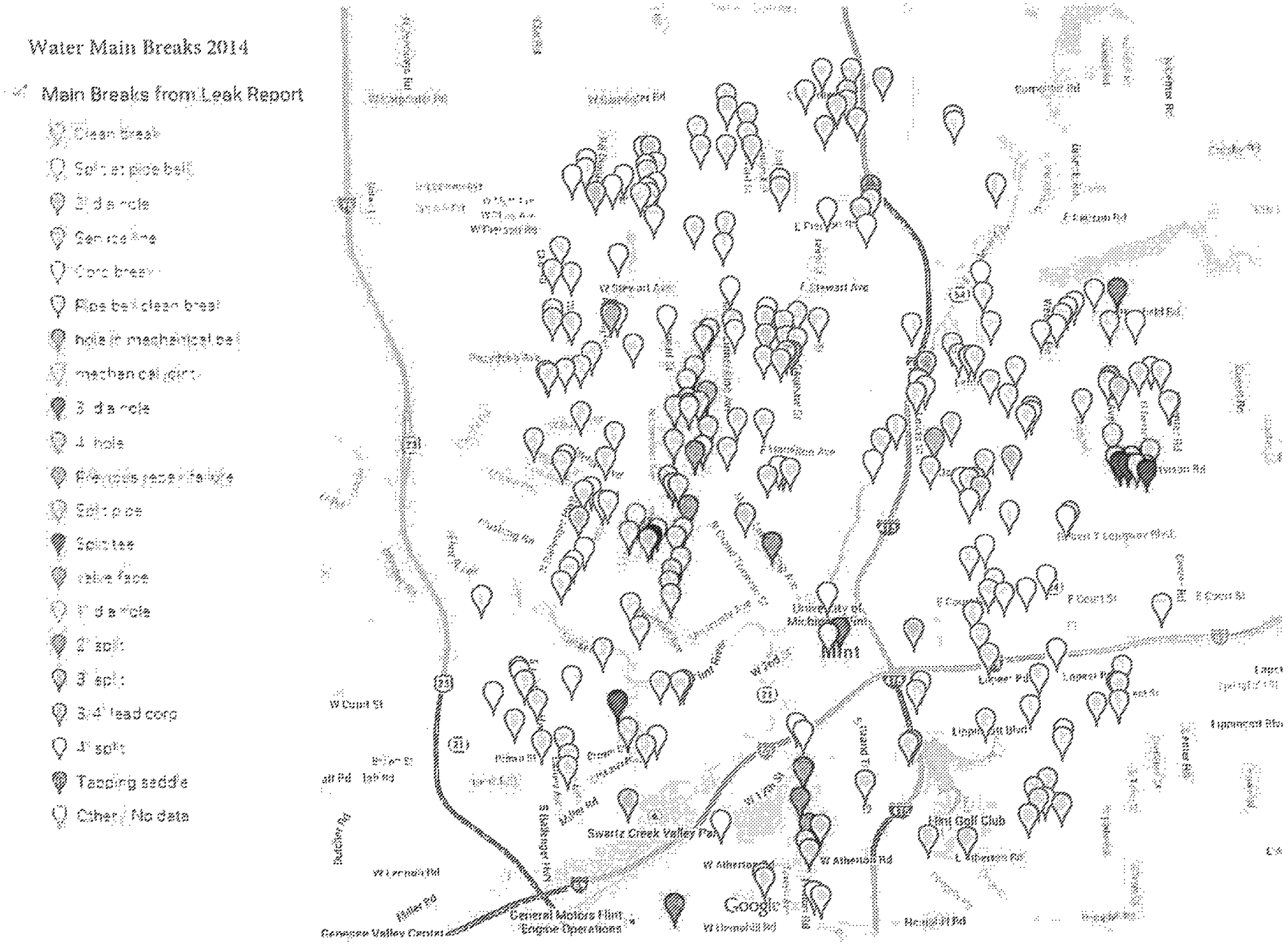
This notice is being sent to you by the City of Flint.

CERTIFICATION: F2/S3 WSSN: 02310

I certify that this water supply has fully complied with the public notification requirements in the Michigan Safe Drinking Water Act, 1976 PA 399, as amended, and the administrative rules.

Signature	Plant Supervisor	7-1-15
	Title	Date Distributed

Reminder to water supplier: This notice/certification must be sent to the Department of Environmental Quality.


Water Main Breaks 2014
Main Breaks from Leak Report
Clean break
Split at pipe bell
3/4" dia hole
Service line
Corp break
Pipe bell clean break
hole in mechanical bell
mechanical joint
3" dia hole
4" hole
Pinhole pack joint failure
Split pipe
Split tee
valve face
1" dia hole
2" split
3" split
3/4" lead corp
4" split
Tapping saddle
Other / No data
Flint
Swartz Creek Valley Park
Flint Golf Club
General Motors Flint Engine Operations
Genesee Valley Center
Google

CITY OF FLINT
OFFICE OF EMERGENCY MANAGER
DARNELL EARLEY
ICMA-CM, MPA

Jason Lorenz
Public Information Officer
(810) 237-2039
jlorenz@cityofflint.com

For Immediate Release

City of Flint Boil Water Advisory Still in Effect for Area Affected by Discovery of Abnormal Water Sample

Flint, Michigan – August 18, 2014 – The City of Flint's Utilities Department has received word today from the Department of Environmental Quality that the boil water advisory issued for a small portion of the city is still in effect although additional testing has shown no signs of E-coli or fecal coliform bacteria in the water. Testing over the last 48 hours has shown that the water tests negative for the presence of fecal coliform bacteria and E-coli, but an abnormal test result triggered the advisory. It is believed that a sampling error is to blame for the abnormal test; however, as a precaution, the advisory will remain in effect until the next citywide sampling has been completed. The next round of routine testing will take place on Tuesday, August 19, 2014 with the possibility that the advisory could be lifted as early as Wednesday, August 20, 2014.

Testing of the drinking water is a part of the routine process for ensuring the quality and safety of the system which happens weekly at nine different sites around the city. Drinking water contamination due to E-coli or coliform bacteria is very rare due to the fact that the bacteria cannot survive in the water for very long. The colder temperature

–CONTINUE–

CITY OF FLINT
OFFICE OF EMERGENCY MANAGER
DARNELL EARLEY
ICMA-CM, MPA

of water in the system coupled with the regular blending of chlorine into the water makes for a hostile environment for these kinds of bacteria. The Flint Water Treatment Plant works diligently to provide water of the highest quality to everyone in the city.

–END–

City Hall
1101 S. Saginaw Street - Flint, Michigan 48502
810-766-7346 FAX: 810-766-7218 www.cityofflint.com

CITY OF FLINT
OFFICE OF EMERGENCY MANAGER
DARNELL EARLEY
ICMA-CM, MPA

Jason Lorenz
Public Information Officer
(810) 237-2039
jlorenz@cityofflint.com

For Immediate Release

City of Flint Boil Water Advisory in Effect for Area Affected Due to Abnormal Water Sample

Flint, Michigan – September 5, 2014 – The City of Flint's Utilities Department in conjunction with the Department of Environmental Quality has issued a boil water advisory for a portion of the city. The boil water advisory is in effect for the area bordered by Dayton Street on the north, DuPont Street on the east, the Flint River on the south, and by Lavelle Road (to the Flint River) on the west. Testing over the last 48 hours has shown that the water in the area above tests positive for the presence of total coliform bacteria. Residents in the area should continue to boil water or use bottled water for drinking, bathing, making ice, brushing teeth, washing dishes, and preparing food until further notice. Boiling the water kills bacteria or other harmful organisms.

Total coliform bacteria are generally not harmful themselves. Coliforms are bacteria which are naturally present in the environment and are used as an indicator that other, potentially-harmful, bacteria *may be present.* Usually, coliforms are a sign that there could be a problem with the treatment or distribution system (pipes).

–CONTINUE–

CITY OF FLINT
OFFICE OF EMERGENCY MANAGER
DARNELL EARLEY
ICMA-CM, MPA

Whenever we detect coliform bacteria in any sample, we do follow-up testing to see if other bacteria of greater concern, such as fecal coliform or E. coli, are present. We did not find any of these bacteria in our subsequent testing. If we had, we would have notified you immediately. However, we are still finding coliforms in the drinking water.

The City of Flint Utilities Department will be flushing the system in that part of the city and increasing the chlorine added to water in the area. The City anticipates that the problem will be resolved within the next three days, which is the minimum amount of time for a boil water notice. All water testing results at the City of Flint Water Treatment Plant have shown the City's drinking water meets all Safe Water Drinking Standards. Testing of the drinking water is a part of the routine process for ensuring the quality and safety of the system which happens weekly at ten different sites around the city. Anyone with questions about the advisory or any other water issues should call 810-787-6537.

--END--

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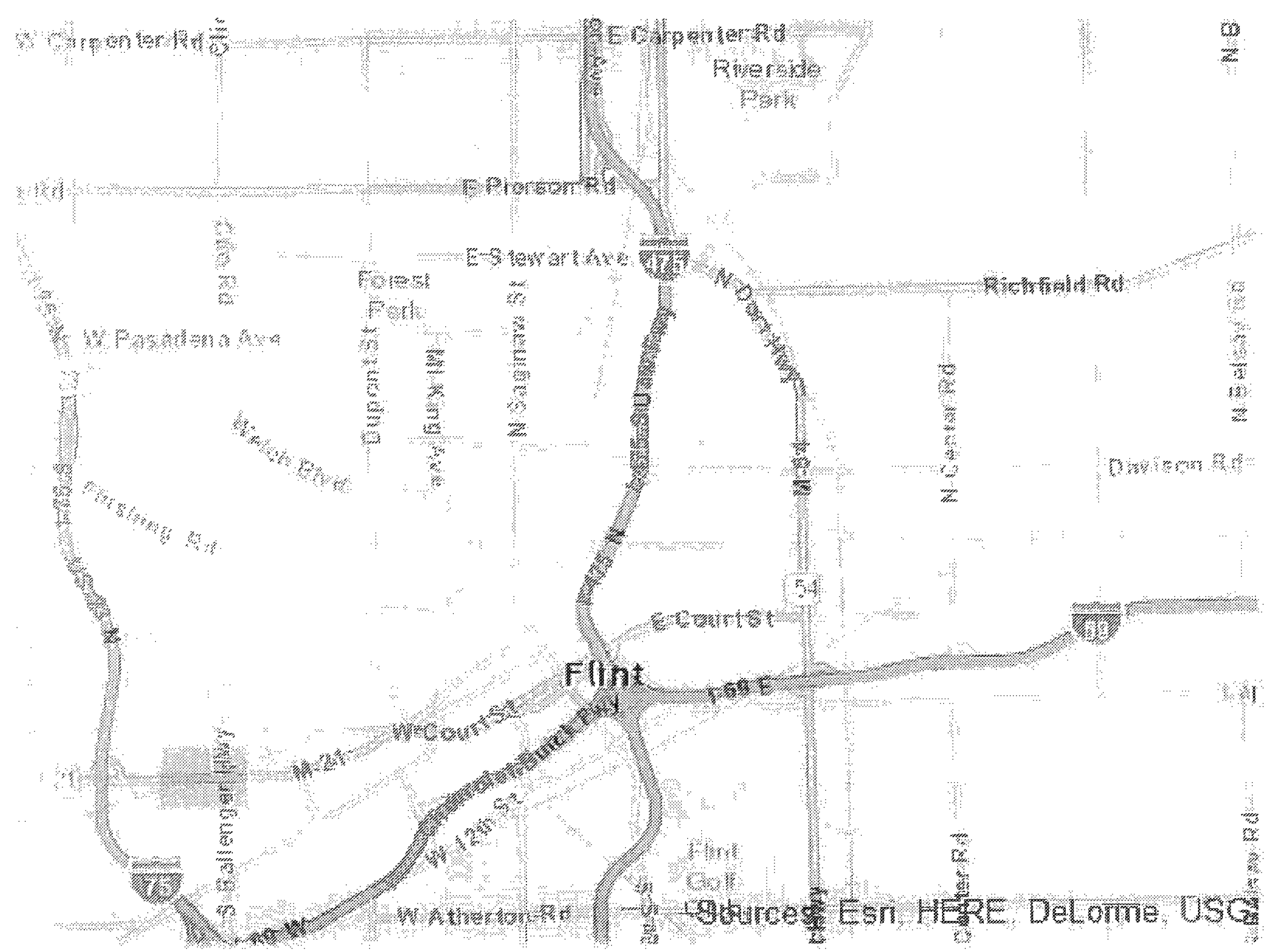
810-766-7346 FAX: 810-766-7218 www.cityofflint.com


S Carpenter Rd
E Carpenter Rd
Riverside Park
E Pierson Rd
E Stewart Ave
Forest Park
Richfield Rd
W Pasadena Ave
Davison Rd
E Court St
Flint
W Court St
W Atherton Rd
Flint Golf
Source: Esri, HERE, DeLorme, USGS

McLaren FLINT	Policy Title: Water Management Including Legionella Prevention	
Effective Date: 2/01 Review Dates: 12/16 Revised: 12/04, 4/07, 11/10, 5/14, 12/14	Oversight Level: Level 2	Policy No: EG-101
McLaren Flint Business Unit: Engineering	Functional Responsibility for the Policy: Engineering Department	

Objective: To ensure safe water management for McLaren Flint

Scope: All departments, units, clinics and facilities under the direction of McLaren Flint

Definitions: McLaren Flint shall provide a potable water supply for drinking, food preparation, hand washing, and personal hygiene for patients, visitors, and employees.

Provisions:

A. When potable (drinking) water is not available, a potable supply will be furnished. Engineering shall establish sources for potable water per policy and arrange for supplies in times of water interruption (See Engineering Procedure Manual).

B. If there is a break in the water system to the facility, the municipal water supplier is responsible for testing the water. As a precaution, a copy of the city's report shall be obtained and reviewed by engineering to confirm results.

C. If there is a potential internal or external contamination of the water system within the facility and the need for testing is evident, water samples shall be collected by a third-party consultant and sent to a licensed laboratory for analysis.

D. All construction areas with new plumbing fixtures shall have water samples collected by a third-party consultant and sent to a licensed laboratory for analysis prior to use.

E. If a disruption of service is planned or occurs spontaneously, Engineering shall notify Infection Control and the managers of the affected area, establish a potable water source, and conduct water testing if required. The Infection Preventionist, along with area managers, shall notify and educate staff, patients, and visitors as to the source and use of the temporary potable water supply.

F. Only potable water can be used for drinking, food preparation, handwashing, and personal hygiene. In the event of a water shortage or disruption in service, an alcohol-based hand rinse may be used temporarily until access to a potable water source has been established. Alcohol-based hand rinses shall not replace hand washing on a permanent basis.

G. Anti-siphon valves shall be installed on faucets used for dialysis to prevent backflow and contamination during use.

McLaren FLINT	Policy Title: Water Supply Failure (Code W)	
Effective Date: 4/2015 Reviewed: Revised:	Oversight Level: Level 2	Policy No: EG-105
McLaren Flint Business Unit: Engineering Department	Functional Responsibility for the Policy: Director of Engineering	

Objective: McLaren Flint Hospital campus will be able to prepare for, respond to, and recover from a total or partial interruption of McLaren Flint's normal water supply.

Scope: This policy applies to McLaren Flint Hospital, the adjacent outpatient sites and all immediate grounds.

Policy: A water supply failure can be categorized as one of multiple types of system disruptions:

1. Visibly Discolored Water
2. Water Boil Advisory
3. Scheduled Interruption of Water Supply
4. Emergency Loss of Water Supply

Visibly Discolored Water

Visibly discolored water can be defined when the appearance of potable water, specifically, is iron-tinted and or yellow in color. There are two major sources that can cause water to be discolored – flow changes in the municipal distribution system caused by a main leak, valve failure or an open fire hydrant, and/or a flow change to the internal water system of the building. Discolored water is not a health threat even though it is not very appealing to drink. Even very low levels of iron can color the water.

1. Engineering Services shall recommend the affected area run water continuously (or flush) for a minimum of five (5) minutes or until it clears of the discoloration. If water does not clear within five (5) minutes contact Engineering Services via a work order using AIMS, the Computerized Maintenance Management System (CMMS).

2. In the event that the five (5) minute flush is not successful, Engineering Services will investigate the cause of the discoloration, which may include contacting the City of Flint or appropriate municipality to determine if discoloration is externally caused.

3. Based on information gathered from the municipality or knowledge of the source, Engineering Services will determine if a Code W shall be announced.

Boil-Water Advisory

A boil-water advisory or boil-water order is a public health advisory or directive given by government or health authorities to consumers when a community's drinking water is, or could be, contaminated by pathogens.

1. Boil Advisory notification received from the City of Flint, Flint Township, Genesee County Health Department or another governmental agency, such as the EPA.

2. Engineering Services is to establish and maintain direct contact with the governmental agency to determine location/boundaries of the advisory, estimate the duration of the advisory and provide a status report.

3. Engineering Services shall direct a Code W to be announced over head, with duration and details, if known.

4. Communications will immediately begin notification of critical departments by direct phone call and shall document the contact. (see Attachment A)

5. The Incident Commander and /or Nursing Supervisor with Administration shall determine if the HIC (Hospital Incident Command) is needed for communication management purposes. If so a Code Triage alert shall be announced overhead and paged to all HIC.

6. Engineering Services will shut off the water source to ice machines and drinking fountains, following the Engineering Services Ice Machine policy. The remaining ice in the ice machines shall not be used for human consumption. The ice may be utilized within ice packs. Signs shall be posted indicating the inability to use these units.

7. Distribution of potable water and the appropriate dispensing apparatus to departments for drinking purposes and hand-washing shall be conducted by Engineering Services.

8. Departmental-specific procedures including alternate hand washing protocols are instituted.

9. The sanitary sewer system (toilets, urinals and drains) may still be used.

10. All affected departments shall enact departmental-specific water conservation procedures. If deemed necessary, Engineering Services shall enact the "Extreme Conservation Procedures" of the Disaster Internal/External Engineering policy.

Scheduled Interruption of Water Supply

A scheduled interruption of water supply includes a total loss or reduced volume of the municipal water supply. The loss may be internally created or by a municipality. Prior notice will be given to all areas affected.

1. All attempts will be made to provide a minimum of 48 hour notice to the affected areas or buildings.

2. Engineering Services is to establish and maintain direct contact with the governmental agency to determine the area affected and estimate the duration of the interruption and provide status reports as necessary.

3. Administration and Engineering shall determine if the HIC (Hospital Incident Command) is necessary for communication management. If so the HCC will be set up ahead of the scheduled interruption.

4. Distribution of potable water and the appropriate dispensing apparatus to departments for drinking purposes and hand-washing shall be conducted by Engineering Services.

5. Engineering services will contact the bottled water supplier to increase the bottled potable water supply and dispensing apparatus available for drinking use and hand washing prior to the interruption to maintain a minimum of fifty (50) 5-gallon bottles at the hospital during the water interruption.

6. Engineering Services will shut off the water source to ice machines and drinking fountains, following the Engineering Services Ice Machine policy. The remaining ice in the ice machines may be dispensed and used. Signs shall be posted indicating the inability to use these units once the ice has been completely dispensed.

7. All affected departments shall enact departmental-specific water conservation procedures. If deemed necessary, Engineering Services shall enact the "Extreme Conservation Procedures" of the Disaster Internal/External Engineering policy.

8. If water shut down duration is anticipated to be greater than four (4) hours. Engineering Services will contract to provide portable sanitary toilets for staff and visitor use.

9. The sanitary sewer system (toilets, urinals and drains) may not be used.

10. Code W shall be announced overhead with duration and details.

11. Engineering Services shall update a Code W status report every hour to staff via an overhead page.

12. Engineering Services shall contact the State of Michigan Fire Marshal.

13. Engineering Services will institute a fire watch for affected areas.

14. In the event of a prolonged interruption or unforeseen emergency Administration shall initiate a code triage alert.

<u>Emergency Loss of Water Supply</u>

An emergency loss of water supply includes a total loss or reduced municipal water supply, with no prior notice. The loss may be internally created or by a municipality.

1. Engineering Services is to establish and maintain direct contact with the governmental agency to determine the area affected and estimate the duration of the interruption and provide status reports as necessary.

2. Engineering Services shall contact the State of Michigan Fire Marshal.

3. Engineering Services will institute a fire watch for affected areas.

4. All affected departments shall enact the departmental-specific water conservation procedures. If deemed necessary, Engineering Services shall enact the "Extreme Conservation Procedures" of the Disaster Internal/External Engineering policy.

5. Administration and Engineering shall determine if the HIC (Hospital Incident Command) is necessary for communication management. If so a code triage alert will be announced.

6. Code W shall be announced overhead with duration and details.

7. Engineering Services shall update a Code W status report every hour to staff via an overhead page.

8. Communications will immediately begin notification of critical departments by direct phone call and shall document the contact. (see Attachment A)

9. All affected departments shall enact the departmental-specific water conservation procedures. If deemed necessary, Engineering Services shall enact the "Extreme

Condition Conservation" procedures of the Disaster Internal/External Engineering policy.

10. Distribution of potable water and the appropriate dispensing apparatus to departments for drinking purposes and hand-washing shall be conducted by Engineering Services.

11. Engineering services will contact the bottled water supplier to supplement the potable water supply and dispensing apparatus available for drinking use to maintain a minimum of fifty (50) 5-gallon bottles at the hospital.

12. Engineering Services will shut off the water source to ice machines and drinking fountains, following the Engineering Services Ice Machine policy. The remaining ice in the ice machines may be dispensed and used. Signs shall be posted indicating the inability to use these units once the ice has been completely dispensed.

13. If water shut down duration is anticipated to be greater than four (4) hours, Engineering Services will contract to provide portable sanitary toilets for staff and visitor use.

14. The sanitary sewer system (toilets, urinals and drains) may not be used.

Definitions:

Boil-water advisory : a public health advisory or directive given by government or health authorities to consumers when a community's drinking water is, or could be, contaminated by pathogens

Code W: a water supply failure/interruption

Emergency loss of water supply: a total loss or reduced municipal water supply, with no prior notice. The loss may be internally created or by a municipality.

Fire Watch: a person or persons assigned to an area for the purpose of protecting the occupants from fire or similar emergencies. (NFPA 101: *Life Safety Code*, §3.3.77, 2000 edition)

Municipal Water: water originating from a ground or surface water source (raw water) which is purified through a treatment process, stored and distributed using a distribution system network of pumping stations and underground piping to the user.

Potable water: water suitable for drinking and hand washing.

Scheduled interruption of water supply: a total loss or reduced municipal water supply. The loss may be internally created or by a municipality. Prior notice will be given to all areas affected.

Visibly discolored water: when the appearance of potable water, specifically, is iron-tinted and or yellow in color. There are two major sources that can cause water to be discolored – flow changes in the municipal distribution system caused by a main leak, valve failure or an open fire hydrant, and/or a flow change to the internal water system of the building. Discolored water is not a health threat even though it is not very appealing to drink. Even very low levels of iron can color the water.

Provisions:

The City of Flint provides municipal water and monitors the quality of water provided to McLaren Flint Hospital, Ballenger MRI, Surgery and Endoscopy Center, McLaren Imaging Center, Barbara Ann Karmanos-McLaren Flint Cancer Center and Proton Beam.

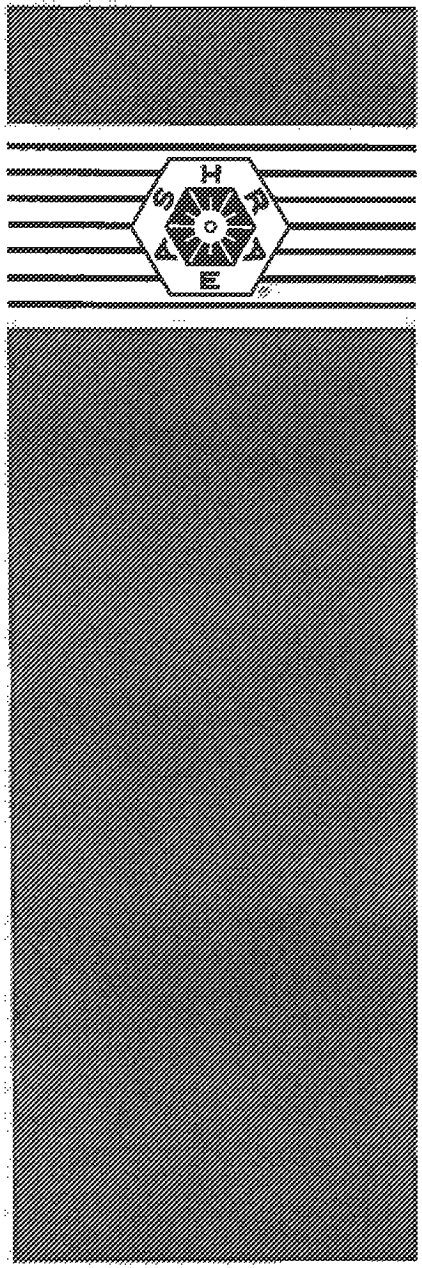
Flint Township provides municipal water to Medical Education, Beech Hill Centre, McLaren

	Corporate Offices, McLaren Health Plan, and the McLaren Hospitality House. 250 gallons of potable water are stored on site and stock is checked periodically.
Administrative Responsibility:	McLaren Flint Director of Engineering has overall administrative responsibility for this policy.
Exception Provisions:	McLaren Flint Incident Commander, State of Michigan Fire Marshal, McLaren Flint Director of Engineering, Vice President of Ancillary and Support Services and/or Chief Executive Officer may supersede any or all of the above noted directives with expressed written documentation.
References or Appendices:	Extreme Condition Conservation procedures, Disaster Internal/External policy Departmental Contact Numbers - Attachment A

APPROVAL:

Donald Kooy
President and CEO

* In Process of being revised
new guide expected in 2016



ASHRAE Guideline 12-2000

ASHRAE STANDARD

Minimizing the Risk of Legionellosis Associated with Building Water Systems

Approved by the ASHRAE Standards Committee February 5, 2000; by the ASHRAE Board of Directors February 10, 2000.

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CONTENTS

ASHRAE Guideline 12-2000
Minimizing the Risk of Legionellosis Associated with Building Water Systems

SECTION		PAGE
1	Purpose	2
2	Scope	2
3	Ecology of *Legionella*	2
4	Potable and Emergency Water Systems	3
5	Heated Spas	5
6	Architectural Fountains and Waterfall Systems	7
7	Cooling Towers Including Fluid Coolers (Closed-Circuit Cooling Towers) and Evaporative Condensers	7
8	Direct Evaporative Air Coolers, Misters (Atomizers), Air Washers, and Humidifiers	10
9	Indirect Evaporative Air Coolers	12
10	Metalworking Systems	13
11	Monitoring for *Legionella*	13
12	References	14
Annex A:	Bibliography	15

1. PURPOSE

The purpose of this guideline is to provide information and guidance in order to minimize *Legionella* contamination in building water systems.

2. SCOPE

2.1 This guideline provides specific environmental and operational guidelines that will contribute to the safe operation of building water systems to minimize the risk of occurrence of Legionellosis.

2.2 This guideline is intended for use with nonresidential building systems (including but not limited to hotels, office buildings, hospitals and other health care facilities, assisted living facilities, schools and universities, commercial buildings, industrial buildings, etc.) and centralized systems in multifamily residential buildings (including but not limited to central heating/cooling systems, central domestic water systems, common area fountains, etc.). While not specifically intended for noncentralized or single-family residential building systems, some of the information may be useful for these systems.

2.3 This guideline is intended for the use of designers, installers, owners, operators, users, maintenance personnel, and equipment manufacturers.

3. ECOLOGY OF *LEGIONELLA*

3.1 Infection and Disease

The majority of Legionnaires' disease cases diagnosed and reported to the public health officials are sporadic (i.e., not occurring as part of a recognized outbreak).[1] Compared with outbreak-associated infection, much less is known about transmission of sporadic Legionellosis, although it is likely that transmission occurs by similar mechanisms. Exposure to legionellae in sporadic cases may occur in a variety of settings, including the home, the workplace, and public places visited during routine daily activities or during travel. The proportion of sporadic disease attributable to exposure in each of these settings and to various environmental sources is unknown.

Legionellae are bacteria. When legionellae are present in aquatic environments, the risk of transmission of infection to humans depends on the presence of several factors: conditions favorable for amplification of the organism, a mechanism of dissemination (e.g., aerosolization of colonized water), inoculation of the organism at a site where it is capable of causing infection, bacterial strain-specific virulence factors, and the susceptibility of the host. Over 40 species of *Legionella* have been identified; *L. pneumophila* appears to be the most virulent and is associated with approximately 90% of cases of Legionellosis. Most *L. pneumophila* infections are caused by serogroup 1; however, certain serogroup 1 strains may be more virulent. The risk of acquiring Legionnaires' disease is greater for older persons and for those who smoke tobacco or have chronic lung disease. Persons whose immune system is suppressed by certain drugs or by underlying medical conditions appear to be at particularly high risk.

3.2 Habitats

Legionellae bacteria are commonly present in natural and man-made aquatic environments. The organism is occasionally found in other sources, such as mud from streams and potting soils; however, the overall importance of nonaquatic environmental sources in human disease is not yet known. In natural water sources and municipal water systems, legionellae are generally present in very low or undetectable concentrations. However, under certain circumstances within man-made water systems, the concentration of organisms may increase markedly, a process termed "amplification." Conditions that are favorable for the amplification of legionellae growth include water temperatures of 25-42°C (77-108°F), stagnation, scale and sediment, biofilms, and the presence of amebae. Legionellae infect and multiply within several species of free-living amebae, as well as ciliated protozoa. The initial site of infection in humans with Legionnaires' disease is the pulmonary macrophage. These cells engulf legionellae, provide an intracellular environment that is remarkably similar to that within host protozoa, and allow for multiplication of the bacterium. Hence, legionellae may be considered protozoantiae, i.e., they naturally infect free-living amebae and incidentally infect the phagocytic cells within human lungs under certain circumstances. Although legionellae may be cultivated on special agar media in laboratory settings, growth in nature in the absence of protozoa and/or in the absence of complex microbial biofilms has not been demonstrated. Intracellular growth of legionellae within protozoa and/or within diverse microbial biofilms may be the primary means of proliferation.

There is no indication that growth of *Legionella* is influenced by certain materials. Natural rubbers, wood, and some plastics have been shown to support the amplification of *Legionella*, while other materials such as copper inhibit their growth.

Generally, *Legionella* thrive in diverse, complex microbial communities because they require nutrients and protection from the environment. Controlling the populations of protozoa and other microorganisms may be the best means of minimizing *Legionella*.[2]

3.3 Transmission of Legionnaires' Disease

Most data on the transmission of Legionnaires' disease are derived from investigations of disease outbreaks. These data suggest that, in most instances, transmission to humans occurs when water containing the organism is aerosolized to respirable droplets (1-5 micrometers in diameter) and inhaled by a susceptible host.

Prior to actual disease a number of events occur, some of which can be influenced by good engineering and maintenance practices. These events and prevention opportunities are outlined in Figure 3. The first event, survival to mature, is generally outside the scope of building engineering and management practices. The next three events—amplification, dissemination, and transmission—can be influenced by engineering design and maintenance practices. Subsequent events are influenced by the individual's health.

The most effective control for most diseases, including Legionellosis, is prevention of transmission at as many points

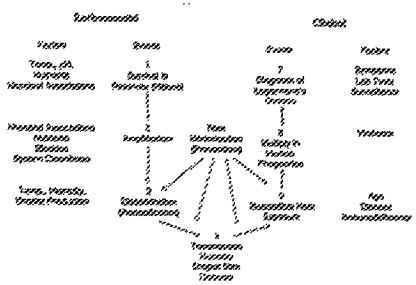

Figure 1 Legionella transmission. Adapted from Barbaree (1991)[3].

as possible in the disease's chain of transmission. The rationale for this is that if one preventive measure fails, others will be in place and act as fail-safe mechanisms. With this philosophy in mind, it may be desirable to design interventions to prevent transmission of Legionellosis at as many points as possible in the disease's chain of transmission. General concepts are presented so that readers may develop an understanding of the types of conditions that may allow amplification and transmission of *Legionella*.

A variety of aerosol-producing devices have been associated with outbreaks of Legionnaires' disease, including cooling towers,[4,5] evaporative condensers,[6,7] showers,[8,9] whirlpool spas,[10,11] nebulizers,[12] decorative fountains,[13,14] and a grocery store produce mister.[15] Aspiration of colonized drinking water into the lungs has been suggested as the mode of transmission in some cases of hospital-acquired Legionnaires' disease.[16–18]

Numerous investigations have demonstrated that cooling towers and evaporative condensers have served as the sources of *Legionella*-contaminated aerosols causing outbreaks of community- and hospital-acquired infection. Outbreak-associated transmission via cooling towers and evaporative condensers has been most commonly documented when these injected have been in close proximity to the contaminated devices; however, data from a few Legionnaires' disease outbreak investigations suggest that legionellae may be carried in cooling tower aerosols for distances of up to 3 kilometers (2 miles)[19] (this is regarded as requiring an unusual combination of climatic conditions). A number of outbreaks of Legionellosis associated with cooling towers and evaporative condensers have occurred after these devices have been restarted following a period of inactivity.[20,21]

Shower heads and tap faucets can produce aerosols containing legionellae in droplets of respirable size. Epidemiologic studies and air sampling conducted during outbreak investigations have established the role of aerosols produced by showers and tap faucets in disease transmission.[9] Aerosols produced by respiratory therapy equipment that have been filled or rinsed with contaminated potable water in hospitals have also caused disease transmission.[17,22]

Heated spa pools operate at temperatures conducive to bacterial growth. The aeration of spa pools can result in formation of potentially contaminated aerosols. A range of pathogenic microorganisms, including *Pseudomonas aeruginosa* and *L. pneumophila*, have been found in spa pools. Outbreaks of Legionellosis have occurred among bathers as well as people near colonized spas.[10,11]

A more complete and detailed description of the most common amplifiers associated with building water systems, including the treatment recommended to minimize the risk of Legionellosis, is found in Sections 4–10.

4. POTABLE AND EMERGENCY WATER SYSTEMS

4.1 Potable Water Systems

4.1.1 System Description. Potable water systems in buildings for this discussion start at the point where the water enters the building and end where it exits the piping as a faucet, showerhead, etc. The systems include all piping, hot water heaters, storage tanks, faucets, nozzles, and other distribution outlets.

4.1.2 System Operation. Factors associated with the plumbing system that may influence the growth of legionellae are as follows:

Chlorine concentration. Municipal potable water supplies are generally chlorinated to control the presence of microorganisms, historically to control microbes associated with sewage. The legionellae are more tolerant of chlorine than many other bacteria and may be present in small numbers in municipal water supplies.[23]

Temperature. Although legionellae have been recovered from cold water, the temperature range favorable for amplification is 25-42°C (77-108°F). The environment becomes more hostile as the temperature is moved from this range.

Design of plumbing system. Growth of legionellae may occur in portions of the system with infrequent use, in stagnant water, and in portions of the system with tepid temperatures. Growth may also occur in dead-end lines, attached hoses, shower nozzles, tap faucets, hot water tanks, and reservoirs.

Plumbing materials. Rubber washers and fittings, including water hammer arresters and rubber hoses with spray attachments, have been shown to provide sites for growth of legionellae.[24] Organic compounds leached from plumbing materials may contribute to growth of heterotrophic bacteria, including legionellae.

4.1.3 Water Droplet Size. Contaminated potable water sources present the greatest risk when dispersed into the air in a very small droplet size (less than 5 micrometers) that can be inhaled deeply into the lungs. Actions that may generate small droplets are those that break up the water stream, i.e., shower nozzles, aerators, spray nozzles, water impacting on hard surfaces, and bubbles breaking up.

4.1.4 Nutrients. Both dead and living microorganisms, biofilms, and debris may provide nutrient sources for legionellae growth. When legionellae are found in plumbing systems, it is common to detect the microbes in the sediment in hot water tanks and in peripheral plumbing fixtures that accumulate sediment. Legionellae growth appears to be heaviest at the solid-liquid interface with the development of slime deposits.

4.1.5 Associated Cases of Legionnaires' Disease. Potable heated water systems are an important potential source of Legionellosis in all buildings and are of particular importance in hospitals, nursing homes, and other health care facilities.[25] Many reports link legionellae in hospital tap water to epidemics and clusters of nosocomial (hospital-acquired infection) Legionnaires' disease, often involving immunosuppressed patients.[26]

4.1.6 Recommended Treatment. Where practical in health care facilities, nursing homes, and other high-risk situations, cold water should be stored and distributed at temperatures below 20°C (68°F), while hot water should be stored above 60°C (140°F) and circulated with a minimum return temperature of 51°C (124°F). However, great care should be taken to avoid scalding problems. One method is to install preset thermostatic mixing valves. Where buildings cannot be retrofitted, periodically increasing the temperature to at least 68°C (150°F) or chlorination followed by flushing should be considered. Systems should be inspected annually to ensure that thermostats are functioning properly.

Where practical in other situations, hot water should be stored at temperatures of 49°C (120°F) or above.

Those hot or cold water systems that incorporate an elevated holding tank should be inspected and cleaned annually. Lids should fit closely to exclude foreign materials.

Detailed current plans for hot and cold water piping systems should be readily available. Hot water heaters and storage vessels for such systems should have a drainage facility at the lowest point, and the heating element should be located as close as possible to the bottom of the vessel to facilitate mixing and prevent water temperature stratification. In high-risk applications, insulated recirculation loops should be incorporated as a design feature. For all situations, the pipe runs should be as short as practical. Moreover, where recirculation is employed, the pipe runs should be insulated and long dead legs avoided. New shower systems in large buildings, hospitals, and nursing homes should be designed to permit mixing of hot and cold water near the showerhead. The warm water section of pipe between the control valve and showerhead should be self-draining.

Copper-silver ionization is a relatively new approach to controlling *Legionella* in hot water distribution systems and has been used successfully in a number of hospitals.[27–29] Electrolytically generated copper and silver ions build up in the hot water recirculating system to levels effective in eradicating *Legionella*, typically in the range of 0.2–0.8 mg/L copper and 0.02–0.08 mg/L silver. The optimal concentration of copper-silver ions for controlling *Legionella* in hot water is not known. A particular concentration may not be universally effective because of variables in water quality and system design. It is also important to note that the efficacy of copper-silver ions, like chlorine, is adversely affected by elevated pH.[30]

Where decontamination of hot water systems is necessary (typically due to implication of an outbreak of Legionellosis) the hot water temperature should be raised to 71–77°C (160–170°F) and maintained at that level while progressively flushing each outlet around the system. A minimum flush time of five minutes has been recommended by the Center for Disease Control Hospital Infection Control Practices Advisory Committee.[31] However, the optimal flush time is not known and longer flush times may be necessary. In the original report describing this method, multiple 30-minute flushes were required to significantly reduce *Legionella* colonization.[27] The number of outlets that can be flushed simultaneously will depend on the capacity of the water heater and the flow capability of the system. Local building and sanitary codes should be checked for any temperature limits of water discharged to the sewer. Appropriate safety procedures to prevent scalding are essential. When possible, flushing should be performed when the fewest building occupants are present (e.g., nights and weekends). For systems where thermal shock treatment is not possible, shock chlorination may provide an alternative.[32,33] However, there is less experience with this method of decontamination. Also, users should realize that the required levels of free chlorine residual can cause corrosion of metals. Chlorine should be added to achieve a free chlorine residual of at least 2 mg/L throughout the system. This may require chlorination of the water heater or tank to levels of 20 to 50 mg/L. The pH of the water should be maintained between 7.0 and 8.0. Each outlet should be flushed until the odor of chlorine is detected. The chlorine should remain in the system for a minimum of 2 hours (not to exceed 24 hours), after which the system should be thoroughly flushed.

Once the decontamination is complete, recontamination is likely to occur unless the proper temperatures are maintained, continuous supplemental chlorination is continued, or alternative approaches, such as the use of a silver/copper ionization device, are employed.

In high-risk applications, monthly removal of shower heads and tap aerators to clean out sediment and scale and to clean them in a chlorine bleach solution is recommended.

For potable water systems that were opened for repair or other construction or systems that were subjected to water pressure changes associated with construction (which may cause water to become brown and the concentration of *Legionella* to dramatically increase),[34] it is recommended that as a minimum the system be thoroughly flushed. High-temperature flushing or chlorination may be appropriate, and this judgement should be made on a job-specific basis. If only a portion of the system is involved, high-temperature flushing or chlorination may be used on only that portion of the system.

4.2 Emergency Water Systems—Safety Showers, Eye Wash Stations, and Fire Sprinkler Systems

4.2.1 System Description. All three of these systems are generally plumbed to the potable water system, have little or no flow with resulting stagnant conditions, and may reach temperatures warmer than ambient. Legionellae, heterotrophic bacteria, and amoebae have been cultured from these systems.[35] When the devices are used, aerosolization is expected.

4.3.3 *Associated Cases of Legionnaires' Disease.* Cases of Legionellosis resulting from exposure to these waters have not been documented.

4.3.4 *Recommended Treatment.* Safety shower and eye wash stations should be flushed at least monthly. In the case of fire sprinkler systems, it is recommended that fire-fighting personnel wear protective respiratory gear and that non-fire-fighting personnel exit the burning area. Appropriate precautions should be taken when checking the operation of fire sprinkler systems.

5. HEATED SPAS

5.1 System Description

Heated spas are small baths or pools used for relaxation (i.e., recreational), hygienic, or therapeutic purposes. Common features include warm water temperatures, (32-40°C/90-104°F) and the constant recirculation and agitation of the water through high-velocity jets and/or injection of air. While there is some confusion over the names used for each, the differences among the types of baths and pools are related mainly to size, purpose, material used, and equipment.

5.1.1 *Whirlpool Spa (Spa, Hydrotherapy Pool).* These are recreational baths or pools (public or private) holding more than one person and filled with warm recirculated water. The water is not replaced after each use but rather is filtered to remove particulates and chemically treated (typically with chlorine or bromine) to provide microbiological control. They may be located indoors or outdoors. Most smaller units are made from molded fiberglass, while larger in-ground varieties are generally made of gunite or concrete with a white plaster finish. They are generally circular in shape, always shallow (less than 1.3 m [52 in.]), and contain seats that allow occupants to submerge up to the chest or neck.

5.1.2 *Hot Tub.* These are traditionally deeper hot water baths or pools made of wood. Redwood is common, but they may also be made of cedar, mahogany, white oak, pine, or teak. Otherwise, the features and uses are similar to spas.

5.1.3 *Whirlpool.* This terminology has been traditionally used for the small therapeutic pools (often used in athletics) filled with warm, vigorously moving water, which may be small enough for treatment of a specific joint, such as a knee, ankle, or elbow. These pools are generally made of stainless steel and are emptied between uses.

5.1.4 *Whirlpool Bath.* These are small baths often found in bathrooms of hotel rooms or private residences. As such, they are used for both recreational and hygienic purposes. The baths are filled with high-velocity water jets and/or air injection, but unlike whirlpool spas and hot tubs, the water is emptied after each use.

5.2 System Operation

Temperature. The water temperature in these spas, baths, and pools is generally in the range of 32–40°C (90–104°F), with the maximum temperature based on bather comfort. These warm temperatures are close to the optimum for the multiplication of *Legionella* and many other microorganisms. The warmer temperatures also accelerate the loss of the biocide.

Aerosol Production. Due to the operational features of the high-velocity water recirculation and air injection, a large number of bubbles of varying sizes rise to the water surface and burst. Microorganisms (e.g., *Legionella*) in the water can be released into the air via either bubbles or aerosol mist.

5.3 Water Droplet Size

This aerosol mist has water droplets of varying sizes (many less than 5 micrometers) and extends into the air to a height of at least 0.5 meters (1 ft) above the water surface (well within the breathing zone of the bathers). Under conditions of high relative humidity and air currents, the aerosol may also expose individuals outside the spa.

5.4 Nutrients

Due to the small volume of water per occupant (approximately 300 liters, compared to 10,000 liters in a typical swimming pool), the bathing load quickly contributes a variety of contaminants into the water, such as body oils, skin flakes, bacteria and fungi, human saliva, and other organic materials. In addition to serving as nutrients, these organic materials can also cause an increase in chlorine (or bromine) demand, resulting in a reduction in free available halogen.

5.5 Associated Cases of Legionnaires' Disease

In surveys of whirlpool spas, legionellae have been isolated from as many as 13% of the spas sampled, but only in those spas where the disinfectant (chlorine or bromine) levels were not adequately maintained. Thus, it is generally presumed that outbreaks of Legionellosis from whirlpool spas are likely to be associated with spas that have similar deficiencies in their disinfectant levels.

It is universally recognized that water treatment criteria for spas (and swimming pools) should include disinfection against coliforms and other fecal pathogens (bacteria, viruses, and protozoa). In recent years, these types of recreational and therapeutic spas have been recognized as important sources of infection by other waterborne pathogens, including *Pseudomonas aeruginosa* and *Legionella* species. Several multiple-case outbreaks of Legionellosis (Legionnaires' disease and Pontiac fever) have been traced to spas and hot tubs, and fatalities have occurred.[7-9] No cases of Legionellosis have been traced to whirlpool baths.

5.6 Recommended Treatment

5.6.1 *Whirlpool Spas.* Whirlpool spas are currently subject to state and local regulations related to public swimming and bathing facilities. These regulations may cover all areas of operation, including mechanical specifications, operational parameters (i.e., flow rate, temperature), water chemistry, and bacteriology. To minimize the occurrence of whirlpool-related infectious diseases (including Legionellosis), the following guidelines are relevant.

5.6.1.1 *Bather Load.* Clearly post and enforce the maximum number of occupants (0.93 m^2 [10 ft^2] of surface area per bather). Using this formula, a 2.5 meter (8 ft) diameter circular spa would have a maximum bather load of five at one time.

5.6.1.2 *Bather Health Restrictions.* Clearly post warnings on the increased health risk related to use by individuals who are immunocompromised or who have chronic lung disease.

5.6.1.3 *Filter Operation.* Hygienic maintenance of spa filters is more difficult than that of swimming pool filters because of the higher ratio of number of bathers to pool volume. Health codes consistently accept filter flow rates as follows:

High rate sand filters — 3.4–6.7 L/s per m^2
(3–10 gal/min per ft^2) of filter media
Diatomaceous earth filters — 1 L/s per m^2
(1.5 gal/min per ft^2) of filter media
Cartridge filters — 0.25 L/s per m^2
(0.375 gal/min per ft^2) of filter media

Maintenance of filters includes back flushing regularly to remove the buildup of organic debris. Determining the frequency of back flushing is currently based on manufacturer recommendations (flow-rate requirements) rather than microbiological criteria. As a general rule, daily back flushing may be required during periods of heavy usage. Filter cartridges should also be cleaned or replaced on a regular basis (once or twice weekly).

5.6.1.4 *Water Chemistry.* The American National Standards Institute and National Spa and Pool Institute (ANSI/NSPI) have established chemical standards related to pool disinfection. The standards are generally used as a basis for most state and local regulations and have been modified slightly by the Centers for Disease Control in their "Interim Recommendations to Minimize Transmission of Legionnaires Disease from Whirlpool Spas on Cruise Ships (1995)."[17]

	Minimum	Ideal Value	Maximum
Free chlorine (mg/L)	1.0	2.0–3.0	10.0
Combined chlorine (chloramines) (mg/L)	None	None	0.2
Bromine (mg/L)	4.0	4.0–6.0	10.0
pH	7.2	7.4–7.6	7.8

The upper value of 10 mg/L (free chlorine or bromine) should not be considered a routine target maintenance level; however, this level is acceptable for relatively short durations.

The ideal values should be considered minimum values for control of *Legionella* because of the relative resistance of *Legionella* to halogens (compared to other bacteria and enteric viruses). Maintaining the required free available halogen level is absolutely critical for controlling the growth of bacteria (including *Legionella*) in the spa water. Thus, these parameters should be measured frequently, as often as hourly during periods of heavy use. Automatic systems that continuously monitor the free halogen and adjust as needed would offer the best control of the water chemistry. In addition, it would be desirable to install halogen level-dependent injector devices on both sides of the filter to ensure that adequate levels of biocide are maintained within the filter and within the water exiting the filter.

Several alternative or adjunctive nonhalogen water treatment procedures are currently being marketed, including copper/silver ion water treatment, ionization treatment, ultraviolet light treatment, and ozonation. While any or all of these approaches may successfully control *Legionella* and other bacteria in pools and spas, there are insufficient data at the present time to recommend any major variation from current water treatment practices. This situation may change as additional data from laboratory and real-world studies become available.

5.6.1.5 *Bacteriological Parameters.* Regular testing of all spas can provide an important record of safe operating conditions and may alert operators of unsafe conditions when they occur. However, since bacteriological results require as much as 24 hours (or longer for *Legionella*) for results, they should be used only to spot-check or confirm the effectiveness of the disinfection system, not as a replacement for frequent testing of the water chemistry or routine maintenance. Where culturing for legionellae is to be done, see section 11 for input on proper sampling, handling, and shipping.

Standard spa plate count (35°C)	200 cfu per mL (maximum)
Total coliforms	1 organism per 100 mL (maximum)
Fecal coliforms	None allowable
Pseudomonas aeruginosa (41°C)	None allowable
Legionella species	None allowable

5.6.1.6 *Routine Maintenance.* Current ANSI/NSPI recommendations include taking the spa out of service at the end of each day in order to carry out a superchlorination (i.e., shock disinfection) using 10 mg/L or 10 times the combined chlorine level, whichever is greater, for one to four hours. Due to the buildup of total dissolved solids and organic matter in the water, the spa water should also be replaced at least once a week (depending on the frequency of use). Daily water changes may be necessary under continuous conditions of high use. At the same time, the spa should be thoroughly cleaned, including a vigorous scrubbing of the spa surface, weirs, and skimming devices, in order to remove buildup of microbial biofilm. Conditions of high bacterial counts also require shock disinfection in order to achieve safe operating conditions, often coupled with changing the water, cleaning the spa, and maintenance of filters.

5.6.1.7 *Training and Record Keeping.* Training of maintenance personnel on all aspects of the safe operation of whirlpool spas should be mandatory. As part of this training, it should be emphasized that spas are not the same as swimming pools; thus, maintenance required for safe operation is very different. Maintenance personnel should also be trained to maintain good records of all water chemistry measurements, back flushing of filters, water changes, and spa cleaning. Results of samples sent to outside labs for bacteriological analysis should also be maintained. All records should be kept for a period of at least two years.

5.6.2 *Whirlpool Baths.* Since whirlpool baths are always filled with fresh potable tap water and drained at the end of each use, the recommendations for control of Legionellosis would fall initially under those guidelines developed for potable water systems.

6. ARCHITECTURAL FOUNTAINS AND WATERFALL SYSTEMS

6.1 System Description

In these systems, water is either sprayed in the air or cascades over a steep media such as rocks, and then it returns to the man-made pool. This guide is not intended to cover fountains in natural bodies of water or natural waterfalls.

6.2 System Operation

These systems are sometimes operated intermittently with on-time often scheduled only during certain time periods. Applications can include elaborate displays specifically intended to periodically attract large crowds in entertainment centers. Systems that are operated intermittently may encourage greater biocontamination.

6.2.6.1 Temperature. Because of the high temperature ranges needed for proliferation of legionellae bacteria, outdoor fountains and pools in hotter climates and indoor fountains and pools subject to sources of heat may be susceptible to becoming amplifiers. Temperature increases may be facilitated by heat from the pump/filter systems themselves. Intermittent operation may also create situations where temperature increases occur in limited parts of the system.

6.3 Water Droplet Size

These systems can produce droplets of various sizes and certainly have the potential to produce droplets less than 5 micrometers. Generally speaking, the legionellae risk increases as the rate of aerosol production increases.

6.4 Nutrients

Fountains are subject to contamination from a wide variety of sources, including materials scrubbed from the air and returned to the pool with the falling water droplets as well as organic and inorganic materials dropped, thrown, or blown into the pool.

Algae and bacteria are recognized as a particular problem in pools less than 1 meter (3 ft) deep. When used, filter systems are similar to the types used for swimming pools.

6.5 Associated Cases of Legionnaires' Disease

Several multiple-case outbreaks of Legionellosis have been associated with decorative fountains in public buildings, particularly hotels.[13,14] However, the true incidence of disease from these sources may be much higher due to the occurrence of isolated cases where an association with the building or the fountain was suspected.

6.6 Recommended Treatment

6.6.1 Design Considerations

- Drains or sumps should be situated at the lowest level of the pool, with no other local low points that are not served by drains or sumps.
- Provision for maintenance should be considered in the design stage. Access to pump(s) and filter(s) should be provided. Stagnant areas or areas that are difficult to clean should be avoided.

6.6.2 Maintenance

- Regular cleaning is recommended.
- Use of filters should be considered; however, systems with a small water volume may be drained and refilled with fresh water every few weeks in lieu of filtering.

6.6.3 Water Treatment

Microbial fouling control is important, especially where the conditions are such that there are significant periods of time when the temperature of the fountain water is in the range that is favorable for the amplification of legionellae growth (see 3.2). When biocidal treatment is employed for microbial fouling control, the biocide must be registered with the Environmental Protection Agency for use in decorative fountains. For further information on water treatment, see 7.6.2 of this guideline and the "Water Treatment" chapter in the Applications volume of the ASHRAE Handbook.

7. COOLING TOWERS INCLUDING FLUID COOLERS (CLOSED-CIRCUIT COOLING TOWERS) AND EVAPORATIVE CONDENSERS

7.1 Cooling Towers

7.1.1 System Description. A cooling tower is an evaporative heat transfer device in which atmospheric air cools warm water, with direct contact between the water and the air, by evaporating part of the water (see Figure 2). Air movement through such a tower is typically achieved by fans, although some large cooling towers rely on natural draft circulation of air. Cooling towers typically use some media, referred to as "fill," to achieve improved contact between the water and the cooling air.

7.1.2 System Operation. Cooling towers associated with building water systems are typically used for rejection of waste heat from the condenser of chillers providing air conditioning for a building. Water from the cooling tower is piped to the condenser where it is heated and then back to the cooling tower to be cooled.

7.1.2.1 Temperature. The typical temperature of the water in cooling towers ranges from 29°C (85°F) to 35°C (95°F) although temperatures can be above 49°C (120°F) and below 21°C (70°F) depending on system heat load, ambient temperature, and system operating strategy.

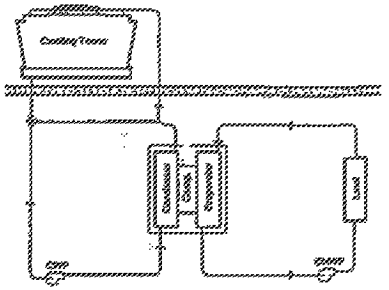

Figure 2 Typical cooling tower/chiller system.

7.1.2.2 Circulating Water System. Cold water piping from the cooling tower runs to one or more pump(s), then to the chiller condenser, where it is heated, and then back to the hot water distribution system in the cooling tower. Considerable variation in the piping arrangement occurs. Stagnant areas or dead legs may be difficult to clean or penetrate with biocides.

A significant volume of water may be contained in the piping system.

7.2 Closed-Circuit Cooling Towers and Evaporative Condensers

7.2.1 System Description. Closed-circuit cooling towers and evaporative condensers are also evaporative heat transfer devices. Both are similar to conventional cooling towers, but there is one very significant difference. The process fluid (either a liquid such as water, an ethylene glycol/water mixture, oil, etc., or a condensing refrigerant) does not directly contact the cooling air. Rather, the process fluid is contained inside a coil assembly (see Figure 3).

7.2.2 System Operation. Water is drawn from the basin and pumped to a spray distribution system over the coil assembly while the cooling air is blown or drawn over the coil by fans. Removal of heat is achieved by evaporating part of the water.

7.2.2.1 Temperature. Water temperature in closed-circuit cooling towers and evaporative condensers is similar to that in cooling towers.

7.2.2.2 Circulating Water System. Most commonly, there is no external piping in these systems. Because the water is totally contained within the unit, the volume of water is generally significantly less than with conventional cooling tower systems.

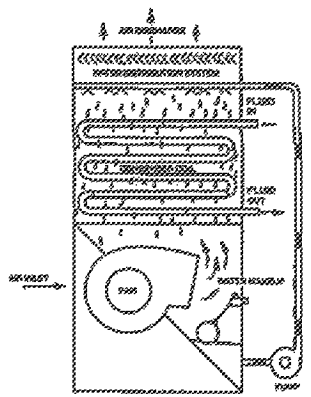

Figure 3 Typical closed-circuit cooling tower or evaporative condenser.

7.3 Water Droplet Size

Cooling towers and evaporative condensers incorporate inertial stripping devices called drift eliminators to remove water droplets generated within the unit. While the effectiveness of these eliminators can vary significantly with the design (new state-of-the-art eliminators are significantly more efficient than older designs) and the condition of the eliminators, it should be assumed that some water droplets in the size range of less than 5 micrometers leave the unit. In addition, some larger droplets leaving the unit may be reduced to 5 micrometers or less by evaporation.

7.4 Nutrients

Because cooling towers and evaporative condensers are highly effective air scrubbers and because they move large volumes of air, organic material and other debris can be accumulated. This material may serve as a nutrient source for legionellae growth. Diverse biofilms, which can support the growth of legionellae, may be present on heat exchanger surfaces, structural surfaces, sump surfaces, and other miscellaneous surfaces.

7.5 Associated Cases of Legionnaires' Disease

Evaporative heat rejection equipment such as cooling towers and evaporative condensers have been implicated in numerous outbreaks of Legionnaires' disease, and studies have shown that detectable levels of legionellae are present in many, if not most, such devices.[15–18]

7.6 Recommended Treatment

The key recommendations are that the system be maintained clean and that a biocidal treatment program be used. It is also recommended that the services of a qualified water treatment specialist be used to define and oversee the treatment.

7.6.1 System Maintenance. Keeping the system clean reduces the nutrients available for *Legionella* growth. Regular visual inspections should be made for general cleanliness. The cold water basin of the unit should be cleaned when any buildup of dirt, organic matter, or other debris is visible or found through sampling. Mechanical filtration may be used to help reduce these solids. Strainers, cartridge filters, sand filters, centrifugal-gravity-type separators and bag-type filters can be used to assist in removal of debris.

The drift eliminators should also be inspected regularly and cleaned if required or replaced if deteriorated or damaged.

Operation and maintenance records should include the following information:

- system schematic
- system water volume, with date and method of determination
- manufacturers' instructions for equipment operation
- regular water treatment procedures
- material safety data sheets for chemicals used (MSDS)
- names of persons responsible for system operation and shutdown
- dates of inspections and written results of inspections
- dates and nature of routine maintenance
- dates of equipment repairs or modifications with description of work done

7.6.2 Water Treatment. Water treatment provides a heat transfer fluid that allows equipment to function optimally. Objectives of water treatment for cooling water systems is to use water efficiently as well as to

- minimize microbial growth,
- minimize scale,
- minimize corrosion,
- minimize sedimentideposition of solids (organic or inorganic) on heat transfer surfaces.

An effective water treatment program should allow more efficient operation due to lower fouling, a longer system life due to decreased corrosion, and safer operation of the system due to reduced chances of microbial exposure to the public.

Control of scaling and corrosion is necessary in many water treatment programs. Scale such as calcium carbonate and/or other minerals containing silica, magnesium, and phosphate may precipitate onto heat exchanger and piping surfaces. Scaling can be minimized by use of inhibitors containing phosphonates, phosphates, and polymers to keep calcium and carbonate and other minerals in solution. Corrosion can be minimized by the use of inhibitors such as phosphate, azoles, molybdenum, and zinc. Scale and corrosion inhibitors are effective if microbial fouling and biofilm development are properly controlled. Microbial fouling can influence scaling and corrosion processes and can affect the performance of inhibitors. Microbial biofilms on surfaces can consume certain inhibitors (such as phosphates, phosphonates, and azoles), prevent access of inhibitors to surfaces, create localized oxygen-depleted zones, change the pH near surfaces, and accumulate or trap deposits onto surfaces.

Surfactants have also been used to minimize deposition on surfaces (particularly heat transfer surfaces). When used, the surfactant must be compatible with the scale and corrosion inhibitors as well as appropriate for the type of dirt, oil, or other material that is present.

Equally important to controlling scale and corrosion is keeping the system clean and free of sediment. Common sources of sediment include materials scrubbed from the air (dirt, leaves, paper, kitchen or other organic exhaust), precipitated solids (calcium, magnesium, carbonate silicas), and corrosion products (rust). Microbes including bacteria, protozoa, algae, and (infrequently) fungi can grow in cooling systems and use the above materials as nutrients. Consequently, it is desirable to either prevent the entry of the material into the system or to remove it from the system.

Strategies to accomplish this include siting of the tower (relative to kitchen exhausts, etc.), scale and corrosion control, and filtration and/or separation.

Microbial fouling is controlled by the use of biocides, which are compounds selected for their ability to kill microbes while having relatively low toxicity for plants and animals. In the USA, the Environmental Protection Agency has regulatory authority for biocides and requires registration of all biocides. In addition, registration is required in each state where the biocide will be distributed. The data package submitted to the EPA includes efficacy data against a variety of microbes and toxicity data for animals. Much of the laboratory data are provided by the manufacturers of the individual biocides. Biocides must be used in accordance with the directions on the label.

There are two main groups of chemical biocides: oxidizers and nonoxidizers.

Oxidizing biocides include bromine, bromo-chloro-hydantoin, chlorine, chlorine dioxide, iodine, isocyanurate, ozone, or other compounds with the ability to accept electrons from other compounds that serve as reducing agents. Oxidizing biocides can accelerate corrosion of metals if they are dosed at excessive concentrations. Halogen biocides (chlorine, bromine, and iodine) react with the protein in cell membranes to cause the protein to become dysfunctional, thus killing/controlling the organism. Ozone and chlorine dioxide are believed to oxidize other components of the microbial cell.

Nonoxidizing biocides include many organic compounds registered with the EPA for cooling water applications, such as bromonitropropanediol, bromonitrostyrene, carbamates, dexythioethanamine, dibromonitrilopropionamide, dodecylguanidine hydrochloride, glutaraldehyde, isothiazolones, methylene bisthiocyanate, quaternary phosphonium salts, and tris-hydroxymethylnitromethane. Quaternary ammonium compounds are sometimes used but were found to be ineffective against legionellae in a recent study.[41] These biocides function in a number of ways, including reacting with intracellular enzymes, solubilizing cell membranes, and precipitating essential proteins in microbial cell walls. Properly used, nonoxidizing biocides are effective for control of the microbial fouling process in cooling water systems.

Both oxidizers and nonoxidizers can undergo chemical reactions with materials in the water that decrease their effectiveness. Some biocides react with components of some scale and corrosion inhibitors to render both compounds less effective for their intended purpose. Selection of corrosion/scale inhibitors as well as the biocide requires a knowledge of water chemistry, a basic understanding of water microbiology, and specific information about the system (what the system is cooling, sources of contamination, etc.).

It is generally sound practice to regularly alternate the biocides used for a cooling water system to avoid the selection and growth of resistant strains of microbes. The alternating biocide approach has been emphasized with the rationale that the population that survives the biocide treatment one week is susceptible to the alternate biocide a week or two later. Alternating the dose and frequency of the same biocide is also used to achieve this goal.

Because *Legionella* are known to enter cooling water systems in the makeup water, it should be assumed that they are present in the water along with other bacteria, protozoans, and algae. Protozoa are highly resistant to both oxidizing and nonoxidizing biocides; hence they must be controlled by limiting the microbial biofilms that serve to provide them nutrients.[42]

For further information on the subject of water treatment, see the "Water Treatment" chapter in the Applications volume of the ASHRAE Handbook.

7.6.3 Cooling Tower System Shutdown and Start-Up Procedure[43]

Shutdown

When the system is to be shut down for a period of more than three days, it is recommended that the entire system (cooling tower, system piping, heat exchangers, etc.) be drained to waste. When draining the system is not practical during shutdowns of short duration, the stagnant cooling water must be pretreated with an appropriate biocide regimen before tower start-up.

Start-Up for Drained Systems

- Clean all debris, such as leaves and dirt, from the cooling tower.
- Fill the system with water. While operating the condensing water pump(s) and prior to operating the cooling tower fans, execute one of the two alternative biocidal treatment programs described below.
  (1) Treat with the biocide that had been used prior to shutdown. Utilize the services of the water treatment supplier. Maintain the maximum recommended biocide residual (for the specific biocide) for a sufficient period of time (residual and time will vary with the biocide) to bring the system under good biological control.
  (2) Treat the system with sodium hypochlorite to a level of 4 to 5 mg/L (ppm) free chlorine residual at a pH of 7.0 to 7.6. The chlorine residual must be held at 4 to 5 mg/L (ppm) for six hours, measurable with standard commercial water test kits.
- Once one of these two biocidal treatments has been successfully completed, the fan can be turned on and the system returned to service. Resume the standard water treatment program (including biocidal treatment).

Start-Up for Undrained (Stagnant) Systems

Remove accessible solid debris from the cooling tower sump and from any remote storage tank(s) that may be used.

- Perform one of the two biocide pretreatment procedures (described in "Start-Up for Drained Systems") directly to the cooling tower sump or remote storage tank. Do not circulate stagnant bulk cooling water over cooling tower fill or operate cooling tower fans during pretreatment.
- Stagnant cooling water may be circulated with the main cooling system pump(s) if tower fill is bypassed. Otherwise, add approved biocide directly to the bulk water source and mix with either manual or by sidestream flow methods. Take care to prevent the creation of aerosol spray from the stagnant cooling water from any point in the cooling water system.
- After biocidal pretreatment has been successfully completed, the cooling water should be circulated over the tower fill with fans off. When biocide residual is maintained at a satisfactory level for at least six hours, the cooling tower fans may be operated.

7.6.4 Emergency Decontamination of Wet-Type Heat Rejection Systems for *Legionella*. The Cooling Tower Institute has formulated an "Emergency Protocol" for decontaminating cooling towers and evaporative condensers using chlorine and dispersants.[44] However, this procedure must not be used routinely because it can be very corrosive and produce toxic fumes. This procedure has been adopted to include additional safety precautions and a 10 mg/L free residual chlorine level for 24 hours.[33]

7.6.5 Siting. In locating cooling towers and evaporative condensers, attention should be given to the following considerations.

- Locate as far as possible from fresh air intakes, including windows that can be opened.
- Do not locate in the immediate area of kitchen exhaust fans, plants, truck bays, or other sources of organic matter.
- Consider the direction of prevailing winds and do not locate upstream of outdoor public areas.
- Consider future construction, including nearby sites.

8. DIRECT EVAPORATIVE AIR COOLERS, MISTERS (ATOMIZERS), AIR WASHERS, AND HUMIDIFIERS

8.1 System Description

Direct evaporative air-cooling equipment and humidifiers cool and humidify air by direct contact with the water, either by wetted-surface materials (as in wetted media air coolers) or with a series of sprays (as in air washers and misters). These devices (see Figures 4 and 5) are used to control the temperature and humidity levels for commercial, industrial, and agricultural applications.

They utilize either once-through or recirculating water. Wetted media systems may include a pump, water distribution piping, and a sump to collect or hold water. A fan may be utilized to move air across the system and distribute evaporatively cooled and humidified air to the location being served. Concentrations of contaminants in the water is limited by blend off and quality of fresh water makeup.

8.1.1 Wetted Media. Wetted media devices utilize a porous substrate to provide an extended surface area for evaporation of water. Water is either circulated over the media or the media are rotated through a water bath. Since evaporation occurs from the surface of the media, no water droplets are produced. Mist eliminators are generally not necessary. These

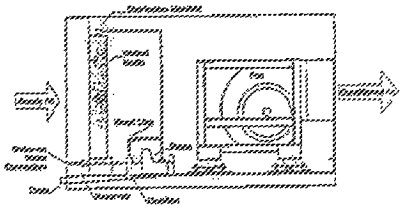

Figure 4 Direct evaporative air conditioner/cooler.

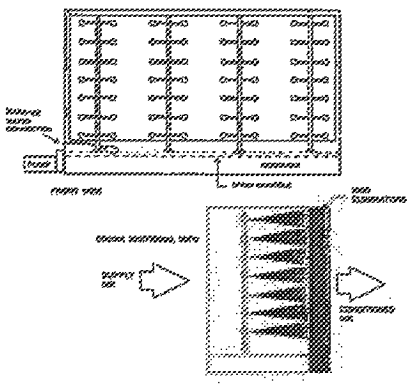

Figure 5 Single bank air washer humidifier.

devices utilize either once-through potable building water or are equipped with a recirculating system including a pump, automatic makeup water valve, a bleed-off/purge, and a positive draining reservoir.

8.1.2 Air Washers. Air washers utilize high-pressure nozzles to reduce water to small droplets for efficient evaporation. These systems have a chamber or casing containing one or more banks of spray nozzles and drift eliminators. Air washers contain a sump for collecting and holding excess spray water. The eliminator section removes entrained droplets of water from the air. Air washers also utilize either once-through potable building water or are equipped with a recirculating system including a pump, automatic makeup water valve, a bleed-off/purge, and a positive draining reservoir. The water may be chilled for additional cooling and/or dehumidification.

8.1.3 Misters. Misters produce an aerosol by use of ultrasonic devices, spinning disks, or spray nozzles. Normally these devices are supplied with fresh potable water directly from the building water systems; however, some systems contain a reservoir.

8.1.3.1 Heated Element and Steam-Type Humidifiers. Heated element and vapor-type humidifiers convert water to vapor that is discharged into the space being conditioned. Due to the elevated temperature and the fact that water droplets are not generated, these humidifiers are not considered a risk for the growth of *Legionella* during normal operation. However, if the humidifier is improperly installed, moisture may accumulate in the duct and lead to bacterial growth. During periods of time when equipment is not in use, all water should be drained from the system to avoid the possibility of bacterial growth.

8.2 System Operation

See 8.1.

It should be noted that due to process conditions, there may be periods of time when equipment is shut down. It is common practice to drain sumps when the units are not in use. In addition, a continuous bleed or purge cycle is usually employed to limit the buildup of solids and contaminants in the basin. High dilution rates remove bacteria, nutrients, and other contaminants before they are a problem. It is rare for growth of *Legionella* to occur under these conditions.

8.2.1 Water Temperature—Wetted Media Evaporative Air Coolers/Humidifiers and Air Washers. For wetted media evaporative air coolers/humidifiers and air washers, the recirculating water temperature approximates the wet-bulb temperature of the airstream to which it is exposed. Since the wet-bulb temperature in most regions where these devices are used is well below 25°C (77°F), the water tends to be maintained at temperatures below the Legionella growth temperature range of 25–42°C (77–108°F).

8.2.2 Water Temperature—Misters. For misters supplied directly from the building potable water system, the temperature would tend to be at the supply cold water temperature. If fed from a stagnant reservoir, or pipes exposed to heat, the temperature could increase. The temperature could exceed 25°C (77°F), which is favorable for amplification of legionellae.

8.2.3 Water Temperature—Air Washers. Air washer operating conditions are based on the requirements of the process; however, a standard operating temperature range for circulating water is 4–10°C (40–50°F). The normal operating portions of air washer systems tend to be maintained at temperatures below the *Legionella* growth temperature range of 25–42°C (77–108°F).

8.3 Water Droplet Size

8.3.1 Wetted Media. Wetted media equipment generally produces few droplets during operation. However, large droplets may form as a result of improper maintenance and uneven water or air distribution. The exact size of the droplets will vary with the condition of the wetted media and mist eliminators (where used), air velocity through the unit, and irrigation rate. It should be assumed that under extreme conditions droplets of less than 5 micrometers could be created.

8.3.2 Air Washers. The major causes of droplets being entrained into the airstream are fouled spray nozzles and damaged or dirty mist eliminators. Air washers can produce droplets of various sizes and certainly have the potential to produce droplets less than 5 micrometers in diameter.

8.3.3 Misters. These systems can produce droplets of varying size and certainly have the potential to produce droplets less than 5 micrometers in diameter.

8.4 Nutrients

Because direct evaporative air coolers/humidifiers are efficient air scrubbers and move large volumes of air, organic matter and other debris can be accumulated. This may serve as a nutrient source for *Legionella* growth.

8.4.0.1 Wetted Media Evaporative Air Coolers/Humidifiers and Air Washers. Wetted media evaporative coolers/humidifiers and air washers have potential for growth where dirt, scale, or biological matter can accumulate. Most likely areas of such accumulation are collection troughs, mist eliminators, or water storage tanks.

8.4.1 Misters. Nutrient availability would be minimal when fed potable water directly from the building potable water system. If distribution piping and/or a holding reservoir is used, nutrients in the form of sediment and other debris may exist.

8.5 Recommended Treatment

8.5.1 All Systems. Regular inspection and maintenance of evaporative air coolers/humidifiers, air washers, misters, and ancillary equipment are recommended. Avoid dead-end piping, low spots, and other areas in the water distribution system where water may stagnate during shutdown.

Consider the use of photochemical ozone generators to control microbial concentrations in water in sumps and distribution piping. Water filters and air filters should be cleaned as required. The entire cooling water loop should be cleaned and flushed monthly.

8.5.2 Recirculating Systems. Proper sump water level or spray pressure must be maintained. Bleeding off or purging some of the water is the most practical means to minimize scale and nutrient accumulation. The bleed rate or purge depend on water quality (including hardness) and airborne contaminant level. Regular inspections should be made to ensure that the bleed rate or purge is adequate and is maintained. As an added precaution, sumps could be automatically drained during shutdown of the fan. When it is impractical to shut a system down for cleaning, it should be provided with a positive draining sump and easily accessible flush-out of the water distribution header so it can be flushed during operation. After flushing, dose the recirculating cooling water with a biocide approved by the EPA for such applications.

8.5.3 Air Washers. Use corrosion inhibitors to prevent corrosion of metals in the systems and formation of corrosion products. Control the level of suspended solids that can supply nutrients and growth areas for legionella. Finally, the microbiological activity should be controlled through the utilization of biocides approved by the EPA for such applications.

8.5.4 Wetted Media Evaporative Air Coolers/Humidifiers. Media located inside a large built-up air house may not dry completely during period of shutdown (i.e., weekends), resulting in stagnation. In order to dry out the media, pumps should be shut down prior to scheduled fan shutdowns. Smaller systems and those having the media located adjacent to inlet louvers normally dry sufficiently without assistance. For systems experiencing high contaminant loading, a flush-out cycle may be used that runs fresh water through the pad every 24 hours during a period of time when the system is not in operation. Media should be cleaned or replaced when necessary.

8.5.5 Misters. Never recirculate atomized water. Drain pipes and reservoir when equipment is not in use. For portable misters, drain and disinfect piping and reservoir regularly. Only sterile water should be added to the reservoir of portable humidifiers used in health care environments or in other areas where immune-compromised persons are likely to be exposed to the generated aerosols.

8.6 Siting

Evaporative air coolers/humidifiers should not be located near the outlet of a cooling tower, fluid cooler, evaporative condenser, kitchen exhaust, or any other source of organic contamination. Filtration upstream of the evaporative air cooler/humidifier is recommended when particulate contamination is expected. Filtration downstream of the equipment must be a sufficient distance to allow absorption of moisture into the air stream.

8.7 Associated Cases of Legionnaires' Disease

There have been no known cases of Legionnaire's disease with air washers, wetted media evaporative air coolers/humidifiers, or steam humidifiers. A supermarket vegetable misting device using water from a holding tank was implicated in one outbreak of Legionnaires' Disease.[33] There is a documented case of Legionnaires' Disease that occurred in a hospital setting and resulted from aerosolized tap water from a humidifier.[12,32]

9. INDIRECT EVAPORATIVE AIR COOLERS

Indirect evaporative air coolers cool air in a heat exchanger, which transfers heat to a secondary airstream as shown in Figure 6. Although the primary air is cooled by the evaporatively cooled secondary air, no moisture is added to the primary air.

9.1 System Description

The heat exchanger is cooled by evaporation of water utilizing one of several methods:

1. direct wetting of the heat exchanger surface
2. cooling of secondary air utilizing evaporative cooling media
3. atomizing spray into secondary airstream or onto heat exchanger surface
4. cooling tower and coil.

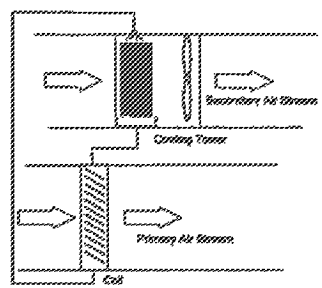

Figure 6 Indirect evaporative cooler.

9.2 System Operation

9.2.1 *Temperature.* The recirculated water temperature approximates the wet-bulb temperature of the secondary airstream. As is the case with direct evaporative air coolers, it is unlikely that the water temperature will exceed 25°C (77°F).

9.3 Water Droplet Size

Water droplet size will vary with exchanger type, condition of the media and mist eliminators (where used), air velocity through the unit, and other factors. Refer to the section of this guideline regarding specific exchanger type, i.e., cooling towers, misters, etc.

9.4 Nutrients

See 7.4 for equipment using a cooling tower to cool the secondary airstream and 8.4 for equipment using evaporative coolers or misters to cool the secondary airstream.

9.5 Recommended Treatment

See 7.6 for equipment using a cooling tower to cool the secondary airstream and 8.5 for equipment using evaporative coolers or misters to cool the secondary airstream.

9.6 Siting

Indirect evaporative air coolers should not be located near the outlet of a cooling tower, fluid cooler, evaporative condenser, kitchen exhaust, paint booth, incinerator, or any other source of organic matter.

9.7 Associated Cases

There has been no positive association of Legionnaires' disease with indirect evaporative air coolers.

10. METALWORKING SYSTEMS

10.1 System Description

In these systems, metalworking fluids are applied to cutting surfaces for lubrication and to prevent overheating of both the machine tool and the machined part.

10.2 System Operation

Both oil-based and water-based fluids are used. A variety of such fluids are commercially available from many companies.

As a rule, microbial growth does not occur in oil-based products. However, water-based fluids do become contaminated by microorganisms.

10.2.1 *Temperature.* As the fluids cool the machine tool and machined part, they become heated and the ambient temperature of the fluid sumps ranges between 24° and 32°C (75°F and 90°F), permitting the growth of many pathogens including *Legionella* species.

10.3 Water Droplet Size

These systems can produce droplets of varying size depending on the specific machining operation and have the potential to produce droplets less than 5 micrometers in size.

10.4 Nutrients

These systems are typically open and subject to contamination from the air and surfaces that are being machined.

10.5 Associated Cases of Legionnaires' Disease

Metalworking systems have been implicated in the outbreak of Pontiac fever as well as acute respiratory syndrome and hypersensitivity pneumonitis.[45]

10.6 Recommended Treatment

Exposures from metalworking operations can be a serious potential health concern, the magnitude of which is not fully understood. Biocides are supplied with fluid concentrates, which are diluted when used and/or added to the fluid reservoir. However, the variety of fluids, microbial types, turnover rate, and metal operations makes successful dosing not always predictable. Selections of biocides should be based on fluids and microbes being treated.

It is recommended that care be taken to minimize contamination and to reduce exposure to machine operators until further information is available.

11. MONITORING FOR LEGIONELLA

Culturing for *Legionella* may be appropriate if carried out for a specific purpose, such as verifying the effectiveness of a water treatment protocol, tracing the source of an outbreak, evaluating the potential amplifier/transmission sources at a facility, verifying that the decontamination procedures have been effective, or in health care facilities caring for patients with exceedingly high risk of developing Legionnaires' disease (e.g., organ transplant recipients).[46-48] Where culturing is performed, proper sampling, handling, and shipping methods should be used.[49]

However, except as discussed in 5.6.1.5, routine culturing of samples from building water systems may not be predictive of the risk of transmission for the following reasons.

1. Presence of the organism cannot be directly equated to the risk of infection. The bacterium is frequently present in water systems without being associated with known cases of disease.
2. Interpretation of the results of culturing of water is confounded by use of different bacteriologic methods in various laboratories, by variable culture results among sites sampled within a water system, and by fluctuations in the concentration of *Legionella* isolated from a single site.
3. The risk of illness following exposure to a given source is influenced by a number of factors other than the concentration of organisms in a sample. These factors include, but are not limited to, strain virulence, host susceptibility, and how efficiently the organisms are aerosolized to the small particle size required to reach the deep portion of the human lung and remain viable.
4. Test results only represent the counts at the time the sample was collected. A negative result from such a sample is likely to lead to a false sense of security because any amplifier can quickly become heavily colonized if it suffers neglect.

Testing is not a substitute for sound maintenance practices and water treatment.

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(This informative annex is not a part of this guideline and is for information purposes only.)

ANNEX A

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POLICY STATEMENT DEFINING ASHRAE'S CONCERN FOR THE ENVIRONMENTAL IMPACT OF ITS ACTIVITIES

ASHRAE is concerned with the impact of its members' activities on both the indoor and outdoor environment. ASHRAE's members will strive to minimize any possible deleterious effect on the indoor and outdoor environment of the systems and components in their responsibility while maximizing the benefits these systems provide, consistent with accepted standards and the practical state of the art.

ASHRAE's short-range goal is to ensure that the systems and components within its scope do not impact the indoor and outdoor environment to a greater extent than specified by the standards and guidelines as established by itself and other responsible bodies.

As an ongoing goal, ASHRAE will, through its Standards Committee and extensive technical committee structure, continue to generate up-to-date standards and guidelines where appropriate and adopt, recommend, and promote those new and revised standards developed by other responsible organizations.

Through its Handbook, appropriate chapters will contain up-to-date standards and design considerations as the material is systematically revised.

ASHRAE will take the lead with respect to dissemination of environmental information of its primary interest and will seek out and disseminate information from other responsible organizations that is pertinent, as guides to updating standards and guidelines.

The effects of the design and selection of equipment and systems will be considered within the scope of the system's intended use and expected misuse. The disposal of hazardous materials, if any, will also be considered.

ASHRAE's primary concern for environmental impact will be at the site where equipment within ASHRAE's scope operates. However, energy source selection and the possible environmental impact due to the energy source and energy transportation will be considered where possible. Recommendations concerning energy source selection should be made by its members.

Ask Man ag meres anyone dnr to contact about software installation for me/dustin

MDEQ Mclaren / Hurley meeting
Meeting w/ city

Hurley - dont have water safety plan or HACP
MDEQ providing information. Don't do any water monitoring
for leg or chlorine. Does flush system

Mclaren - monitoring sept/oct jan feb, march, April
Continuous treatment sept - treated as public drinking
water, Hyperchlorination oct/nov, daily every 6 mos
April monitoring chlorine residuals Have a control
plan needs to be upmanaged Cant temper hot water
maintain 98-110° temp - Daily monthly tests, trying to
standardize sampling protocal

2014
400 breaks

Water main breaks? spreadsheet provided? currently ~4/day
City doesnt maintain plumbing records
water age map sept, oct, novemb, hoping for new one

2013-2014 winter had big impact in Flint

Data being requested by MDCH and/or suggested data collection needs to be addressed:

1) Please provide the name of the primary point-of-contact for the overall GCHD legionellosis investigation. Shurooq Hasan is lead on the CD investigation. Jim Henry is the lead on the water system investigation. Our entire CDIRT team is involved in both investigations.

2) The current copy of the GCHD Legionnaires Disease outbreak data collection line list is requested and updates sent to MDCH on a regular basis. Let us know the time table you are proposing. We would like to request a regular meeting schedule so we can discuss our mutual findings.

3) Onset dates or estimated onset dates need to be determined for all cases. As discussed during our call, we can provide estimated onset dates. We would like your input...would you prefer we report the onset date reported by the patient, their primary care physician or the ID Physician consulting? There are differences. Please keep this in mind when reviewing the data.

4) A current map of the municipal water system needs to be obtained and cases' residences mapped in relation to the water system. As discussed in our call, we are experiencing difficulty in obtaining the information we have requested from DWP and MDEQ. We have sent the FOIA request for the current map of the municipal water system. As discussed during our call, we have mapped our cases to look for commonalities and to identify the proximity of the cases to the boil water advisories.

5) The investigation needs a Genesee-specific supplemental questionnaire beyond the MDCH supplemental form and the 6 questions in the email message dated 10/17/14. As discussed in our call, GCHD has been identifying and reaching out to individuals with expertise with type 1 water supplies. During our call, we asked specifically of anyone at MDCH has this expertise. Please let us know if you have a staff member we can consult with. Also stated during our call, we requested the assistance of MDCH in creating our Genesee specific questionnaire....the questionnaire we are currently using. We are reaching out to water experts to assist in the updating of our questionnaire. In the limited conversations we have had so far, we have learned a great deal which will inform the questions we need to ask. We also look forward to additional conversations with our MDCH colleages

6) All previous cases (since 5/1/14) and new cases should be re-interviewed as soon as possible with the new outbreak-specific questionnaire. If cases are not available, then a proxy should be interviewed, ideally someone from the same household. See me notes below...

7) To look for cases of milder illness such as Pontiac Fever, the questionnaire should ask if there are other household members who have had a similar respiratory illness. Any household contacts with legionellosis-consistent illness should also be interviewed with the outbreak-specific questionnaire. As discussed on the call in the review of our invesitgations, we have found this and, we have been reporting this... and have reported them in MDSS. This is the reason why we asked for testing of clinical samples not only of the patients, but, also of their close contacts.

8) Clinical culture specimens, in addition to urine antigen testing, should be collected from all suspect cases where individuals are seeking medical care. As discussed in our call, this is what we have requested from MDCH. In addition, we requested testing of close contacts, environmental testing of the patient home environments and potentially testing of key locations in the community with high heterotrophic plate counts. Based on the feedback from our consultations, this may be very helpful.

9) Hospitals should be queried to determine whether any previously diagnosed cases had respiratory cultures collected and whether any of these culture specimens were retained. If so, it should be requested that these samples be held until a determination on environmental testing can be made. This was discussed at our Bug Fuzz meeting on 1/22/15. We will also be requesting more information regarding previous years legionella testing. We suspect a

significant increase in the numbers of tests conducted, particularly during August/September than in previous years. Remember, the hyperclorination done at our hospital of interest was completed 10/4/15. That may also influence the number of tests conducted.

Assistance that MDCH can provide to Genesee to aid in the outbreak investigation:

1) MDCH can provide language to GCHD for distribution to the medical community regarding the request for clinical respiratory culture collection on all suspect cases of legionellosis (Legionnaire's Disease and Pontiac Fever). What we specifically requested was the specific testing protocols for sample collection, storage and transportation of clinical samples. We also requested testing of environmental samples from patient homes and key community sites. We would like the same protocol information for this type of testing as well. Jim's email covered some of this, but, we still have some questions.

2) MDCH staff is available to conduct medical record extraction, as needed. Medical records are attached in MDSS and we do not need assistance with this at this time.

3) MDCH staff can assist with data entry into MDSS, as needed. At this time, we do not need assistance with this. Please see the note below…

4) MDCH staff can help with the development of a Genesee-specific outbreak questionnaire. We welcome your participation in the revision of our Genesee specific questionnaire. We have already received some helpful feedback from our expert consultations.

5) MDCH is willing to assist with supplemental questionnaire data collection by conducting case interviews (on previously and/or newly diagnosed cases) and also by assisting with data analysis, as needed. Our CD nurses can address newly diagnosed cases. We would like to discuss MDCH's assistance for conducting interviews with previously diagonosed/interviewed cases.

6) MDCH can assist with the coordination and communication with MDEQ for specific data requests by GCHD. As discussed in our call, we are requesting MDCH assistance with obtaining information from MDEQ. GCHD has sent a FOIA letter requesting the information we have not been able to obtain regarding the water system. If we do not receive the information or have other challenges we would request MDCH assistance in obtaining the information.

7) The MDCH PIO can work with the GCHD PIO to develop a coordinated public health message to respond to public and media inquiries. As discussed in our call, the water system is an extremely sensitive topic. We are very careful in crafting messages. Should we need MDCH PIO assistance, we will request it.

1) line list by end of week - MDCH
2) send out HAN by the end of week? If not, what's a reasonable timeframe.
3) draft legionellosis questionnaire by Wed next wk. finalized - Shenna, Lily environmental assessment
4) Hurley - OK leg. cases
Genesys -
Mclaren -
MDCH - part starting record review / hospitalization leg
5) estimate onset dates for all cases
6) outbreak period, case def, outbreak ID
7)

1/27: Genesee Cnty Legionnaires
Suzanne, Shuroog, Dr. Johnson, Bonnie, Jim Henry
Tim, Mark Valacek, Shannon, Susan Bohm, Lily,
Jay
Suzanne GCHD updates:
June 2014 - Bug Fu33 mtg LHD & hosp.
cases of Legionnaires among previously hosp
pt of McLaren, same cooling tower area diff
floors. McLaren hired yfrm to investigate hospital
McLaren testing on 9/5
25 cases resided in city of Flint, not confined to
city of Flint
9/15 - Line list, 9/26 results
10/4 - hyperchlorination @ McLaren
10/16 - Bug Fu33 mtg.
10/16 Steve Busch MDEQ, heterotrophic plate counts
10/30 Jim met McLaren DPW, heterotrophic plate count
11/12 met to discuss results
11/28 requested written to DPW for plate count data
1/9 Jim speaks to DPW about water concerns
1/13 internal mtg
1/9 Jim Henry attended mtg, DPW sent out msg
about trihalomethane
1/13 Genesee met w/ Mark, access to other testing
1/21 Jim attended Presentation on DPW trihalomethane
1/22 MDEQ declined mtg. request,

1/23 -

1/26 - GCHD wants to 1831
a resident after
2 questionnaires completed - in mdss now

- 3 cases had family members hospitalized at Mclaren
- Contact w/ MDEQ to get information
- want to do testing, need to get clinical specimens
- locations w/ high heterotrophic plate counts

25 resident city of Flint Don't know what communities,
10 cases of mouth norm's served by city of Flint

- primary point of contact for genesee
- copy of supplemental questions
- supplemental questionnaire cases / household
- onset dates
- clinical specimen collection / guidance
- map cases based on water system, map of water system
- line list, hospitalized dates, exposure questions
- water advisory date / boil water
- start to med record extraction, as needed
- data entry as needed for mdss
- supplemental questionnaire review / modification / analysis
- coordination w/ MDEQ
- interview previous ill case w/ supplemental questionnaire

sue.forrest@mclaren.org
Sue Forrest
ICP coordinator
@ mclaren 292 a
810 342 2928
Denise

Darren ave data on wakeman breaks, some descriptive data, plotted breaks & distribution site has chlorine data levels, looking at where loop locations are

Edward ing @ Mclaren not approved ing testing @ Hurley united
62 d rst draw sampled
lls ; 30 t water in ideal growth temp
ver taps under chlorine residuals
29 de 9 1, leg . 3 o leg pneumophila
leg dom, ion exchange water softening Ro
- PSTREAT

Russell
H director , ng has eliminated cooling towers as source
nitial consultant dufferen results, vs
Dr group
1 any 1 sample showed over 10 C they would quarantine room ; 1 sample too , next day 1

Genesee conference call 4/7 2:30

Status of case interviews (MDCH/Genesee)

- -How far on list (by referral date) have interviews been assigned to/completed by staff at MDCH/GCHD ✓
- -Who will conduct final 6-7 unassigned interviews (~Oct, 2014 cases) ✓ – Send line list
- -Discuss goal date to finish current interviews ✓ – decide on ugrad interviews
- -Discuss number of attempts before determining "lost to follow-up" ✓
- -Lily entering questionnaire data into Epi Info database as she receives them

Status of any clinical samples

- -Most recent case negative on hospital culture specimen (+UA)
- -Were any cultures retained at McLaren/Hurley/Genesys on previously dx'd cases? (Genesee)

Status of environmental investigation (Genesee)

- DEQ/Genesee updates
- DEQ/EPA/CDC recommendations?

- Change @ hospital Mclaren in water switch over to Fe, Increase in water pressure?

- copy of letter to individual sent
  - need Genesee template
  - 2 mailed copies of letters 2 wks apart

- need water main breaks dates/locations saw @ mayor mtg: Flint
  - onset of cases 6/14
  - higher # of water breaks in 2014?

- Pittsburgh water system issue
  - Janet Stat

- Flint fixed Ozonator ↓ Chlorine by products / ↓ organic matter
- rec maintain Ph

-type of bact - certain more likely to cause illness
Amount of Cl

- dead ends / or less active lines
  - Increase in water pressure?
  - status of switch back?

low chlorine levels on outside?

- maintain adequate flushing schedule
- monitoring for Legionella not at premise plumbing

environment organic matter, heavy metals

EPA - Regan S Mark
COC -

Testing of pipe near mclaren - city of Flint
Mclaren had brown water around Oct 30th

- different chemicals in water ~~[illegible]~~ & hardness
(reports of skin rashes primarily related to water hardness)

Suzanne - GCHD
Shuroo B - GCHD
Bonnie - GCHD
Jim Henry

Leann Schecter-Smith
Mike Presby

Preliminary Stats on Genesee County Legionellosis Investigation,

April 7, 2015

Number of lab-confirmed cases of Legionnaires' Disease: 45

Number of Pontiac fever cases: 1 possible

Total number of legionellosis cases: 46

Geographic distribution:

45/46 Genesee Co (27 Flint, 6 Mt. Morris, 4 Burton, 2 Flint Twp, 1 Flushing, 1 Byron, 1 Davison, 1 Linden, 1 Otisville, 1 Vienna Twp)

1/46 Saginaw County (1 Chesaning)

Age range: 26-94 years

Average age (median): 62.2 years (63.5 years)

% Males: 50% (23/46)

Range of illness onset dates (n=45): 6/6/14-1/10/15 (new case onset 3/9/2015)

Number (%) of deaths: 15.2% (7/46); expect this number will increase as interviews are completed

Number (%) with other underlying comorbidities: TBD

Conference calls with Genesee County: Jan 27; Feb 10, Feb 19, Apr 7, 2015

Conference calls with hospitals: Jan 28, 2015

Date outbreak-specific survey completed and approved: 2/23/15

Number of cases interviewed: 21 completed (45.7%; 82.6% in total attempted/completed; 7 still unassigned)

MDCH: 14 completed / 29 contacted (MDCH had 2 interviewers – now increased to 4)

Genesee: 7 completed / 10 , 3 left - 2 passed away - no next of kin 1 Person left

Number (%) of cases hospitalized: 45/46 (97.8%). Number in ICU: 22/45 (48.8%)

Number (%) of cases hospitalized at McLaren: 18/45 (40%)

Number (%) of cases hospitalized at Hurley: 14/45 (31%)

Number (%) of cases hospitalized at Genesys: 6/45 (13.3%)

Mclaren Legionella
hyperchlorination
water main breaks / flushing of system

- hospitals in area with cases
- water age map from DEQ

Number (%) of cases hospitalized at other hospitals outside Flint: 7/45 (15.6%)

Number (%) of cases who had been hospitalized in 2-weeks prior to onset: 20/45 (44.4%)

Number (%) of cases who had been hospitalized in 2-weeks prior to onset at McLaren: 16/45 (35.6%)

Number (%) of cases who had been hospitalized in 2-weeks prior to onset at Hurley: 2/45 (4%)

Number (%) of cases who had been hospitalized in 2-weeks prior to onset at Genesys: 0

Number (%) of cases who had been hospitalized in 2-weeks prior to onset at other hospitals: unknown

Number (%) of cases who had a short-term visit to a hospital in 2-weeks prior to onset:

Number (%) of cases who had a short-term visit to McLaren facility in 2-weeks prior to onset: 5/45 (11.1%)

Number (%) of cases who had a short-term visit to Hurley facility in 2-weeks prior to onset: 1/45 (2%)

Number (%) of cases who had a short-term visit to Genesys facility in 2-weeks prior to onset: 0

Number (%) of cases who had been hospitalized or who had a short-term visit to a hospital facility in 2-weeks prior to onset:

Number (%) of cases who had been hospitalized or who had a short-term visit to a McLaren facility in 2-weeks prior to onset: 21/45 (46.7%)

Number (%) of cases who had been hospitalized or who had a short-term visit to a Hurley facility in 2-weeks prior to onset: 3/45 (6.7%)

Number (%) of cases who had been hospitalized or who had a short-term visit to a Genesys facility in 2-weeks prior to onset: 0

Number (%) of cases who work outside the home: 8/46 (17.4%) [min of 72% at home]

Number (%) of cases who are retired: 20 (43.5%)

Number (%) of cases who are unemployed: 7/46 (15.2%)

Number (%) of cases who are disabled: 6/46 (13%)

Number (%) of cases whose occupation status is unknown: 5/46 (10%)

Number (%) of cases whose homes are on Flint water: 45.6% (21/46)

Genesee Legionellosis Conference Call 6/26/15

may/June
4/5 associated w/ McLaren

Updates/information on the new June cases:

Any new information from McLaren:

Any recent environmental test results?: monthly testing w/ 4 locations @ hosp: identifying leg = hyperchlorinate every 6 mos. 3x in past 9 mos. hyp. chlor. in apt, identified leg right after step @ 4ppm not looking at specific rooms pt. stayed in. Any culture over 100 will use room

Any updates from Genesee water department?:
- schedule for flushing hydrants 75% complete

Aware of any changes to water processing in the city system?:
releasing a lot of sediment, worked through most of the city, focusing on community concerns: reducing TTHM / Brown water - improved chemical cocktail; install carbon filters by end of June

Discussion on any modifications to data collection tools :
TBD

Lab results on 2 sputum specimens- pending at BoL
- still pending at BoL

Genesee POC?:
- Suzanne POC for outbreak
- Bonnie stepping down 7/1

EPC envir. consulting
Cooling towers <1
Cold water <1
hot water colonized
no boiled water advisories recently; had significant # of water main breaks
- more water line work compared to last year

Future investigation plans:
- information consulting / remediation firms
- direct environmental testing re: results clinical
-
- environmental sampling

GOAL
Call Ave Forest
- updated line list
- clinical specimens

06/24/2014- Bug Fuzz Meeting- Hospitals discussed legionella cases that had been previously hospitalized at Mclaren.Began monitoring legionella cases that were previously hospitalized (especially at McLaren) – GCHD did not note a significant increase in Legionella

07/2014- Total cases hospitalized from McLaren- 3

08/20/2014 CDIRT-Discussed increase in Legionella – Started to talk to Mclaren around this time (suspect cooling towers as potential source, planned meeting with engineering department to discuss their investigation) **6 cases hospitalized from Mclaren out of 13**

9/4/2014- McLaren identifies location of their patients with legionella, found them same towers but different floors. They have hired someone to inspect the air valves on 13th floor and will keep us updated. **10 out of 18 total cases from Mclaren**

9/05/2014-Mclaren First Test

9/26/2014- Test results returned to Mclaren

10/4/2014- McLaren does hyper chlorination

10/15/2014- CDIRT-Discussed Legionella- 15 Total cases in September Mclaren hyper chlorinated, more cases- Jim to talk to DEQ, develop Environmental survey for cases

10/30/2014- Jim meets with McLaren +DPW- we get results for Heterotrophic plate count (October only) and Mclaren results for testing- Mclaren will continue to test monthly for legionella, they have a plan in place for remediation if necessary.

2015 Genesee Legionellosis Analysis

- 2nd wave analysis may - Nov.
- total picture 2014 - 2015
- Genesee comments on draft

- validate outpatient visits
- 8 PFGE
* - Christine has urine antigen from 1 hosp - email
* Mark Edwards 2 huge leg

2014 - onset to interview date average
2015 - onset to interview date averages

* validate water residence
* asset to interview 2015, base to 2014
* Emburse Use lists are next couple days

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Person:	FAX Number
Ann Newell	(810) 262-7268
Office Name	**Phone Number**
Hurley IC	

FROM:

Person:	Fax Number
Shannon Johnson	**517-335-8263**
Office Name	**Phone Number**
Communicable Disease Division	**517-335-8165**

Comments:

email / PRI 3 reports attached

Best,
Shannon

Receipt Acknowledgment Requested?

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Johnson, Shannon (DHHS)

From: Johnson, Shannon (DHHS)
Sent: Friday, January 22, 2016 3:10 PM
To: 'Ann Newell'
Subject: FW: FOR IMMEDIATE RELEASE: MDHHS issues 2015 Legionnaires Disease Report for Genesee County

Hi Ann,

I actually didn't get this email yesterday, but Suzanne forwarded it to me. Sending in case you haven't received it. Not sure why the links aren't in order at the bottom, but the newest summary is the second one: "Updated 5-15 to 11-15 Legionellosis Analysis Summary.pdf"

Thanks,

Shannon

Shannon Andrews Johnson, MPH
Infectious Disease Epidemiologist
Michigan Dept. of Health and Human Services
201 Townsend St., CVB 5th Floor
Lansing, MI 48913
Phone: 517-335-8165
Fax: 517-335-8263

From: Michigan Department of Health and Human Services [mailto:MDHHS@govsubscriptions.michigan.gov]
Sent: Thursday, January 21, 2016 3:46 PM
To: Cupal, Suzanne
Subject: FOR IMMEDIATE RELEASE: MDHHS issues 2015 Legionnaires Disease Report for Genesee County

Press Release

FOR IMMEDIATE RELEASE: January 21, 2016

CONTACT: Jennifer Eisner, (517) 241-2112

MDHHS issues 2015 Legionnaires Disease Report for Genesee County

LANSING, Mich. – The Michigan Department of Health and Human Services today issued its report regarding the increase of Legionnaires' disease (LD) during 2015 in Genesee County. MDHHS cannot conclude that the increase is related to the water switch in Flint nor can we rule out a possible association at this time.

From May 2015 through October 2015, 42 LD cases were reported in Genesee County. Data previously indicated three Legionnaires associated deaths from May 2015 through October 2015, however additional case information received has brought this number to four.

"While cases of Legionnaires disease are not expected in the winter, we remain fully engaged with the Genesee County Health Department as well as our federal partners at the Centers for Disease Control and Prevention to protect the health of Flint residents," said Eden Wells, M.D., Chief Medical Executive with the MDHHS. "We remain diligent in our efforts to proactively and appropriately address the potential for future cases."

Legionella is a type of bacteria commonly found in the environment that grows best in warm water, such as hot tubs, cooling towers, hot water tanks, potable water systems, and decorative fountains. When people are exposed to the bacteria, it can cause Legionellosis, a respiratory disease that can infect the lungs and cause pneumonia. The bacteria can also cause a less serious infection called Pontiac fever. *Legionella* is not transmitted person to person.

The state today also released an updated report for cases from June 2014 to March 2015. During that time, 45 LD cases were confirmed in Genesee County, including five associated fatalities. The report issued on January 13 originally identified seven fatalities during that time period.

Consistent with published literature, legionella related deaths are defined as fatalities that occurred within 30 days of hospital discharge. While the number of cases remain unchanged for LD in Genesee County, the total associated fatalities is now nine because some cases occurred outside of the 30 day period.

During LD outbreak investigations, clinical isolates, or case specimens, are often evaluated against environmental specimens to aid in determining an infection source. One reason that the increase in cases cannot be directly related to the change in Flint water supply is due to the lack of clinical *Legionella* isolates from case patients. Clinical isolates are necessary to interpret the findings of an environmental investigation in an outbreak. Although a limited number of clinical isolates are available from the 2015 cases, there are not enough to determine a conclusive environmental source.

Of the 87 total confirmed cases between June 2014 and November 2015, 31 people, or 35.6 percent, received city of Flint water to their residence. A total of 26 people, or 29.8 percent, had no known exposure to a Flint hospital on the city of Flint water system in the two weeks prior to illness, nor were their homes on the Flint water system. Other possible exposures were evaluated and no known community exposures were identified. Enhanced surveillance will continue in 2016.

MDHHS has been and continues to work with the Genesee County Health Department (GCHD), Michigan Department of Environmental Quality (DEQ), Centers for Disease Control and Prevention (CDC) and the Environmental Protection Agency (EPA) on this matter. MDHHS shared an initial report with local and federal partners in June 2015, and has continued to facilitate regular communication with our federal partners and GCHD to monitor cases.

###

- 6-14 to 3-15 Legionellosis Report Full Analysis Results.pdf
- Updated 5-15 to 11-15 Legionellosis Analysis Summary.pdf
- 6-14 to 3-15 Legionellosis Report_Investigation Summary Analysis.pdf
- Update Legionellosis GC Press Release 012116.pdf

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STATE OF MICHIGAN

RICK SNYDER
GOVERNOR

DEPARTMENT OF HEALTH AND HUMAN SERVICES
LANSING

NICK LYON
DIRECTOR

FOR IMMEDIATE RELEASE
January 21, 2016

CONTACT: Jennifer Eisner
(517) 241-2112

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- MORE -

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# # #

There are expectations for any public health organization that conducts surveillance and investigation around legionellosis. These expectations include a variety of activities ranging from the active engagement of community partners to the timely, thorough and accurate evaluation of individually reported cases.

It is the expectation of ~~this department~~ MDHHS that by accepting these responsibilities, the Genesee County Health Department will adequately address all of the items identified below. Recognizing the resource demands of this effort, the MDHHS continues to offer support of any aspects of the surveillance process that the GCHD cannot effectively address.

As we enter the warmer spring and summer months that are more conducive to legionella transmission, there are two primary areas of community outreach that should serve as the backdrop in support of surveillance activities. First, with the finalization of the CDC/MDHHS/GCHD Toolkit that focuses on the development of a water management program to prevent Legionella in "high risk" buildings, a valuable resource is now available to help direct water management in facilities throughout Genesee County. In addition to this document, the partnership has produced a preliminary list of facilities that are likely to be identified as being at elevated risk of legionella transmission. It is the expectation that the GCHD can deliver in the next week, a plan for the effective distribution and support of the toolkit at these facilities.

Second, it is a longstanding and effective public health practice to reach out to the healthcare community in response to increases in reported legionellosis. While the MDHHS has provided two HAN updates to Genesee's healthcare community in recent months, active communications are still warranted. These communications are best focused on the need for continued vigilance for incident cases of disease, heightened index of suspicion toward the diagnosis of cases, appropriate testing and simultaneous specimen collection. Consistent reinforcement of these messages is an important part in the process of identifying incident disease in any community. The GCHD must produce a plan that enumerates the steps, actions, materials and timeline for local public health engagement of the healthcare community.

Finally, every legionellosis referral to the MDSS warrants a timely, appropriate, complete and consistent public health evaluation. This evaluation includes communication with the diagnosing clinician, support for specimen collection/transport, review of clinical records, completion of patient/proxy interviews and updating of electronic disease surveillance records.

Once a suspect or confirmed Legionellosis case is identified:

1. Enter the case into MDSS within 24 h of notification if not already entered by provider or lab
2. Email the Regional Epidemiologist with the MDSS number
3. a. Contact the diagnosing hospital ICP or physician
   b. Verify that a respiratory specimen was collected, and if it was collected prior to the initiation of antibiotics or after (see ~~lab follow-up~~ below)
   c. Obtain the medical record for the legionellosis hospitalization
   d. Verify the illness onset date
   e. Collect any additional information about the clinical course of illness
   f. Recommend additional testing, as needed ~~(e.g., if serology is done, a convalescent serum must be drawn 2-4 weeks after the initial acute draw)~~
4. Verify whether the case was previously hospitalized at the diagnosing facility during the 2 weeks prior to onset

4. Using the enhanced Legionellosis Questionnaire, conduct an interview as quickly as possible with ~~case~~ or proxy and upload to the MDSS record when completed. ~~Questionnaires should be completed within one week.~~

5. Confirm via medical record reviews or contact with ICPs whether the individual had any inpatient or outpatient hospital exposures at any other hospital (McLaren, Hurley, or Genesys) during the 2 weeks prior to onset.

~~Laboratory~~ Follow-up (see current clinical guidelines for additional details)

1. Within 24 h of case notification, call the ICP at the diagnosing hospital to verify that a respiratory specimen was collected for culture.
2. Respiratory specimens should be collected in conjunction with a ~~urine~~ antigen test, before the initiation of antibiotics, if possible. Even if antibiotics have been started, a respiratory specimen should still be collected.
    a. If a specimen has not been collected, verify that an order has been placed for a respiratory specimen collection by the physician. Request that the ICP follow-up with the physician about collecting the specimen as soon as possible.
    b. If no respiratory specimen collection has been ordered, work with the hospital ICP to request it be ordered and collected as soon as possible.
    c. If a specimen was collected, determine whether the hospital lab will be conducting the culture in-house or whether the clinical specimen should be sent directly to BOL.
    d. For cases with a positive urine antigen where the culture is not being done at the hospital, have the respiratory specimen sent immediately at refrigeration temperature overnight (or via courier) to the MDHHS BOL.
3. If the *Legionella* culture is positive, verify that the hospital will send the isolate on a slant on cold packs to BOL immediately overnight (or via courier) for PFGE testing.
    a. If the Legionella culture is negative but the patient has a positive urine antigen, have the hospital immediately send the remaining respiratory specimen overnight (or via courier) at whatever temperature it has been maintained at (i.e., refrigerated or frozen) to the MDHHS BOL for repeat culture.
    b. If the individual has a negative urine antigen and the hospital is not performing cultures, or the individual has a negative urine antigen and negative culture, but there is still clinical suspicion of legionellosis review the clinical information and any available labs (e.g., influenza or RSV testing, etc.) with the physician. Determine whether it is appropriate to send the specimen to BOL for additional testing.
4. Monitor specimen/isolate results from BOL.
5. Determine whether additional testing of negative cultures at CDC is appropriate.
6. Based on clinical laboratory results and information collected from interview/medical record, evaluate with investigation team if environmental sampling is appropriate.
7. Continued review/analysis of data including medical records, questionnaires, and laboratory results from clinical and environmental testing (if collected).

2. maintain case line list ~~of demographics~~, consistent w/ 2014-2015 line list and including enhanced questionnaire information / exposure data

Please provide a copy of your plan to address all of the specifics of case referral surveillance at the GCHD.

There are expectations for any public health organization that conducts surveillance and investigation around legionellosis. These expectations include a variety of activities ranging from the active engagement of community partners to the timely, thorough and accurate evaluation of individually reported cases.

It is the expectation of this department, that by accepting these responsibilities, the Genesee County Health Department will adequately address all of the items identified below. Recognizing the resource demands of this effort, the MDHHS continues to offer support of any aspects of the surveillance process that the GCHD cannot effectively address.

As we enter the warmer spring and summer months that are more conducive to legionella transmission, there are two primary areas of community outreach that should serve as the backdrop in support of surveillance activities. First, with the finalization of the CDC/MDHHS/GCHD Toolkit that focuses on the development of a water management program to prevent Legionella in "high risk" buildings, a valuable resource is now available to help direct water management in facilities throughout Genesee County. In addition to this document, the partnership has produced a preliminary list of facilities that are likely to be identified as being at elevated risk of legionella transmission. It is the expectation that the GCHD can deliver in the next week, a plan for the effective distribution and support of the toolkit at these facilities.

Second, it is a longstanding and effective public health practice to reach out to the healthcare community in response to increases in reported legionellosis. While the MDHHS has provided two HAN updates to Genesee's healthcare community in recent months, active communications are still warranted. These communications are best focused on the need for continued vigilance for incident cases of disease, heightened index of suspicion toward the diagnosis of cases, appropriate testing and simultaneous specimen collection. Consistent reinforcement of these messages is an important part in the process of identifying incident disease in any community. The GCHD must produce a plan that enumerates the steps, actions, materials and timeline for local public health engagement of the healthcare community.

Finally, every legionellosis referral to the MDSS warrants a timely, appropriate, complete and consistent public health evaluation. This evaluation includes communication with the diagnosing clinician, support for specimen collection/transport, review of clinical records, completion of patient/proxy interviews and updating of electronic disease surveillance records.

Once a suspect or confirmed Legionellosis case is identified:

1. Enter the case into MDSS within 24 h of notification if not already entered by provider or lab
2. Email the Regional Epidemiologist with the MDSS number
3. a. Contact the diagnosing hospital ICP or physician to:
   a. b. Verify that a respiratory specimen was collected, and if it was collected prior to the initiation of antibiotics or after (see lab follow-up below)
   b. c. Obtain the medical record for the legionellosis hospitalization
   c. d. Verify the illness onset date
   d. e. Collect any additional information about the clinical course of illness
   e. f. Recommend additional testing, as needed (e.g., if serology is done, a convalescent serum must be drawn 2-4 weeks after the initial acute draw)
4. Verify whether the case was previously hospitalized at the diagnosing facility during the 2 weeks prior to onset

(within one week)

4. Using the enhanced Legionellosis Questionnaire, conduct an interview as quickly as possible with ~~Case~~ patient or proxy and upload to the MDSS record when completed. ~~Questionnaires should be completed within one week.~~
5. Confirm via medical record reviews or contact with ICPs whether the individual had any inpatient or outpatient hospital exposures at any other hospital (McLaren, Hurley, or Genesys) during the 2 weeks prior to onset.

Specimen
~~Laboratory~~ Follow-up (see current clinical guidelines for additional details)

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4. Monitor specimen/isolate results from BOL. Consultation
5. Determine whether additional testing of negative cultures at CDC is appropriate.
6. Based on clinical laboratory results and information collected from interview/medical record, evaluate with investigation team if environmental sampling is appropriate.
7. Continued review/analysis of data including medical records, questionnaires, and laboratory results from clinical and environmental testing (if collected).

Chart

Summary completion of investigation follow-up.

Maintain line list consistent w/ demographic & questionnaire data (exposure/history data from questionnaire).

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There are expectations for any public health organization that conducts surveillance and investigation around legionellosis. These expectations include a variety of activities ranging from the active engagement of community partners to the timely, thorough and accurate evaluation of individually reported cases.

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   c. Obtain the medical record for the legionellosis hospitalization
   d. Verify the illness onset date
   e. Collect any additional information about the clinical course of illness
   f. Recommend additional testing, as needed (e.g., if serology is done, a convalescent serum must be drawn 2-4 weeks after the initial acute draw)
4. Verify whether the case was previously hospitalized at the diagnosing facility during the 1-2 weeks prior to onset

4. Using the enhanced Legionellosis Questionnaire, conduct an interview as quickly as possible with case or proxy and upload to the MDSS record when completed. ~~Questionnaires should be completed~~ within one week.
5. Confirm via medical record reviews or contact with ICPs whether the individual had any inpatient or outpatient hospital exposures at any other hospital (McLaren, Hurley, or Genesys) during the 2 weeks prior to onset.

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Laboratory Follow-up (see current clinical guidelines for additional details)

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7. Continued review/analysis of data including medical records, questionnaires, and laboratory results from clinical and environmental testing (if collected).

Maintain case Onelist including exp. hx data

6. avail investigation follow-up. Follow-up to complete
- determine pt. outcome

Please provide a copy of your plan to address all of the specifics of case referral surveillance at the GCHD.

Enhanced Surveillance and Monitoring for *Legionella* in Flint, Michigan

Wayne State University Flint Investigation Team

1. **Active enhanced surveillance for suspected case identification**
    a. Case reporting from health care providers
        i. Active reporting will be utilized
        ii. Requires phone, email, internet or direct reporting
        iii. Direct reporting from health care providers will require engagement of health care institutions
            1. Will identify point person for case form completion and reporting
            2. Line listing of identified suspected cases with completion of one-page active surveillance form (modeled on standard CDC investigation form)

    b. Case reporting from healthcare institutions
        i. Emergency Departments (Appendix 1)
        ii. Outpatient clinics
        iii. Hospitalists/Inpatient Departments

    c. Other case reporting sources
        i. Federally qualified health centers
        ii. Public health clinics (of Flint)
        iii. Community organizations

2. **Clinical case confirmation and case review with data collection**
    a. Clinical signs and symptoms review, data collection
        i. Standard data will be abstracted from electronic or paper health records
        ii. Data will be de-identified for study analytic purposes

    b. Physical exam and exam data collection
        i. Standard data collection for physical characteristics; including systems relevant for *Legionella* disease (e.g., cardiopulmonary, others)

    c. Radiologic examination review and data collection
        i. Chest x-ray (CXR) interpretation and recording of CXR reading

ii. Include other studies as performed for patient

d. Laboratory tests and test data collection
   i. Routine lab test results will be collected from electronic and paper health records (e.g., liver function, kidney function, hematologic tests)
   ii. Non-routine tests will also be recorded (e.g., Erythrocyte sedimentation rate, C-reactive protein, and the like)

e. *Legionella* specific and other microbiological testing (culture, antigen detection) and data collection
   i. *Legionella* urinary antigen testing and data collection
   ii. *Legionella* culture testing and data collection
   iii. Other pathogen testing for individual patients and data collection

f. Molecular analysis (*Legionella* genotyping, virulence factor analysis) and lab data collection
   i. PCR testing for *Legionella* using standardized assay (commercially available primers) and data collection
   ii. Laboratory testing and analysis to characterize *Legionella* virulence factors and data collection

3. **Epidemiologic investigation with data collection**
   a. Interview of suspected case participants and their families
      i. Make interview contact (direct or via community support)
      ii. Schedule interview appointment
      iii. Household or hospital visit for interview
      iv. Conduct interview using standardized, tested instrument

   b. Systematic identification and interview of control participants
      i. Age-matched
      ii. Neighborhood-matched

   c. Exposure identification among cases and controls
      i. Personal and SES characteristics (i.e., age, gender, education, and the like)
      ii. Health histories (i.e., past medical histories, current list of health problems)

iii. Household and work environment exposures (i.e., smoke, cooking, shower, whirlpools, etc...)
iv. Other environmental exposures (e.g., pool, spa, whirlpool, garden hose water)

d. Data management, collation and cleaning of electronic case data
    i. Clinical data/variables (including electronic data from health care institutions)
    ii. Laboratory data (including electronic clinical lab values, micro lab data, reference lab results from molecular *Legionella* testing)
    iii. Epidemiologic/personal and household member interview data
    iv. Cleaning and merger of datasets
    v. Preliminary analysis to run descriptive data tables and figures

4. Analysis, interpretation and review of data

a. Interim analysis of risk factors
    i. 2-way contingency table analysis

b. Additional data cleaning, descriptive and multivariate risk factor analysis
    i. Unadjusted and adjusted multivariate analysis
    ii. Logistic regression analysis

c. Geographic analysis
    i. Descriptive distribution of Legionella case information
    ii. Mapping of case and control participants
    iii. Time and geographic analysis for patterns of *Legionella*

Timeline

Calendar Month	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB
Project Month	1	2	3	4	5	6	7	8	9	10	11	12
	March 2016 through February 2017											
Activity												
Written investigation protocol	XX											
WSU IRB Approval and Flint local Institutional approvals	XX											
Draft enhanced surveillance SOPs	XX	XX										
Final surveillance SOP, case report form and other forms		XX										
Confirmation of health care institution contact list	XX	XX										
Surveillance workshop and refresher training		XX		XX		XX		XX		XX		
Distribution of lab specimen collection SOP and supplies		XX	XX									
Case detection, reporting, case data form completion, data cleaning			XX	XX	XX	XX	XX	XX	XX	XX		
Environmental/water household & other relevant workplace exposure sampling			XX	XX	XX	XX	XX	XX	XX	XX		
Case household interviews and investigation, human and environmental specimen collection			XX	XX	XX	XX	XX	XX	XX	XX		
Control participants interview, household interview and data collection			XX	XX	XX	XX	XX	XX	XX	XX		
Interim clinical-epi and lab data analysis			XX	XX	XX	XX	XX	XX	XX	XX		
Merger of clin-epi-environmental databases									XX	XX		
Final data analysis and reporting										XX	XX	XX

Appendix 1. Health care institutions

a. Provision listing of health care institutions
   iv. McLaren Flint-Flushing Women's Health
   v. McLaren Flint-Flushing Community Medical Center
   vi. Hurley Medical Center
   vii. McLaren Community Medical Center
   viii. McLaren specialty services
   ix. Select specialty hospital
   x. AMD Urgent Care
   xi. Flushing Rd Urgent Care
   xii. Hurley Womens Health Services
   xiii. Genesys Hurley Cancer Institute
   xiv. DaVita Bailenger Pointe Dialysis
   xv. Genesys Inetegrated Group Practice
   xvi. Hurley Bariatric Center
   xvii. Genesys Family Health Center
   xviii. Planned Parenthood Burton Health Center
   xix. Burton Urgent Care
   xx. McLaren Flint-Burton Occupational and Convenient Care Center
   xxi. Grand Blanc Urgent Care
   xxii. Genesys PHO

Legionellosis Outbreak-Genesee County

May, 2015 – October, 2015

Full Analysis

Michigan Department of Health and Human Services
Genesee County Health Department

Legionellosis Outbreak — Genesee County, May 2015 – October 2015

Contents

Legionellosis Outbreak — Genesee County, May 2015 – October 2015 2

Summary 3

Working Case Definitions 4

Data Sources 4

Epidemiology 4

Epi Curves 5

Five-year History 5

Outbreak 1: June 2014–March 2015 (Previous Cases) 6

Outbreak 2: May 2015-October 2015 (Cases Analyzed in Current Report) 6

Cases by Residence Water Source 7

Healthcare Exposure 7

Healthcare Exposure by Residence Water Source 7

Healthcare Exposures by Hospitals Location and Residence Water Source 7

Healthcare-associated Legionellosis Cases by Hospital Location 8

Prior Inpatient Hospitalization Cases by Length of Stay and Residence Water Source 9

Epi Curve by Hospital A Exposure 9

Legionellosis Questionnaire Results 10

Interview Status by Healthcare Exposure 10

Interview Status by Residence Water Supply 10

Water Changes at Residence 11

Work and Travel 12

Community Exposures 13

Water Exposures in the Home 15

Water Exposures Outside of the Home 15

Comorbidities by Healthcare Exposure and Residence Water Supply 16

Health Behaviors by Healthcare Exposure and Residence Water Supply 16

Epi Summary of Cases with No Known Healthcare Exposure 17

Cases with No Known Healthcare Exposure and Residence not on City of Flint Water Supply 18

Case Flow-chart 18

Epi Curve 18

Laboratory Testing 19

Summary

From May 2015 to October 2015, 43 legionellosis cases, all confirmed Legionnaires' disease (LD), were reported as part of an outbreak in Genesee County, Michigan. Forty-two of these cases were among residents of Genesee County. One additional case-patient from outside of Genesee County was hospitalized in Genesee during the 2 weeks prior to their onset. Five individuals have died. The Michigan Department of Health and Human Services (MDHHS) assisted the Genesee County Health Department (GCHD) during their investigation.

Data were collected from patient medical record review, the Michigan Disease Surveillance System case report form, and interviews with case-patients or their proxies using an enhanced legionellosis questionnaire. In an attempt to identify community sources, case-patients or proxies were interviewed about travel, work, and locations visited during the 2 weeks prior to symptom onset (considered the incubation period for LD during an outbreak investigation).

Median patient age was 68 years (range: 35–89); 23 (53%) were male. Illness onset dates ranged from May 2, 2015 to October 29, 2015 and peaked in July with 12 cases. Case-patients were interviewed by GCHD using an enhanced questionnaire; interviews were conducted for 40 of 43 (93%) case-patients.

Healthcare-associated LD was suspected for a subset of cases. Over half of the case-patients (24/43) had an exposure to at least one Genesee County hospital facility in the 2 weeks prior to their illness onset. In addition, all 24 case-patients had at least one exposure (inpatient, outpatient, or visitor) to the same hospital facility within the 2 weeks prior to onset.

The source of water at the residence where the case-patient lived during the 2 weeks prior to onset was evaluated. Ten of 43 (23%) cases occurred in individuals whose residence was serviced by the City of Flint municipal water system. Seven of those 10 individuals also had an exposure to the same Genesee County hospital during their incubation period. Among the 33 individuals whose residence is not serviced by the City of Flint municipal water system, 17 had an exposure to a Genesee County hospital during the 2 weeks prior to onset. In total, 16 out of 43 case-patients did not reside on the City of Flint water system and had no known healthcare exposure.

Questionnaire interview data were evaluated for other potential common community exposures. No other common community locations, beyond the healthcare facility, were reported by more than 4 individuals. Three different grocery stores and one home improvement store were each reported to have been visited by 4 individuals in the 2 weeks prior to their onset. These 3 grocery stores and the home improvement store are not located on the City of Flint water system.

All 43 cases were laboratory confirmed by *Legionella* urinary antigen test. Twelve sputum specimens were submitted to the MDHHS Bureau of laboratories (BoL) for *Legionella* culture and pulsed-field gel electrophoresis (PFGE) testing. Four samples were unsuitable for PFGE typing (3 were culture negative and one was received contaminated). The remaining 8 specimens were culture-positive and all 8 isolates were PFGE typed; 2 isolates had matching PFGE patterns, while 6 were unique (non-matching patterns). Seven of the 8 isolates were from individuals who did not reside on the City of Flint municipal water system. The remaining isolate was from a case-patient with a residence serviced by the City of Flint water system and was 1 of the 2 isolates obtained from case-patients with a hospital exposure during the 2 weeks prior to illness onset.

No environmental samples were forwarded to the MDHHS laboratory for testing during this investigation. CDC protocol does not recommend environmental specimen collection from case-patient residences. In addition, no common community exposures were identified from case-patient interviews for environmental evaluation and/or testing. In October, 2015, MDHHS was provided with a summary of the environmental testing conducted at the Genesee County hospital where 24/43 case-patients had a healthcare exposure. The report indicated that environmental samples collected at that facility in August of 2015 tested positive for *Legionella*. No environmental samples collected from the hospital were submitted to the MDHHS lab for further testing.

Enhanced surveillance will continue in 2016. From 2009–2013, an average of 9 confirmed legionellosis cases per year (range 5–13 cases per year) were reported in Genesee County. No new cases of legionellosis were confirmed in Genesee County between November, 2014 and February, 2015. However, MDHHS recommends continued vigilant legionellosis awareness and surveillance, including interviewing of case-patients or proxies with the enhanced legionellosis questionnaire within one week of reporting. MDHHS also recommends the assistance of the clinical community in LD surveillance through identification, testing, and reporting of all suspect cases. **Prompt collection of clinical respiratory specimens in addition to and at the same time as urinary antigen testing is of critical importance** in these increased surveillance efforts. Because *Legionella* bacteria are commonly found in the environment, clinical isolates are necessary to interpret the findings of an environmental investigation in an outbreak. MDHHS has distributed updated legionellosis guidance to health care providers via the Michigan Health Alert Network.

Working Case Definitions

Confirmed Legionnaires' Disease (LD) – meets the CDC clinical and laboratory case definition for confirmed LD and illness occurred since May 1, 2015 in residents of Genesee County or those who had visited the Flint area in 2 weeks prior to their LD illness onset date.

Data Sources

1. Legionellosis Case Report Form in Michigan Disease Surveillance System (MDSS)
2. Medical record review from:
    a. Hospital A; Flint, MI
    b. Hospital B; Flint, MI
    c. Hospital C; Grand Blanc, MI
3. Case-patient/proxy interview using Genesee County specific Legionellosis Questionnaire
4. City of Flint water distribution map

Epidemiology

Number of lab-confirmed cases of Legionnaires' disease: 43

Geographic distribution: 42/43 Genesee County (15/42 City of Flint residence), 1 non-Genesee County resident

Case-patients with residence on the City of Flint water system: 10/43 (23.3%)

Age: Range: 35-89 years
Average age: 67.4 years
Median age: 68 years

Sex: Males, 23/43 (53.5%)

Range of illness onset dates (N=43): 5/2/2015–10/29/2015

Death associated with legionellosis was defined as one that occurred during hospitalization, within 30 days of hospital discharge, or where Legionellosis was listed as a cause of death on the death certificate. (Ref. Mykietiuk A et al. Clin Infect Dis. 2005 Mar 15;40(6): 794-9.)

Deaths: 5/43 (11.6%)

4/5 (80%) individuals had an inpatient Genesee County hospital exposure in the 2 weeks prior to illness onset

0/5 (0%) individuals lived at a residence on the City of Flint water system in the 2 weeks prior to illness onset

Case-patients interviewed: 40/43 (93.0%); 38 completed plus 2 partial interviews

Case-patients hospitalized for legionellosis illness: 43/43 (100%)

Case-patients with an inpatient (overnight) Genesee County hospital exposure in the 2 weeks prior to illness onset: 23/43 (53.5%)

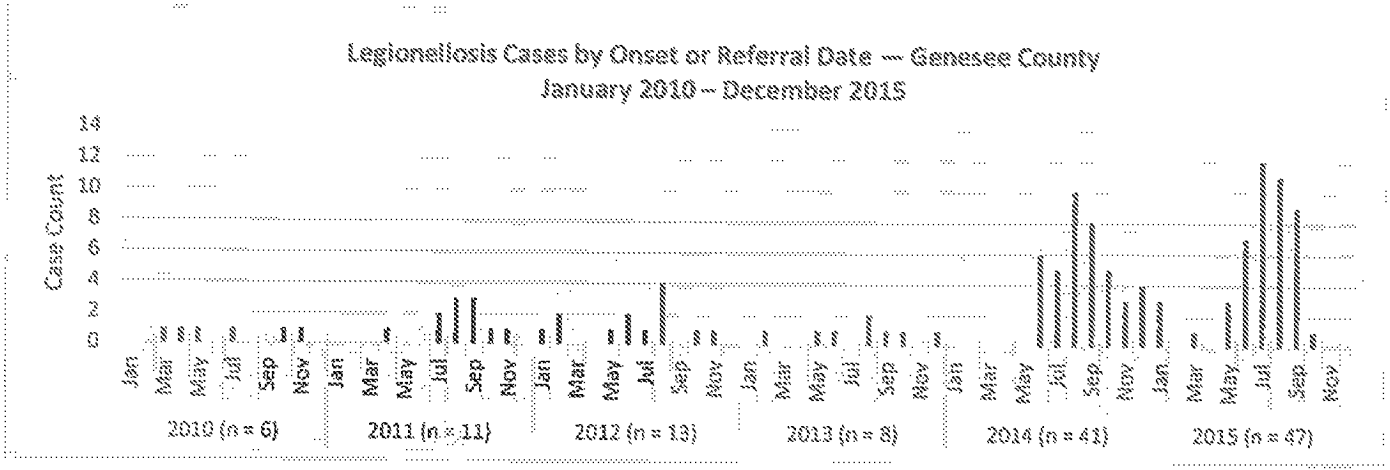
Case-patients with any healthcare exposure (inpatient, outpatient, or visitor) to a Genesee County hospital in the 2 weeks prior to illness onset: 24/43 (55.8%)

Case-patients with ≥1 comorbidity: 35/43 (81.4%)

Case-patients who are current or former smokers: 30/42 (71.4%)

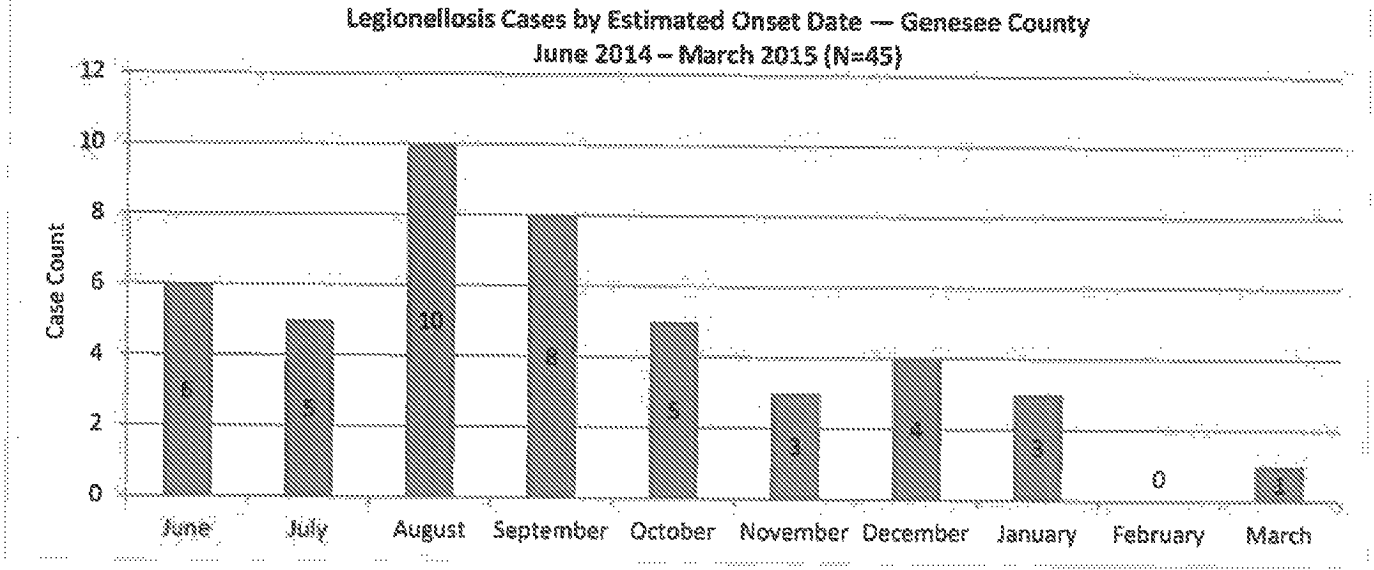
Epi Curves

Five-year History



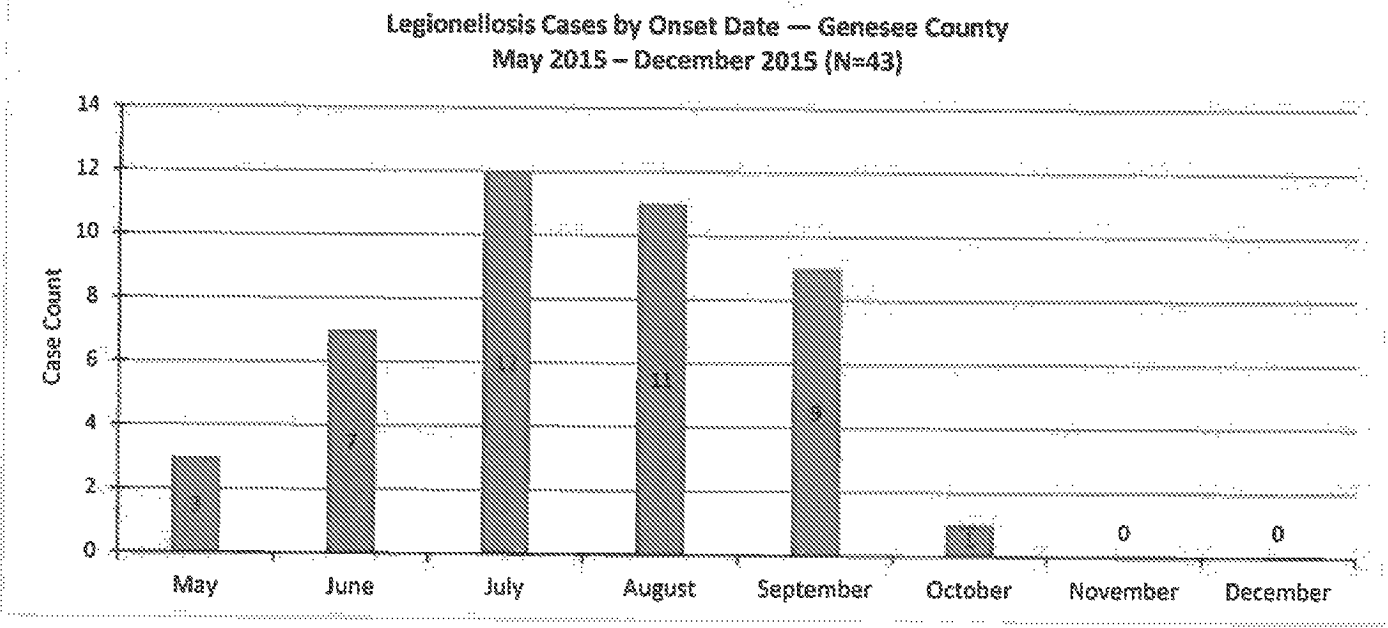
Note: If onset date was not available, referral date was used (i.e., date that the case was referred to public health). The graph includes two cases (one in 2014, one in 2015) in non-Genesee County residents who were hospitalized in Genesee County during the 2 weeks prior to illness onset.

Outbreak 1: June 2014–March 2015 (Previous Cases)



Outbreak 2: May 2015-October 2015 (Cases Analyzed in Current Report)

This report summarizes data collected from 43 confirmed legionellosis cases that were reported May, 2015 through October, 2015. The final case included in the analysis had an illness onset at the end of October, but was reported to public health the beginning of November.



Cases by Residence Water Source

Residence water source refers to the source of tap water at the case-patient's home residence during the 2 weeks before symptom onset and was determined by case-patient interview and verified by the City of Flint map. Of the 43 cases, one case-patient had exposure to both a private well and other municipal source during the 2 weeks prior to onset, accounting for the increase in the total (N=44) in the table below.

Water Source at Residence	Total N=44	
	N	%
City of Flint water	10	22.7
Other municipal water system	14	31.8
Private well	17	38.6
Flint Township Water	0	0
Unknown*	3	6.8

*Represents three questionnaires that were not completed. Per the Flint map, these residences are not located on the City of Flint Water system; it is unknown if the residence water sources are private wells or other municipal water systems.

Healthcare Exposure

A person was defined as having a healthcare exposure if they visited a hospital in Genesee County as an inpatient (overnight), outpatient, or visitor during the 2 weeks prior to their legionellosis symptom onset date. Hospitals A, B, and C are located in Genesee County. The City of Flint supplies water to Hospitals A and B.

Healthcare Exposure by Residence Water Source

Residence Water Source	Healthcare exposure n=24		No known healthcare exposure n=19		Total N=43	
	n	%	n	%	n	%
City of Flint water	7	29.2	3	15.8	10	23.2
Other water at residence	17	70.8	16	84.2	33	76.7

Healthcare Exposures by Hospitals Location and Residence Water Source

Healthcare exposure in 2 weeks prior to legionellosis symptom onset	Residence on City of Flint water	Residence NOT on City of Flint water	Total N=43
Hospitalized at Hospital A	5	15	20
Hospitalized at Hospital A and Hospital C	1	0	1
Hospitalized at Hospital A and Hospital Y*	1	0	1
Hospitalized at Hospital A and Hospital Z*	0	1	1
Visited Hospital A and Hospital B	0	1	1
No known Genesee hospital healthcare exposure	3	16	19
Total	10	33	43

*Hospitals Y and Z are located outside of Genesee County.

Healthcare exposure to a Genesee County hospital during the 2 weeks prior to onset:

7/10 (70%) case-patients with City of Flint water at their residence had a healthcare exposure to a Genesee County hospital during the 2 weeks prior to onset

- 5/7 (71.4%) had a hospitalization at Hospital A
- 1/7 (14.3%) had a hospitalization at Hospital A and Hospital C
- 1/7 (14.3%) had a hospitalization at Hospital A and Hospital Y (non-Genesee County)

17/33 (51.5%) case-patients NOT on City of Flint water at their residence had a healthcare exposure to a Genesee County hospital during the 2 weeks prior to onset

- 15/17 (88.2%) had a hospitalization at Hospital A
- 1/17 (5.9%) had a hospitalization at Hospital A and Hospital Z (non-Genesee County) during the entire 2 weeks prior to onset
- 1/17 (5.9%) visited both Hospital A and Hospital B

23/43 (53.5%) case-patients were hospitalized (overnight) at Hospital A during the 2 weeks prior to onset
24/43 (55.8%) case-patients had an exposure (inpatient, outpatient, visitor) to Hospital A during the 2 weeks prior to onset

19/43 (44.2%) case-patients had no known hospital exposure during the 2 weeks prior to onset
16/43 (37.2%) case-patients had no known hospital exposure and did not have City of Flint water at their residence

Healthcare-associated Legionellosis Cases by Hospital Location

Consistent with the working case definition used for this outbreak, a case was defined as definitely healthcare-associated if the case-patient was hospitalized continuously for at least the 14 days prior to legionellosis symptom onset. A case was defined as possibly healthcare-associated if they had exposure to a hospital for a portion of the 2-14 days prior to legionellosis symptom onset. (Ref. Demirjian A et al. *Clin Infect Dis*. 2015 June 1;60(11): 1596-1602.)

Healthcare exposure in 2 weeks prior to legionellosis symptom onset	Definitely healthcare-associated	Possibly healthcare-associated	Not healthcare-associated
Hospitalized at Hospital A	0	20	0
Hospitalized at Hospital A and Hospital C	0	1	0
Hospitalized at Hospital A and Hospital Y*	0	1	0
Hospitalized at Hospital A and Hospital Z*	1	0	0
Visited Hospital A and Hospital B	0	1	0
No known Genesee hospital healthcare exposure	0	0	19
Total	1	23	19

*Hospitals Y and Z are located outside of Genesee County.

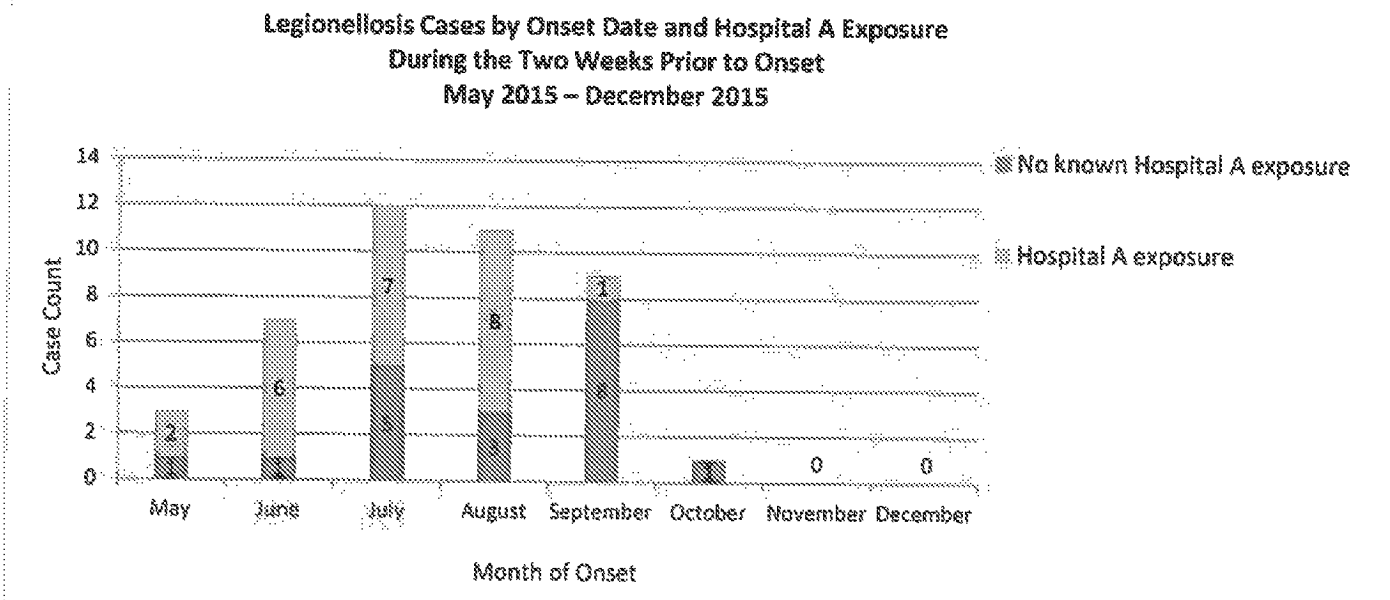
Prior Inpatient Hospitalization Cases by Length of Stay and Residence Water Source

Prior inpatient hospitalization was defined as a person who was an inpatient (overnight) at a hospital in Genesee County within the 2 weeks prior to legionellosis symptom onset. Length of stay was defined as the number of nights hospitalized at a hospital in Genesee County during the 2 weeks prior to legionellosis symptom onset.

Location	Length of Stay		
	N	Median (days)	Range
Hospital A*	22	5	1–11
Individuals with City of Flint water at residence	6	8.5	1–9
Individuals with other water at residence	16	4.5	1–11
Hospital A and Hospital C Individual's residence on City of Flint water	1		
Hospital A		1	
Hospital C		6	
Total	23	5	1–11

*Two people hospitalized at Hospital A also had additional inpatient stays at hospitals outside of Genesee County during the 2 weeks prior to onset; one case-patient for 5 days (Hospital Y) and another for 10 days (Hospital Z).

Epi Curve by Hospital A Exposure



Legionellosis Questionnaire Results

Data were obtained from case-patient or proxy interviews using the enhanced legionellosis questionnaire. Column percentages are displayed. The denominators are based on the number of case-patients interviewed.

Interview Status by Healthcare Exposure

A person was defined as having a healthcare exposure if they visited a hospital in Genesee County as an inpatient, outpatient, or visitor during the 2 weeks prior to their legionellosis symptom onset date.

Interview status	Healthcare Exposure n=24		No Known Healthcare Exposure n=19		Total N=43	
	n	%	n	%	N	%
Complete interview	21	87.5	17	89.5	38	88.4
Partial interview	1	4.2	1	5.3	2	4.7
Refused	0	0.0	0	0.0	0	0.0
Unable to contact	2	8.3	1	5.3	3	7.0

Interview Status by Residence Water Supply

Interview status	Flint water at residence n=10		Other water at residence n=33		Total N=43	
	n	%	n	%	N	%
Complete interview	9	90.0	29	87.9	38	88.4
Partial interview	0	0.0	2	6.1	2	4.7
Refused	0	0.0	0	0.0	0	0.0
Unable to contact	1	10.0	2	6.1	3	7.0

Water Changes at Residence

Question Prompts:

Q4. During the last year, has the water pressure at your residence changed?

Q5. During the last year, has the water quality (appearance, taste, smell) at your residence changed?

Q6. Prior to your illness, did you make any recent plumbing changes or repairs at your residence?

Q7. Prior to your illness, were there any water main breaks or other water line issues that affected the water at your residence, including boil water advisories?

	City of Flint water at Residence n=9		Other Water Source at Residence n=30		Total N=39*	
	n	%	n	%	N	%
Q4. Noticed changes in water pressure	2	22.2	6	20.0	8	20.5
Healthcare exposure	1		1		2	
No known healthcare exposure	1		5		6	
Q5. Noticed changes in water quality	7	77.8	5	16.7	11	28.2
Healthcare exposure	3		2		4	
No known healthcare exposure	4		3		7	
Q6. Made recent plumbing changes or repairs at residence	0	0.0	1	3.3	1	2.6
Healthcare exposure	0		1		1	
No known healthcare exposure	0		0		0	
Q7. Experienced water main breaks or water line issues that affected residence	1	11.1	2	6.7	3	7.7
Healthcare exposure	0		0		0	
No known healthcare exposure	1		2		3	

* Does not include one person who was interviewed but did not answer these questions.

Work and Travel

Question Prompts:

Q8. During this 2 week period (exposure period), did you work or volunteer, either full or part time?

Q10. Visit, reside, or work in a long term care facility, nursing home, assisted living facility, or senior living facility?

Q11. In the 2 weeks before you before you got sick, did you spend any nights away from home (excluding healthcare settings)?

Work and Travel, n (%)	City of Flint Water At Residence n=7	Other Water Source At Residence n=28	Total N=35*
Q8. Work/volunteer outside of home (all different locations outside of Flint)	0 (0.0)	7 (25.0)	**7 (20.0)**
Q10. Reside or visit an assisted living facility or rehab facility (all different facilities outside of Flint)	0 (0.0)	4 (14.3)	**4 (11.4)**
Q11. Spend nights away from home (all different locations outside of Flint)	0 (0.0)	5 (17.9)	**5 (14.3)**

* Does not include data from 5 interviewees. 4 individuals were interviewed based on an incorrect exposure time period and one person did not answer these questions.

Community Exposures

Question prompt:

Q12. In the 2 weeks before you got sick, did you visit any of the following community venues?

Community Venue, n (%)	Healthcare Exposure		No Known Healthcare Exposure		Total N=35*
	City of Flint Water At Residence n=5	Other Water At Residence n=15	City of Flint Water At Residence n=2	Other Water At Residence n=13	
Hotel without staying overnight (unknown location)	0 (0.0)	0 (0.0)	0 (0.0)	1 (7.7)	**1 (2.9)**
Auditorium (outside of Flint)	0 (0.0)	0 (0.0)	0 (0.0)	1 (7.7)	**1 (2.9)**
Barbershop or hair salon (all different locations)	0 (0.0)	5 (33.3)	1 (50.0)	2 (15.4)	**8 (22.9)**
On City of Flint water supply	0	0	1	0	**1**
Not on City of Flint water supply	0	2	0	2	**4**
Unknown location	0	3	0	0	**3**
Car wash (all different locations)	0 (0.0)	1 (6.7)	0 (0.0)	1 (7.7)	**2 (5.7)**
On City of Flint water supply	0	1	0	0	**1**
Not on City of Flint water supply	0	0	0	1	**1**
Casino	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	**0 (0.0)**
Doctor's office or clinic (all different locations)**	1 (20.0)	5 (33.3)	1 (50.0)	8 (61.5)	**15 (42.9)**
On City of Flint water supply	0	1	0	1	**2**
Not on City of Flint water supply	0	3	1	9	**13**
Unknown location	1	1	0	0	**2**
Place of worship (all different locations)	1 (20.0)	3 (20.0)	0 (0.0)	6 (46.2)	**10 (28.6)**
On City of Flint water supply	0	0	0	1	**1**
Not on City of Flint water supply	1	3	0	4	**8**
Unknown	0	0	0	1	**1**
Gym or work-out facility (outside of Flint)	0 (0.0)	0 (0.0)	0 (0.0)	1 (7.7)	**1 (2.9)**
Grocery store**	1 (20.0)	8 (53.3)	2 (100.0)	12 (92.3)	**23 (65.7)**
On City of Flint water supply:					
Store A	0	0	0	1	1 ✓
Store B	0	0	1	0	1 ✓
Not on City of Flint water supply:	0	0	1	0	1
Store C	0	0	1	1	3
Store D	0	6	0	1 ✓	7
Store E	0	2	0	9	3 ✓

Not on City of Flint water (continued):					
Store F K Rec Sm	0	0	0	3	3
Store G K GB	0	0	0	2	2
Store H Center	0	0	0	4	4
Store I M Msh	0	1	0	1	2
Store J M Br Run	0	2	0	0	2
Store K M Rau C	0	0	0	1	1
Store L Mc Hill	0	1	0	1	2
Store M M Msh	1	0	0	1	2
Store N W Chi	0	2	0	2	4
Store O W GB	0	1	0	1	2
Store P W Buck	0	0	0	1	1
Store Q V B C	0	3	0	1	4
Store R GB C	0	1	0	0	1
Store S V G F	0	1	0	0	1
Home improvement store; None on City of Flint water supply**	0 (0.0)	4 (26.7)	0 (0.0)	4 (30.8)	8 (22.9)
Store T	0	0	0	1	1
Store U	0	0	0	2	2
Store V	0	0	0	1	1
Store W	0	1	0	0	2
Store X	0	1	0	3	4
Store Y	0	1	0	0	1
Unknown	0	1	0	0	1
Spa or nail salon (unknown location)	0 (0.0)	1 (6.7)	0 (0.0)	0 (0.0)	1 (2.9)
Mall or department store	0 (0.0)	1 (6.7)	0 (0.0)	1 (7.7)	2 (5.7)
Not on City of Flint water supply	0	0	0	1	1
Unknown	0	1	0	0	1
Movie theater (unknown locations)	0 (0.0)	2 (13.3)	0 (0.0)	0 (0.0)	2 (5.7)
Other locations (all different locations: bank, pharmacy, convenience store)	0 (0.0)	1 (6.7)	1 (50.0)	1 (7.7)	3 (8.6)
On City of Flint water supply	0	0	1	0	1
Not on City of Flint Water supply	0	1	0	1	2

* Does not include data from 5 interviewees. 4 individuals were interviewed based on an incorrect exposure time period and one individual did not answer these questions.

** The individual locations do not equal the total because some individuals visited more than one location.

Question prompt:

Q13. In the 2 weeks before you got sick, did you have exposure to any of the following water sources, either *at home* or while *away from home*?

Water Exposures in the Home

Water exposure, n (%)	Healthcare Exposure		No Known Healthcare Exposure		Total N=34*
	City of Flint Water At Residence n=5	Other Water At Residence n=14	City of Flint Water At Residence n=2	Other Water At Residence n=13	
Shower	5 (100.0)	12 (85.7)	2 (100.0)	13 (100.0)	32 (94.1)
Use a detachable shower head or hose	2 (40.0)	6 (42.9)	1 (50.0)	6 (46.2)	15 (44.1)
Hot tub, whirlpool spa, Jacuzzi tub	0 (0.0)	0 (0.0)	0 (0.0)	1 (7.7)	1 (2.9)
Sat NEAR hot tub or whirlpool spa	0 (0.0)	0 (0.0)	0 (0.0)	1 (7.7)	1 (2.9)
Steam room or wet sauna	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Humidifier	1 (20.0)	2 (14.3)	0 (0.0)	3 (23.1)	6 (17.6)
Respiratory therapy machine	0 (0.0)	2 (14.3)	0 (0.0)	1 (7.7)	3 (8.8)
CPAP	0	1	0	1	
Nebulizer	0	1	0	0	

* Does not include data from 6 interviewees. Four individuals were interviewed based on an incorrect exposure time period and two individuals did not answer these questions.

Water Exposures Outside of the Home

Water Exposure, n (%)	Healthcare Exposure		No Known Healthcare Exposure		Total N=34*
	City of Flint Water At Residence n=5	Other Water At Residence n=14	City of Flint Water At Residence n=2	Other Water At Residence n=13	
Showered outside the home	1 (20.0)	1 (7.1)	0 (0.0)	4 (30.8)	6 (17.6)
Use a detachable shower head or hose	1 (20.0)	1 (7.1)	0 (0.0)	2 (15.4)	4 (11.8)
Hot tub, whirlpool spa, Jacuzzi tub	0 (0.0)	0 (0.0)	0 (0.0)	2 (15.4)	2 (5.9)
Sat NEAR hot tub or whirlpool spa	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Humidifier	0 (0.0)	0 (0.0)	0 (0.0)	1 (7.7)	1 (2.9)
Pool/splash pad/waterpark	0 (0.0)	0 (0.0)	0 (0.0)	1 (7.7)	1 (2.9)
Recreational or cooling misters	0 (0.0)	0 (0.0)	0 (0.0)	1 (7.7)	1 (2.9)
Steam room or wet sauna	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Decorative fountain	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Outdoor watering hose or sprinkler	0 (0.0)	1 (7.1)	0 (0.0)	5 (38.5)	6 (17.6)
Beach, lake, pond, river, creek, etc.	0 (0.0)	0 (0.0)	0 (0.0)	1 (7.7)	1 (2.9)

* Does not include data from 6 interviewees. Four individuals were interviewed based on an incorrect exposure time period and two individuals did not answer these questions.

Comorbidities by Healthcare Exposure and Residence Water Supply

n (%)	Healthcare Exposure		No Known Healthcare Exposure		TOTAL N=43*
	City of Flint water at residence N=7	Other water at residence N=17	City of Flint water at residence N=3	Other water at residence N=16	
≥1 comorbidity	7 (100.0)	16 (94.1)	2 (66.7)	10 (62.5)	35 (81.4)
Chronic kidney disease	3(42.9)	5 (29.4)	0 (0.0)	2 (12.5)	10 (23.3)
Immunocompromised	1 (14.3)	7 (41.2)	0 (0.0)	3 (18.8)	11 (25.6)
Diabetes	2 (28.6)	7 (41.2)	2 (66.7)	5 (31.3)	16 (37.2)
Chronic lung disease	2 (28.6)	4 (23.5)	0 (0.0)	3 (18.8)	9 (20.9)
Asthma or chronic bronchitis	2 (28.6)	2 (11.8)	1 (33.3)	1 (6.3)	6 (14.0)
Heart disease or congestive heart failure	5 (71.4)	13 (76.5)	1 (33.3)	7 (43.8)	26 (60.5)
Liver disease	0 (0.0)	0 (0.0)	0 (0.0)	1 (6.3)	1 (2.3)

* Number increased compared to previous tables because of data from medical records and self-reported comorbidities.

Health Behaviors by Healthcare Exposure and Residence Water Supply

Smoking and Drinking Status, n (%)	Healthcare Exposure		No Known Healthcare Exposure		TOTAL N=43*
	City of Flint water at residence N=7	Other water at residence N=17	City of Flint water at residence N=3	Other water at residence N=16	
Current smoker	1 (14.3)	4 (23.5)	2 (66.7)	5 (31.3)	12 (27.9)
Former smoker	4 (57.1)	9 (52.9)	1 (33.3)	4 (25.0)	18 (42.9)
Lives with Smoker	0 (0.0)	0 (0.0)	0 (0.0)	1 (6.3)	1 (2.4)
Never Smoker	1 (14.3)	4 (23.5)	0 (0.0)	6 (37.5)	11 (23.8)
Unknown	1 (14.3)	0 (0.0)	0 (0.0)	0 (0.0)	1 (2.4)
Drinks alcohol	0 (0.0)	5 (29.4)	2 (66.7)	6 (37.5)	13 (30.2)
Does not drink alcohol	3 (42.9)	10 (58.8)	1 (33.3)	7 (43.8)	21 (48.8)
Unknown	4 (57.1)	2 (11.8)	0 (0.0)	3 (18.8)	9 (20.9)

* Number increased compared to previous tables because of data from medical records and self-reported health behaviors.

Epi Summary of Cases with No Known Healthcare Exposure

Number of cases in individuals with no known healthcare exposure to a Genesee County Hospital: 19/43 (44.2%)

Geographic residence distribution: 19 Genesee County (7 Flint, 12 non-Flint)

Residence on City of Flint water system: 3/19 (15.8%)

Age range: 45–89 years

Average age (median): 66.4 years (63 years)

Sex: males, 9/19 (47.4%)

Legionellosis symptom onset dates from May 27, 2015 – October 29, 2015

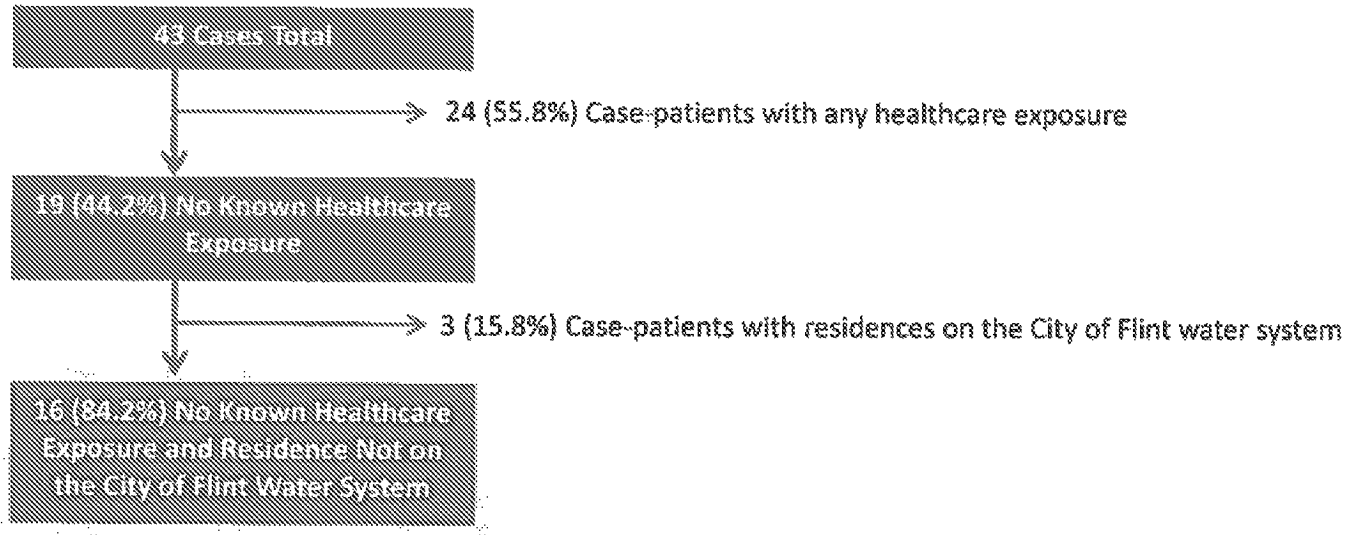
L. pneumophila isolates obtained: 6/19 (31.6%); among the 6 isolates, none had matching PFGE patterns to each other.

During their two week exposure period:

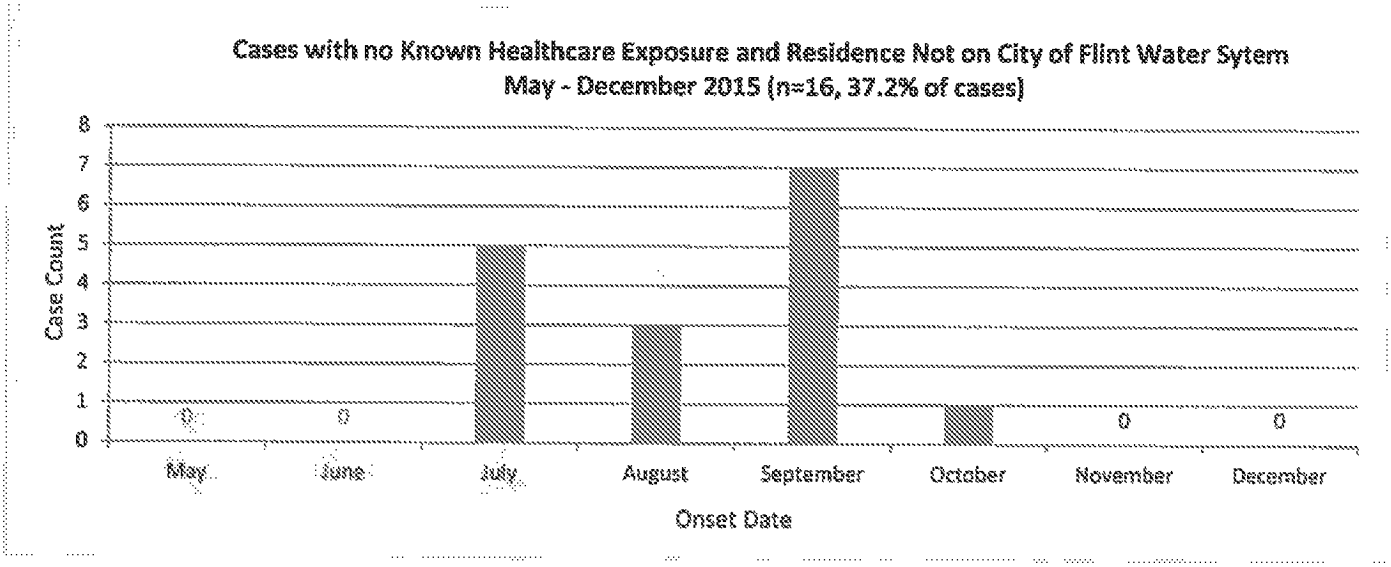
- 5/19 (26.3%) case-patients reported visiting a community location on the City of Flint water system
  - 2/5 (40.0%) individuals also have City of Flint water at their residence
  - All different locations; no location on the City of Flint water system was reported by more than one individual
- 14/19 (73.7%) case-patients visited a grocery store
  - 2 individuals visited two different grocery stores on the City of Flint water system
  - At most, 4 people reported visiting the same grocery store, which is not on the City of Flint water system
- 9/19 (47.4%) case-patients visited a doctor's office or clinic
  - 10 different locations (1 on City of Flint water system; 1 not on City of Flint water; 8 non-Flint locations)
- 6/19 (31.6%) case-patients visited a place of worship
  - 5 different locations (1 on City of Flint water system; 4 non-Flint locations) and 1 unknown location
- 4/19 (21.0%) case-patients visited home improvement stores
  - At most, 3 people reported visiting the same home improvement store, which is not on the City of Flint water system
- 4/19 (21.0%) case-patients had an overnight stay away from home
  - 4 different locations; all non-Flint locations
- 3/19 (15.8%) case-patients visited a barbershop or salon
  - 3 different locations (1 on City of Flint water system; 2 non-Flint locations)

Cases with No Known Healthcare Exposure and Residence not on City of Flint Water Supply

Case Flow-chart



Epi Curve



Laboratory Testing

Out of 43 cases, 12 sputum specimens were received at the MDHHS BoL for additional testing. Three specimens were culture negative; one specimen was received contaminated and unable to be tested. *L. pneumophila* was cultured from 8 of the 12 specimens; all 8 isolates were typed by PFGE. Two of these case-patients had inpatient hospitalizations in the 2 weeks prior to the onset of illness; one of the two hospitalized case-patients also had a residence on the City of Flint water system. While the number of samples available for additional testing increased relative to the previous year (cases from June, 2014–March, 2015), the isolates represent only 19% of the current cases (May–Nov, 2015). The collection of respiratory culture specimens remains a priority for the continued surveillance in 2016.

	Total N = 43	
	n	%
Urinary Antigen Positive	43	100
Sputum Culture Positive		
Yes (*Legionella pneumophila* serogroup 1)	8	18.6
No (Specimen culture negative or specimen received contaminated)	4	9.3
Specimen culture not collected by hospital or not received at MDHHS Lab	31	72.1

Pulsed-field gel electrophoresis (PFGE) Testing Summary

Number of legionellosis cases with PFGE performed: 8

Geographic residence distribution: 8 Genesee County (3 Flint, 5 non-Flint)

Residence on City of Flint water system: 1/8 (12.5%)

Age range: 45-85 years

Average age (median): 60.3 years (56 years)

Sex: Males, 4/8 (50%)

Number of cases interviewed: 7/8 (87.5%); 6 completed plus one partial interview

PFGE results: 6/8 isolates had unique (non-matching) PFGE patterns:

Onset	Healthcare exposure during the 2 weeks prior to onset?	Residence on City of Flint water system?	Enhanced questionnaire interview able to be completed?
July, 2015	No	No	Yes
July, 2015	No	No	Yes
July, 2015	No	No	Yes
August, 2015	No	No	Yes
Sept, 2015	Yes- Hospital A & Hospital C	Yes	Yes
Sept, 2015	No	No	Partial interview

2/8 isolates had matching PFGE patterns:

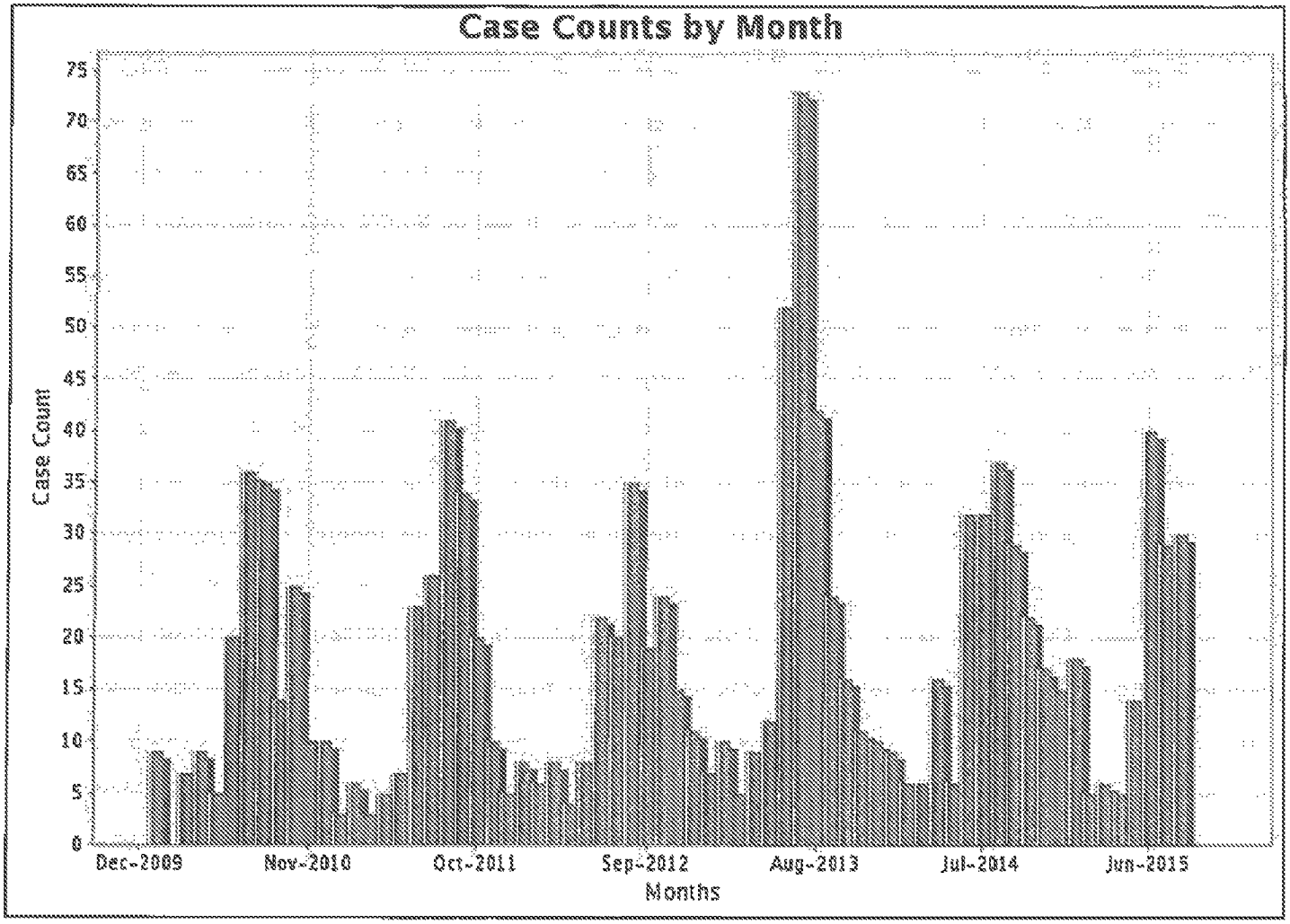
Onset	Healthcare exposure during the 2 weeks prior to onset?	Residence on City of Flint water system?	Enhanced questionnaire interview able to be completed?
May, 2015	Yes- Hospital A	No	Yes
August, 2015	No (Hospital visitor status unknown)	No	No

Report 8: Epi-Curve Graph

Time Period: 01/01/2010 - 09/11/2015
Time Breakdown: by Month
Reportable Condition: Legionellosis
Case Status: Confirmed
Investigation Status: Completed

Geographic Area:
The State of Michigan

Case Types: Individual and Aggregate



Month	Total
JAN 2010	9
MAR 2010	7
APR 2010	9
MAY 2010	9
JUN 2010	20
JUL 2010	36
AUG 2010	35
SEP 2010	14
OCT 2010	25
NOV 2010	10
DEC 2010	10
JAN 2011	3
FEB 2011	6
MAR 2011	3
APR 2011	5
MAY 2011	7
JUN 2011	23
JUL 2011	26
AUG 2011	41
SEP 2011	34

Month	Total
OCT 2011	20
NOV 2011	10
DEC 2011	5
JAN 2012	8
FEB 2012	6
MAR 2012	8
APR 2012	4
MAY 2012	8
JUN 2012	22
JUL 2012	20
AUG 2012	36
SEP 2012	19
OCT 2012	24
NOV 2012	15
DEC 2012	11
JAN 2013	7
FEB 2013	10
MAR 2013	5
APR 2013	9
MAY 2013	12

Month	Total
JUN 2013	52
JUL 2013	73
AUG 2013	42
SEP 2013	24
OCT 2013	16
NOV 2013	11
DEC 2013	10
JAN 2014	9
FEB 2014	6
MAR 2014	6
APR 2014	16
MAY 2014	6
JUN 2014	32
JUL 2014	32
AUG 2014	37
SEP 2014	29
OCT 2014	22
NOV 2014	17
DEC 2014	15
JAN 2015	18

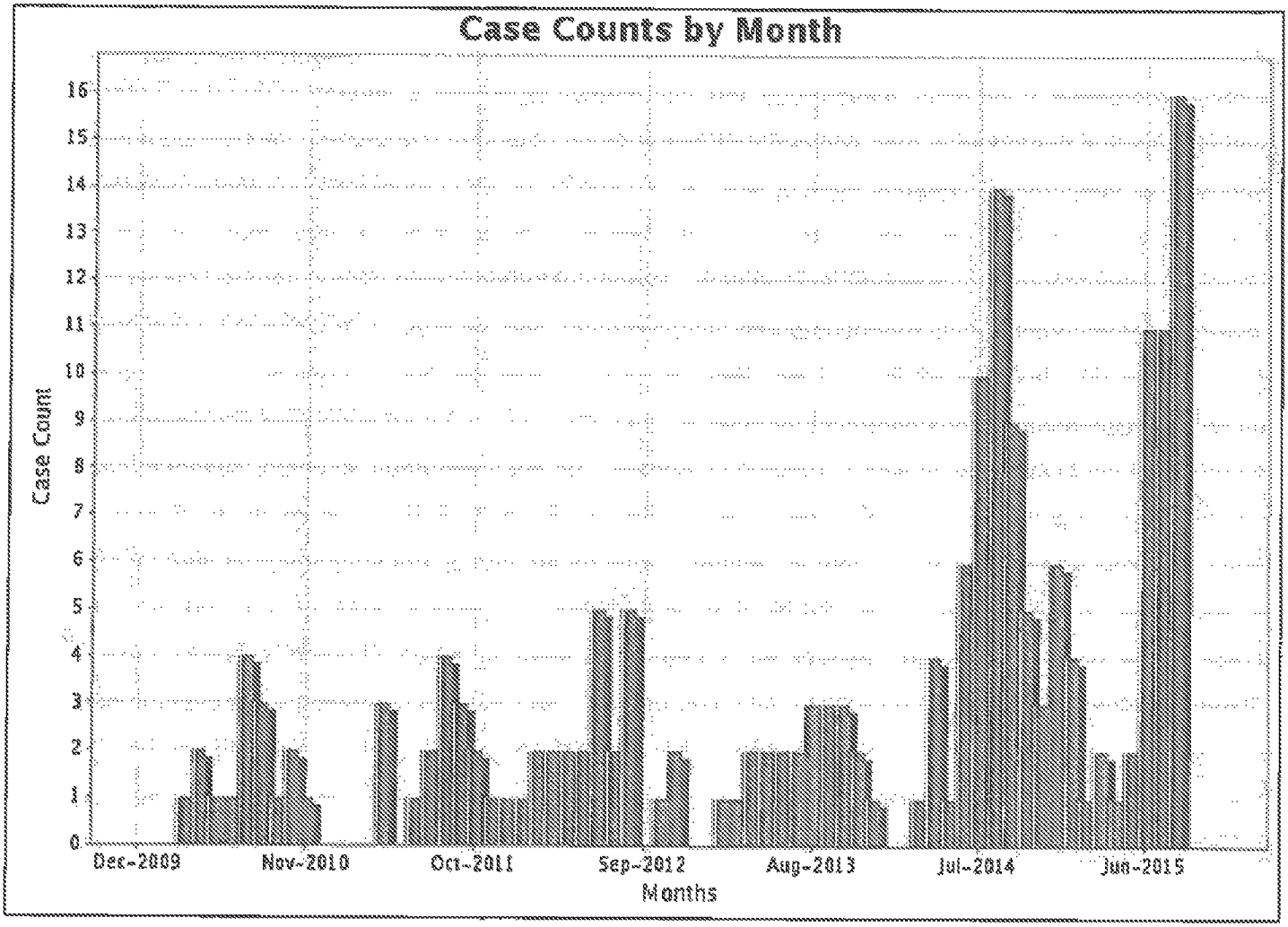
Month	Total
FEB 2015	5
MAR 2015	6
APR 2015	5
MAY 2015	14
JUN 2015	40
JUL 2015	29
AUG 2015	30

Report 8: Epi-Curve Graph

Time Period: 01/01/2010 - 09/11/2015
Time Breakdown: by Month
Reportable Condition: Legionellosis
Case Status: Confirmed
Investigation Status: Completed

Regions:
3

Case Types: Individual and Aggregate



Month	Total
MAR 2010	1
APR 2010	2
MAY 2010	1
JUN 2010	1
JUL 2010	4
AUG 2010	3
SEP 2010	2
OCT 2010	3
NOV 2010	1
APR 2011	3
JUN 2011	1
JUL 2011	2
AUG 2011	4
SEP 2011	3
OCT 2011	2
NOV 2011	1
DEC 2011	1
JAN 2012	1
FEB 2012	2
MAR 2012	2

Month	Total
APR 2012	2
MAY 2012	2
JUN 2012	5
JUL 2012	2
AUG 2012	5
OCT 2012	1
NOV 2012	2
FEB 2013	1
MAR 2013	1
APR 2013	2
MAY 2013	2
JUN 2013	2
JUL 2013	2
AUG 2013	3
SEP 2013	3
OCT 2013	3
NOV 2013	2
DEC 2013	1
MAR 2014	1
APR 2014	4

Month	Total
MAY 2014	1
JUN 2014	6
JUL 2014	10
AUG 2014	14
SEP 2014	9
OCT 2014	5
NOV 2014	3
DEC 2014	6
JAN 2015	4
FEB 2015	1
MAR 2015	2
APR 2015	1
MAY 2015	2
JUN 2015	11
JUL 2015	11
AUG 2015	16

Flint Water System Issues Discussion Agenda

Monday, January 4th

11am

Call In PPI, **code** PPI

1.) Water System Review-Risk Assessment
   a.) Legionella risk assessment
   b.) Other water related illness risk assessment
   c.) Other contaminate risk assessment
2.) ASHRAE 188 Education/Outreach Resources
3.) Lessons Learned from Other Communities
4.) Risk assessment Communication Resources
5.) Review of Legionella Questionnaire-feedback requested
6.) Health Assessment Advisory Team

MDHHS Preliminary Data on Genesee County Legionellosis Investigation (April 29, 2015)
Epi Info Analysis of Questionnaire Data

30 cases of 46 have been interviewed so far (65% interviewed). Of these interviews, 29 are complete and 1 interview was refused half way through (97% completed, 63% of all cases).

3.) Where did you get your tap (drinking and other household use) water from __/__/__ to __/__/__?

Water Source	Number	%
City of Flint Water	13	43
City of Flint Township Water	3	10
Other municipal water system	4	13
Private well	7	23
Unknown	3	10
TOTAL	30	100

4.) During the last year, has the water pressure at your residence changed?

Variable	Yes	%	No	%	Unk	%	Total Number
City of Flint Water	2	67	8	36	3	60	13
City of Flint Township Water	0	0	2	9	1	20	3
Other municipal water system	0	0	3	14	1	20	4
Private well	1	33	6	27	0	0	7
Unknown	0	0	3	14	0	0	3
TOTAL	3	100	22	100	5	100	30

5.) During the last year, has the water quality (appearance, taste, smell) at your residence changed?

Variable	Yes	%	No	%	Unk	%	TOTAL
City of Flint Water	10	100	2	11	1	100	13
City of Flint Township Water	0	0	3	16	0	0	3
Other municipal water system	0	0	4	21	0	0	4
Private well	0	0	7	37	0	0	7
Unknown	0	0	3	16	0	0	3
TOTAL	10	100	19	100	1	100	30

6.) Prior to your illness, did you make any recent plumbing changes or repairs at your residence?

Variable	Yes	%	No	%	Unk	%	TOTAL
City of Flint Water	1	33	11	44	1	50	13
City of Flint Township Water	0	0	3	12	0	0	3
Other municipal water system	2	67	1	4	1	50	4
Private well	0	0	7	28	0	0	7
Unknown	0	0	3	12	0	0	3
TOTAL	3	100	25	100	2	100	30

7.) Prior to your illness, were there any water main breaks or other water line issues that affected the water at your residence, including boil water advisories?

Variable	Yes	%	No	%	Unk	%	TOTAL
City of Flint Water	6	100	5	23	2	100	13
City of Flint Township Water	0	0	3	14	0	0	3
Other municipal water system	0	0	4	18	0	0	4
Private well –N/A	0	0	7	32	0	0	7
Unknown	0	0	3	14	0	0	3
TOTAL	6	100	22	100	2	100	30

8.) During this 2 week period (exposure period), did you work or volunteer, either full or part time?

Variable	Yes	%	No	%	Not Sure	%	Total
Work or volunteer	6	21	23	79	0	0	29

10.) Visit, reside, or work in a long term care facility, nursing home, assisted living facility, or senior living facility?

Variable	Yes	%	No	%	Unk	%	TOTAL
Resident	0	0	29	100	0	0	29
Visitor	2	7	27	93	0	0	29
Employee	0	0	29	100	0	0	29

11.) In the 2 weeks before you before you got sick, did you spend any nights away from home (excluding healthcare settings)?

Variable	Yes	%	No	%	Unk	%	TOTAL
Travel Exposure	2	7	27	93	0	0	29

12.) In the 2 weeks before you before you got sick (__/__/__ to __/__/__), did you visit any of the following community venues?

Variable	Yes	%	No	%	Unk	%	Total
Hotel (no stay)	0	0	28	97	1	3	29
Auditorium	1	3	28	97	0	0	29
Barbershop or Hair salon	7	23	22	73	1	3	30
Car Wash	5	17	24	80	1	3	30
Casino	3	10	26	87	1	3	30
Place of worship*	8	28	21	72	0	0	29
Gym or Work out facility	1	3	27	93	0	0	29
Grocery Store	20†	69	7	24	2	7	29
Aldi's**	3						
Kroger**	8						
Meijer**	9						
Walmart**	4						
Other stores	5						
Home improvement store	7	24	17	59	3	10	29
Spa or nail salon	0	0	27	93	0	0	29
Mall or Department store	2	7	24	83	1	3	29
Movie Theater	0	0	28	97	0	0	29
Other (specify)	4	14	17	59	0	0	29

*Only 2 reported the same church

**Need to check addresses, not all the same location

†Do not sum to 20 because people visited multiple locations

13.) In the 2 weeks before you got sick, did you have exposure to any of the following water sources, either *at home* or while *away from home*?

Variable	Yes	%	No	%	Unk	%	Total
At Home							
Shower	27	93	2	7	0	0	29
By water source:							
City of Flint	10(37%)						
City of Flint Township	3 (11%)						
Other Municipal water system	4 (15%)						
Private	7 (26%)						
Unknown	3 (11%)						
Use a detachable shower head or hose	8	28	21	72	0	0	29
By water source:							
City of Flint	3 (38%)						
City of Flint Township	0 (0%)						
Other Municipal water system	1 (13%)						
Private	3 (38%)						
Unknown	1 (13%)						
Hot tub, whirlpool spa, Jacuzzi tub	2	7	27	93	0	0	29
Sat NEAR a working hot tub or whirlpool spa	0	0	29	100	0	0	29
Steam room or wet sauna	0	0	29	100	0	0	29
Humidifier	6	21	22	76	1	3	29
By water source:							
City of Flint	2 (33%)						
City of Flint Township	0 (0%)						
Other Municipal water system water	1 (17%)						
Private	3 (50%)						
Unknown	0 (0%)						
Respiratory therapy machine	6	21	23	79	0	0	29
CPAP	1 (17%)						
Nebulizer	5 (83%)						
Away from home							
Shower at gym, work, other location	3	10	26	89	0	0	29
Use a detachable shower head or hose	1	3	28	97	0	0	29
Hot tub, whirlpool spa, Jacuzzi tub	0	0	29	100	0	0	29
Sat NEAR a working hot tub or whirlpool spa	0	0	29	100	0	0	29
Humidifier (whole house or portable)	1	4	27	96	0	0	28
Pool/splash pad/waterpark (3 different locations)	3	11	25	89	0	0	28
Recreational or cooling misters	0	0	29	100	0	0	29
Steam room or wet sauna	0	0	29	100	0	0	29
Decorative fountain	1	3	27	93	1	3	29
Outdoor watering hose or sprinkler	5	17	23	79	1	3	29
Beach, lake, pond, river, creek, etc.	2	7	27	93	0	0	29

Legionellosis Outbreak — Genesee County, June 2014–March 2015

Contents

Legionellosis Outbreak — Genesee County, June 2014–March 2015 1
- Working Case Definitions 2
- Data Sources 2
- Epidemiology 2

Epi Curves 3
- Five-year History 3
- Cases Analyzed in Current Report 3

Cases by Residence Water Source 4

Healthcare Exposure 4
- Healthcare Exposure by Residence Water Source 4

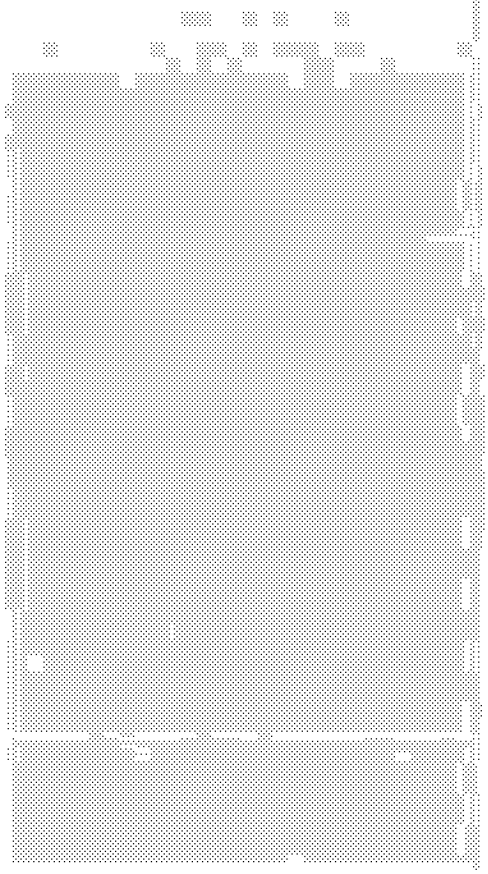
Hospitalized Cases By Length of Stay and Residence Water Source 5
- Water Changes at Residence 6
- Work and Travel 7
- Community Exposures 8
- Water Exposures in the Home 9
- Water Exposures Outside of the Home 9
- Patient or Proxy reported Comorbidities 10
- Patient or Proxy reported Health Behaviors 10

Cases with No Known Healthcare Exposure and Residence not on Flint Water Supply 11
- Case Flow chart 11
- Epi Curve 11

Working Case Definitions

Confirmed Legionnaires' Disease (LD) – meets the CDC clinical and laboratory case definition for confirmed LD and illness occurred since June 1, 2014 in residents of Genesee County or those who had visited the Flint area in 2 weeks prior to their illness onset date.

Suspected LD – meets the CDC clinical and laboratory case definition for suspected LD and illness occurred since June 1, 2014 in residents of Genesee County or those who had visited the Flint area in 2 weeks prior to their illness onset date.



Data Sources

1. Legionellosis Case Report Form in Michigan Disease Surveillance System (MDSS)
2. Medical record review from:
    a. Hospital A; Flint, MI
    b. Hospital B; Flint, MI
    c. Hospital C; Grand Blanc, MI
3. Patient interview using Genesee County-specific Legionellosis Questionnaire

Epidemiology

Number of lab-confirmed cases of Legionnaires' Disease: 45

Geographic distribution:

44/45 Genesee County (27 Flint)

1/45 Saginaw County

Age range: 26-94 years

Average age (median): 62.1 years (63 years)

% Males: 51% (23/45)

Range of illness onset dates (n=45): 6/5/14- 3/9/2015

Number (%) of deaths: 15.6% (7/45)

Number of cases interviewed: 29 completed + one partial (63% complete; 95.7% in total attempted/completed)

Number (%) of cases hospitalized: 45/45 (100%). Number in ICU: 22/45 (48.8%)

Number (%) of cases who had been hospitalized in 2-weeks prior to onset: 19/45 (37.8%)

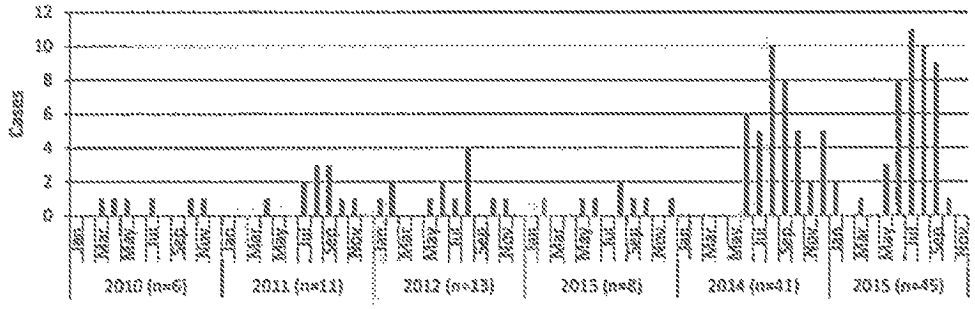
Number (%) of cases with ≥1 co-morbidity: 25/29 interviewed (86%)

Number (%) of cases who are current or former smokers: 24/29 interviewed (83%)

Epi Curves

Five-year History

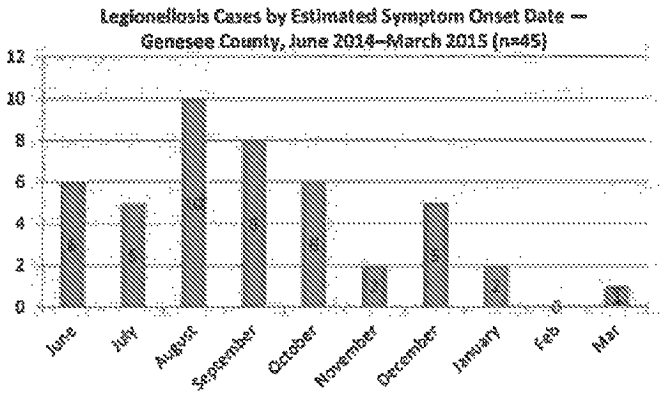
Commented [WM(1]: Swapped graphs. Had, 5 year history then, cases included in this report



Cases Analyzed in Current Report

This report summarizes data collected from the 45 confirmed legionellosis cases that occurred June 1, 2014 through March 31, 2015.

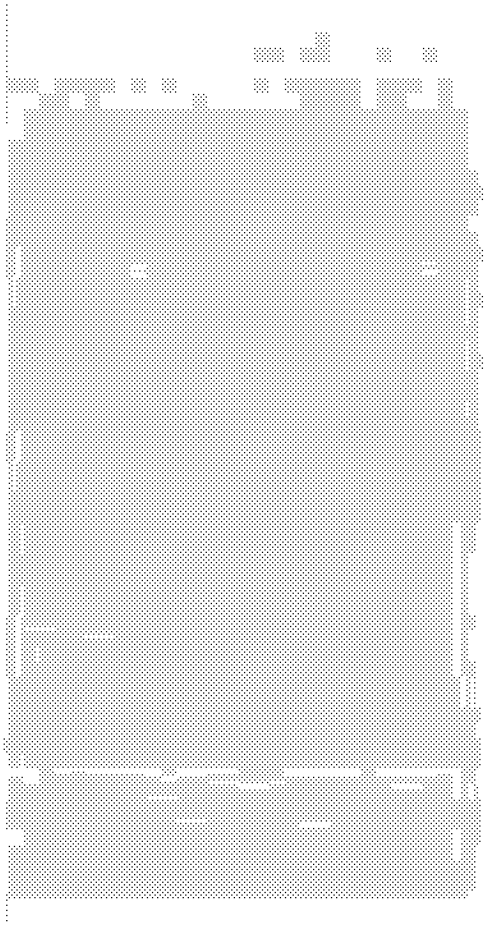
Commented [WM(2]: Added sentence



Cases by Residence Water Source

Residence water source refers to the source of tap water at patient's home residence during the 14 days before symptom onset and was determined by patient interview and verified by City of Flint water distribution map.

Water Source at Residence	Total N=45	
	n	%
City of Flint water	21	47
City of Flint Township water	3	7
Other municipal water system	4	9
Private well	7	16
Unknown	10	22



Healthcare Exposure

A person was defined as having a healthcare exposure if they visited a hospital or clinic in Flint, Michigan as an inpatient, outpatient, or visitor during the 14 days prior to their symptom onset date.

Healthcare Exposure by Residence Water Source

	Total N=45		Healthcare exposure N=27		No known healthcare exposure N=18	
	n	%	n	%	n	%
City of Flint Water	21	47	13	48	8	44
Other water at residence	24	53	14	52	10	56

Hospitalized Cases By Length of Stay and Residence Water Source

Commented [WM[3]: OPTIONAL
Do we stratify by HOSPITAL?

Location	Length of Stay*		
	N	Median (days)	Range
Hospital A	15	2	0.5–14
City of Flint water at patient residence	7	2	0.5–7
Other water at patient residence	9	5	1–14
Hospital B	2	1.5	1–2
City of Flint water at patient residence	1	1	
Other water at patient residence	1	2	
Hospital A and Hospital B; Residence on Flint water	1	5	
Hospital A		3	
Hospital B		2	
Total	19	3	0.5–14

* Length of stay = Number of days hospitalized during 14 days prior to symptom onset date.

Water Changes at Residence

Question Prompts:

Q4. During the last year, has the water pressure at your residence changed?
Q5. During the last year, has the water quality (appearance, taste, smell) at your residence changed?
Q6. Prior to your illness, did you make any recent plumbing changes or repairs at your residence?
Q7. Prior to your illness, were there any water main breaks or other water line issues that affected the water at your residence, including boil water advisories?

	Flint Water at Residence (N=13)		Other Water Source at Residence (N=17)		Total (N=30)	
	n	%	n	%	n	%
Q4. Noticed changes in water pressure	2	15	1	6	3	10
Q5. Noticed changes in water quality	10	77	0	0	10	33
Q6. Made recent plumbing changes or repairs at residence	1	8	2	12	3	10
Q7. Experienced water main breaks or water line issues that affected residence	6	46	0	0	6	20

Commented [WM(4]: Keep stratification by residential water source?

Work and Travel

Question Prompts:

- Q8. During this 2 week period (exposure period), did you work or volunteer, either full or part time?
- Q10. Visit, reside, or work in a long term care facility, nursing home, assisted living facility, or senior living facility?
- Q11. In the 2 weeks before you before you got sick, did you spend any nights away from home (excluding healthcare settings)?

	Total N=30	
	n	%
Q8. Work outside of the home	5	17
Contractor/painter		
Construction		
HR technician		
Industrial painter		
Welder		
Q8. Volunteer outside of the home	0	0
Q10. Reside or visit an assisted living facility or rehab facility	3*	10
Q11. Spend nights away from home	2**	7

* Patients visited three different locations; none on City of Flint Water

**Patients stayed in two different hotels outside of Flint and stayed ≤2 nights each.

Community Exposures

Question prompt:

Q12. In the 2 weeks before you before you got sick (_____to_____), did you visit any of the following community venues?

	Total N = 29*	
	n	%
Hotel but did not stay overnight	0	0
Auditorium	1	3
Barbershop or Hair Salon	7	24
Car Wash	5	17
Casino	3	10
Place of Worship	8	28
Gym or Work-out Facility	1	4
Grocery	20	69
Home Improvement Store	7	24
Spa or Nail Salon	0	0
Mall or Department Store	2	7
Movie Theater	0	0

* Number decreased compared to previous tables because of the one partial interview.

Water Exposures in the Home

Question prompt:

Q13. In the 2 weeks before you got sick (__/__/__ to __/__/__), did you have exposure to any of the following water sources, either *at home* or while *away from home*?

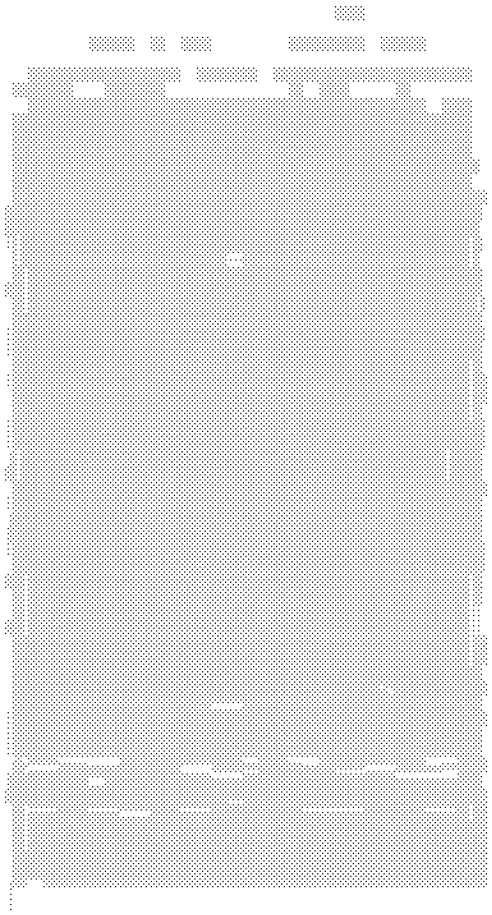
	Total N = 29	
	n	%
Shower	27	93
Use a detachable shower head or hose	8	28
Hot tub, whirlpool spa, Jacuzzi tub	2	7
Sat NEAR hot tub or whirlpool spa	0	0
Steam room or wet sauna	0	0
Humidifier	8	28
Respiratory therapy machine	6	21

Water Exposures Outside of the Home

	Total N = 29	
	n	%
Use a detachable shower head or hose	1	3
Hot tub, whirlpool spa, Jacuzzi tub	0	0
Sat NEAR hot tub or whirlpool spa	0	0
Humidifier	1	3
Pool/splash pad/waterpark	3	10
Recreational or cooling misters	0	0
Steam room or wet sauna	0	0
Decorative fountain	1	3
Outdoor watering hose or sprinkler	5	17
Beach, lake, pond, river, creek	2	7

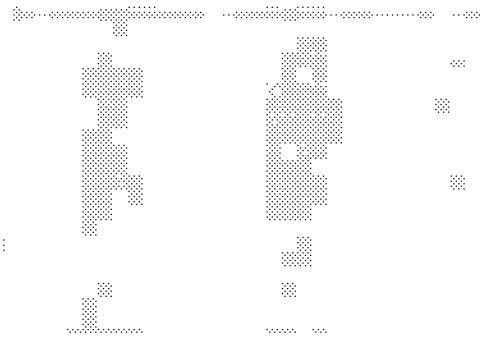
Patient or Proxy reported Comorbidities

	Total N = 29	
	n	%
≥1 comorbidity	25	86
Chronic kidney disease	11	38
Immunocompromised	9	31
Diabetes	12	41
Chronic lung disease	12	41
Asthma or chronic bronchitis	7	24
Heart disease or congestive heart failure	12	41
Liver disease	0	0



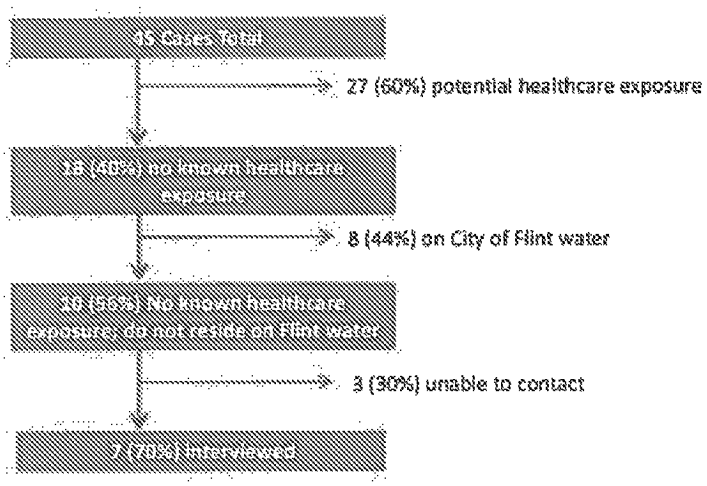
Patient or Proxy reported Health Behaviors

	Total N=29
Former or current smoker, n (%)	24 (83)
Median packs per day (range)	1 (0.14–3.5)
Median years (range)	30 (15–48)
Drinks alcohol, n (%)	9 (31)
Median drinks per day (range)	1 (0.1–2)
Median years (range)	45 (1–57)

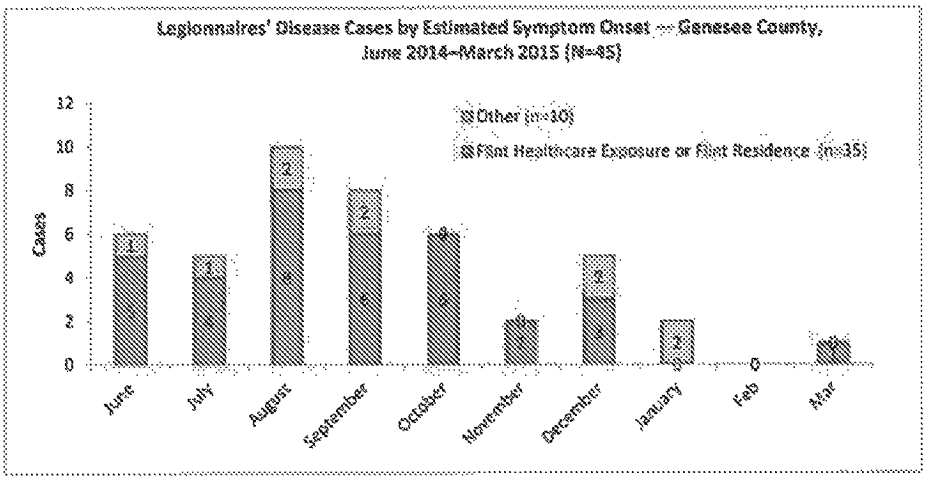


Cases with No Known Healthcare Exposure and Residence not on Flint Water Supply

Case Flow-chart



Epi Curve



Report Date 5/29/2015

Summary of Legionellosis Outbreak — Genesee County, June 2014–March 2015

From June 2014 to March 2015, 45 Legionnaires' disease (LD) cases including 7 deaths were reported in Genesee County, Michigan. The Michigan Department of Health and Human Services (MDHHS) assisted the Genesee County Health Department (GCHD) in the investigation.

Data were collected from patient medical record review, the Michigan Disease Surveillance System case report form, and interviews with case-patients or their proxies with an enhanced legionellosis questionnaire. In an attempt to identify community sources, case-patients or proxies were interviewed about travel, work, and locations visited during the 2 weeks prior to symptom onset (considered the incubation period for LD).

All 45 cases were laboratory confirmed by *Legionella* urinary antigen test; one sputum specimen was collected, which was *Legionella* culture negative. Median patient age was 62 years (range: 26–94); 23 (51%) were male. Illness onset dates ranged from June 6, 2014 to March 9, 2015 and peaked in August, 2014 with 10 cases. Multiple attempts by phone and letter were made to contact all case-patients; interviews using the enhanced questionnaire were completed on 30 of 45 (67%). Healthcare-associated LD was suspected for a subset of cases. Nineteen of the 45 (42%) patients were hospitalized during the 2 weeks prior to symptom onset. Of those, 16 (84%) were hospitalized at hospital A, 2 (11%) at hospital B, and 1 (5%) at hospitals A and B. One patient was hospitalized at hospital A during their entire 2-week exposure period. Eight additional persons were exposed to Flint hospitals as outpatients or visitors; 5 (63%) to hospital A, 2(25%) to hospital B, and 1 (15%) to hospitals A and B. In total, 23/45 (51%) patients were exposed to hospital A as an inpatient, outpatient, or visitor. On October 4, 2014, hospital A hyperchlorinated their water system and continues to monitor for *Legionella*.

The municipal water system was an additional suspected source. Twenty-one of 45 (47%) cases occurred in people whose residence received City of Flint water. The majority (10 of 13, 77%) of people interviewed who lived on Flint water reported changes in water quality; 6 of 13 (46%) experienced water main breaks or water line issues at or near their residence prior to illness. Of the 18 persons that did not report healthcare visits, 8 (44%) were exposed to Flint water at their home.

In other exposures, of 30 persons interviewed, 2 (7%) stayed overnight in 2 different hotels, 2 (7%) were exposed to hot tubs and 20 (67%) visited ≥1 grocery store. All locations mentioned were visited by ≤2 patients with the exception of one grocery store outside of Flint that was visited by 5 patients.

Surveillance & Infectious Disease Epidemiology

Ten cases had no exposure to a Flint hospital in the 2 weeks prior to illness nor were their homes on the Flint water system. Of those, 3 people might have been exposed to Flint water at a grocery store or motel. Additionally, 1 person reported exposure to stagnant water as an industrial painter and one person was hospitalized at hospital A for 10 days immediately prior to their exposure period. The remaining 5 cases have no known exposure to Flint water, healthcare, or travel.

The outbreak is over; the last reported case occurred in March, 2015. The lack of clinical *Legionella* isolates precludes our ability to link cases to an environmental source. As epidemiologic data did not indicate a common community source, we cannot recommend environmental testing or additional patient/proxy interviews. As we enter the summer season, MDHHS recommends vigilant legionellosis awareness and surveillance in Genesee County, including interviewing of cases or proxies with the enhanced legionellosis questionnaire within one week of reporting. MDHHS also recommends the clinical community assist in LD surveillance through accurate identification, testing, and reporting of all suspect cases. Obtaining respiratory specimens in addition to urinary antigen testing is of critical importance in these increased surveillance efforts. Because *Legionella* spp. are commonly found in the environment, clinical isolates are necessary to interpret the findings of an environmental investigation in an outbreak. To assist, MDHHS has prepared updated legionellosis guidance to be distributed to health care providers via the Michigan Health Alert Network.

Legionellosis Outbreak — Genesee County, June 2014–March 2015 (n=45)

Contents

Legionellosis Outbreak — Genesee County, June 2014–March 2015 (n=45) 1
- Working Case Definitions 2
- Data Sources 2
- Epidemiology 2

Epi Curves 4
- Current Outbreak 4
- Five-year History 4

Cases by Residence Water Source 5

Healthcare Exposure 5
- Healthcare Exposure by Residence Water Source 5
- Healthcare Exposures by Healthcare Location, Visit Type, and Residence Water Source (Table) 6
- Healthcare Exposures by Healthcare Location, Visit Type, and Residence Water Source (Graph) 7

Hospitalized Cases By Length of Stay and Residence Water Source 8
- Timeline of the One Patient Hospitalized During Entire Exposure Period 8

Legionellosis Questionnaire Results 9
- Interview Status by Healthcare Exposure 9
- Interview Status by Residence Water Supply 9
- Water Changes at Residence 10
- Work and Travel 11
- Community Exposures 12
- Community Exposures by Location of Healthcare Exposure 14
- Water Exposures in the Home 15
- Water Exposures Outside of the Home 15
- Self-reported Comorbidities by Healthcare Exposure and Residential Water Supply 16
- Number of Self-reported Comorbidities by Healthcare Exposure and Healthcare Location 16
- Patient-reported Health Behaviors by Healthcare Exposure and Residential Water Supply 17

Cases with No Known Healthcare Exposure and Residence not on Flint Water Supply 18
- Case Flow-chart 18
- Epi Curve 18
- Map of Community Exposures 19
- Potential Exposures 20
- Summary of December and January Cases 21

Working Case Definitions

Confirmed Legionnaires' Disease (LD) – meets the CDC clinical and laboratory case definition for confirmed LD and illness occurred since June 1, 2014 in residents of Genesee County or those who had visited the Flint area in 2 weeks prior to their illness onset date.

Suspected LD – meets the CDC clinical and laboratory case definition for suspected LD and illness occurred since June 1, 2014 in residents of Genesee County or those who had visited the Flint area in 2 weeks prior to their illness onset date.

Confirmed Pontiac Fever (PF) – meets the CDC clinical and laboratory case definition for confirmed PF and illness occurred since June 1, 2014 in residents of Genesee County or those who had visited the Flint area in 2 weeks prior to their illness onset date.

Data Sources

1. Legionellosis Case Report Form in Michigan Disease Surveillance System (MDSS)
2. Medical record review from:
    a. McLaren Medical Center; Flint, MI
    b. Hurley Medical Center; Flint, MI
    c. Genesys Regional Medical Center; Grand Blanc, MI
3. Patient interview using Genesee County-specific Legionellosis Questionnaire

Epidemiology

Number of lab-confirmed cases of Legionnaires' Disease: 45

Number of Pontiac fever cases: 1 with positive Ag test but asymptomatic (not included in analysis)

Geographic distribution:

PHI

Age range: 26-94 years

Average age (median): 62.1 years (63 years)

% Males: 51% (23/45)

Range of illness onset dates (n=45): **PHI**

Number (%) of deaths: 15.6% (7/45)

Date outbreak-specific survey completed and approved for use: 2/23/15

Number of cases interviewed: 29 completed + one partial (63% complete; 95.7% in total attempted/completed)

MDHHS: 19 completed / 30 contacted Genesee: 10 completed / 15 (1 status unknown)

Number (%) of cases hospitalized: 45/46 (97.8%). Number in ICU: 22/45 (48.8%)

Number (%) of cases hospitalized at McLaren: 18/45 (40%)

Number (%) of cases hospitalized at Hurley: 14/45 (31%)

Number (%) of cases hospitalized at Genesys: 6/45 (13.3%)

Number (%) of cases hospitalized at other hospitals outside Flint: 7/45 (15.6%)

Number (%) of cases who had been hospitalized in 2-weeks prior to onset: 19/45 (37.8%)

Number (%) of cases who had only a short-term visit to a hospital/healthcare facility in 2-weeks prior to onset: 8/45 (17.8%)

Number (%) of cases who had been hospitalized or who had a short-term visit to a hospital/healthcare facility in 2-weeks prior to onset: 27/45 (60%)

Number (%) of cases who work outside the home: 8/46 (17.4%) [min of 72% were at home]

Number (%) of cases who are retired: 20 (43.5%)

Number (%) of cases who are unemployed: 7/46 (15.2%)

Number (%) of cases who are disabled: 6/46 (13%)

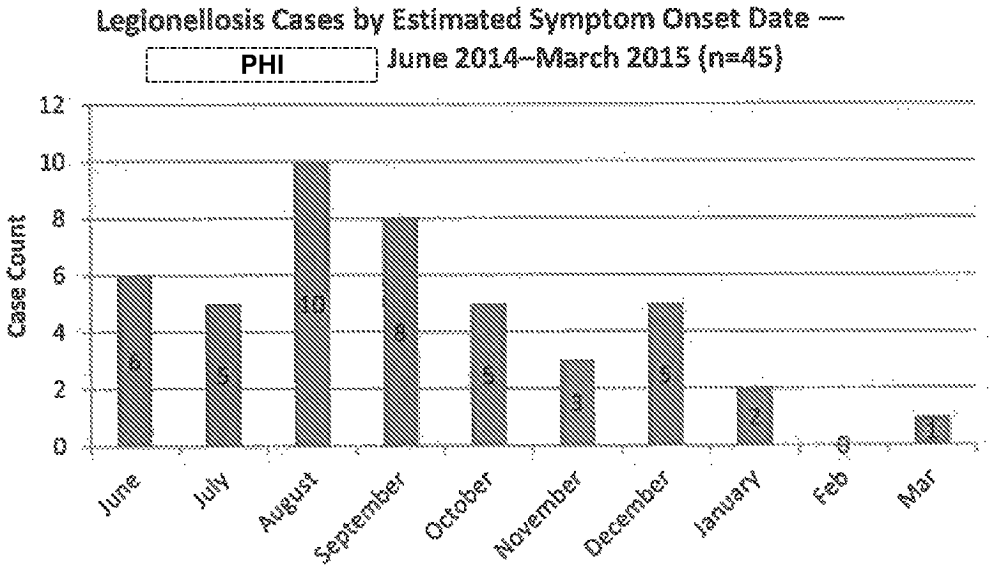
Number (%) of cases whose occupation status is unknown: 5/46 (10%)

Number (%) of cases with ≥1 co-morbidity: 25/29 interviewed (86%)

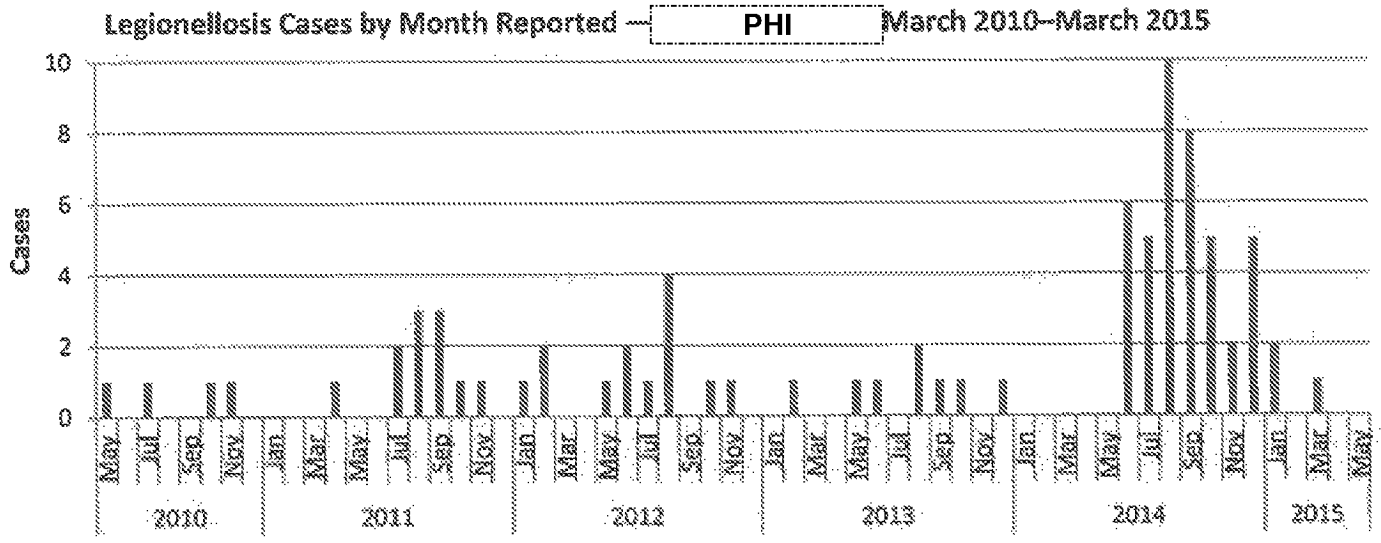
Number (%) of cases who are current or former smokers: 24/29 interviewed (83%)

Epi Curves

Current Outbreak



Five-year History



Cases by Residence Water Source

Residence water source refers to the source of tap water at patient's home residence during the 14 days before symptom onset and was determined by patient interview and verified by City of Flint water distribution map.

Water Source at Residence	Total N=45	
	n	%
City of Flint water	21	47
City of Flint Township water	3	7
Other municipal water system	4	9
Private well	7	16
Unknown	10	22

For the remainder of the analysis, water source at home residence was stratified by:

- **Flint water at residence** (N=21)
- **Other water at residence**, which includes City of Flint Township, other municipal water, private well or unknown (N=24)

Healthcare Exposure

A person was defined as having a healthcare exposure if they visited a hospital or clinic in Flint, Michigan as an inpatient, outpatient, or visitor during the 14 days prior to their symptom onset date.

Healthcare Exposure by Residence Water Source

	Total N=45		Healthcare exposure N=27		No known healthcare exposure N=18	
	n	%	n	%	n	%
City of Flint Water	21	47	13	48	8	44
Other water at residence	24	53	14	52	10	56

Healthcare Exposures by Healthcare Location, Visit Type, and Residence Water Source (Table)

Healthcare exposure in 2 wks prior to onset	Residence on city water		Residence NOT on city water	
	Cases	Interviews missing	Cases	Interviews missing
Hospitalized at McLaren*	5	2	8	2
Hospitalized and Outpatient at McLaren	0		1	
Hospitalized and Visited McLaren; Outpatient at different Flint clinic	1		0	
Hospitalized at McLaren and Outpatient at different Flint clinic	1		0	
Outpatient at McLaren	3	1	1	1
Visited McLaren	0		1	
Hospitalized at McLaren and Hurley**	1		0	
Visited McLaren and Hurley	0		2	
Hospitalized at Hurley	1	1	1	1
Visited Hurley	1		0	
No known Flint healthcare exposure	8	4	11***	3
Total	21	8	24	7

* McLaren Flint Medical Center; Flint, MI. Hospital water is supplied by City of Flint.

**Hurley Medical Center; Flint, MI. Hospital water is supplied by City of Flint.

*** 3 of the 11 cases visited clinics outside of Flint as an outpatient.

Cases admitted (overnight) to a hospital during the 2 weeks prior to onset:

9/21 (43%) cases on City of Flint water with a hospital admission during the 2 weeks prior to onset.
- 8/21 (38%) admission to McLaren hospital
- 1/21 (5%) admission to Hurley

10/24 (42%) cases NOT on City of Flint water with a hospital admission during the 2 weeks prior to onset.
- 9/24 (38%) admission to McLaren hospital
- 1/25 (4%) admission to Hurley

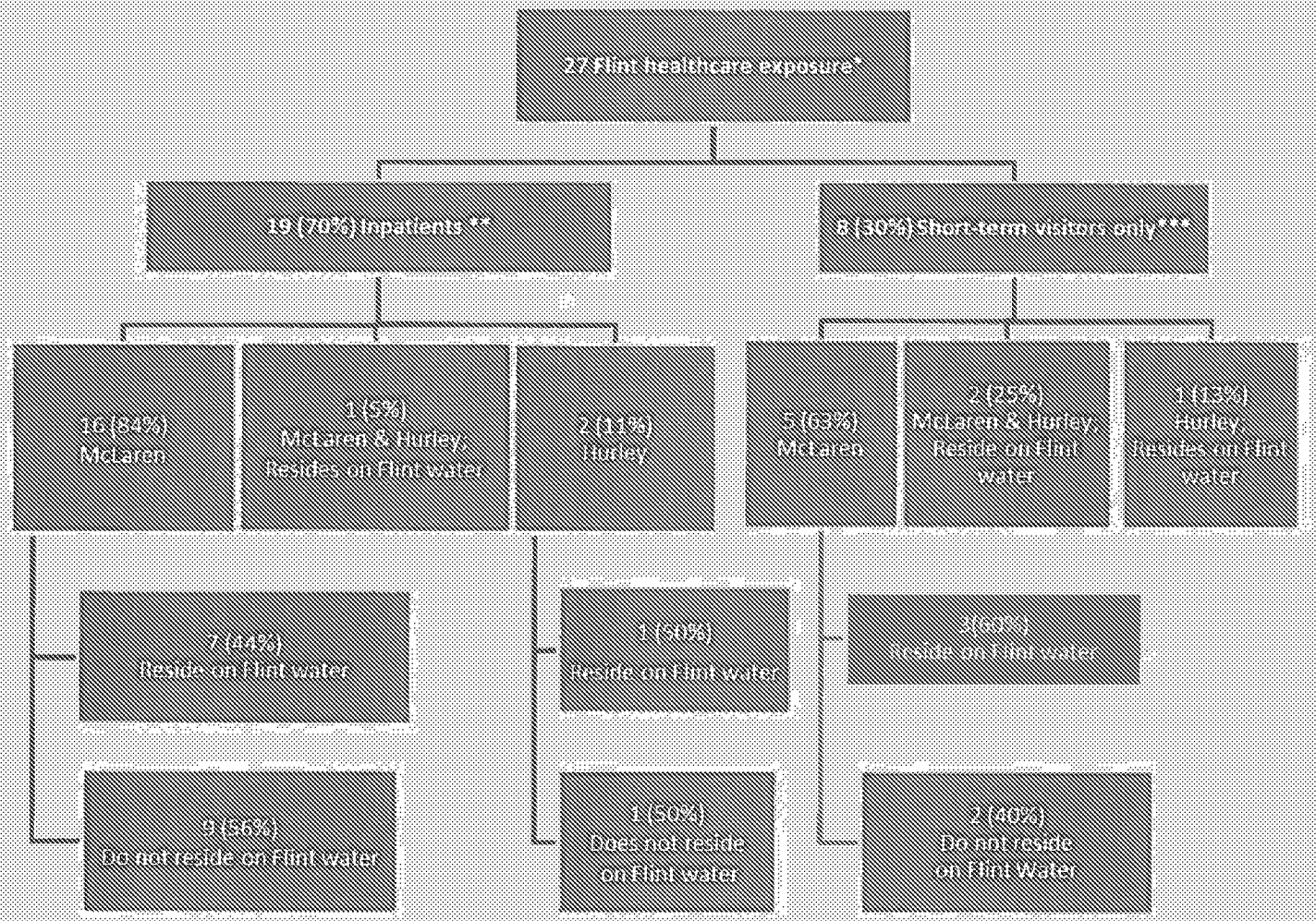
Cases with any hospital exposure during the 2 weeks prior to onset:

13/21 (62%) cases on City of Flint water with any hospital exposure during the 2 weeks prior to onset.
- 11/21 (52%) admission, outpatient, or visit to McLaren*
- 3/21 (14%) admission or visit to Hurley*
- *Percentages do not total due to cases with multiple exposures

14/24 (58%) cases NOT on City of Flint water with any hospital exposure during the 2 weeks prior to onset.
- 13/24 (54%) admission, outpatient, or visit to McLaren*
- 3/24 (13%) admission or visit to Hurley*
- *Percentages do not total due to cases with multiple exposures

Overall:
17/45 (38%) Hospitalized at McLaren (overnight) during the 2 weeks prior to onset.
24/45 (53%) Any exposure to McLaren during the 2 weeks prior to onset.

Healthcare Exposures by Healthcare Location, Visit Type, and Residence Water Source (Graph)



*Flint healthcare exposure = Inpatient, outpatient or visitor to McLaren Flint Hospital or Hurley Medical Center during 14 days prior to symptom onset date.

**Inpatient = overnight stay at McLaren Flint Hospital or Hurley Medical Center during 14 days prior to symptom onset date.

***Short-term visitors = outpatient or visitor to McLaren Flint Hospital or Hurley Medical Center during 14 days prior to symptom onset date.

Hospitalized Cases By Length of Stay and Residence Water Source

Location	Length of Stay*		
	N	Median (days)	Range
McLaren	16	2	0.5–14
City of Flint water at patient residence	7	2	0.5–7
Other water at patient residence	9	5	1–14
Hurley	2	1.5	1–2
City of Flint water at patient residence	1	1	
Other water at patient residence	1	2	
McLaren and Hurley; Residence on Flint water	1	5	
McLaren		3	
Hurley		2	
Total	19	3	0.5–14

* Length of stay = Number of days hospitalized during 14 days prior to symptom onset date.

Timeline of the One Patient Hospitalized During Entire Exposure Period

PHI

Legionellosis Questionnaire Results

Data were obtained from patient interviews using the Legionellosis Questionnaire.
Column percentages are displayed. The denominators are based on the number of patients interviewed.

Interview Status by Healthcare Exposure

Interview status (as of May 21, 2015)	Total (N=45)		Healthcare Exposure (N=27)		No Known Healthcare Exposure (N=18)	
	N	%	N	%	N	%
Complete interview	29	64	19	70	10	56
Partial interview	1	2	0	0	1	6
Refused	1	2	1	4	0	0
Unable to contact	14	31	7	26	7	39

Interview Status by Residence Water Supply

Interview status (as of May 21, 2015)	Total (N=45)		Flint water at residence (N=21)		Other water at residence (N=24)	
	N	%	N	%	N	%
Complete interview	29	64	12	57	17	71
Partial interview	1	2	1	5	0	0
Refused	1	2	0	0	1	4
Unable to contact	14	31	8	38	6	25

Water Changes at Residence

Question Prompts:

Q4. During the last year, has the water pressure at your residence changed?

Q5. During the last year, has the water quality (appearance, taste, smell) at your residence changed?

Q6. Prior to your illness, did you make any recent plumbing changes or repairs at your residence?

Q7. Prior to your illness, were there any water main breaks or other water line issues that affected the water at your residence, including boil water advisories?

	Flint Water at Residence (N=13)		Other Water Source at Residence (N=17)		Total (N=30)	
	n	%	n	%	n	%
Q4. Noticed changes in water pressure	2	15	1	6	3	10
Healthcare exposure	2		1		3	
No known healthcare exposure	0		0		0	
Q5. Noticed changes in water quality	10	77	0	0	10	33
Healthcare exposure	7		0		7	
No known healthcare exposure	3		0		3	
Q6. Made recent plumping changes or repairs at residence	1	8	2	12	3	10
Healthcare exposure	1		2		3	
No known healthcare exposure	0		0		0	
Q7. Experienced water main breaks or water line issues that affected residence	6	26	0	0	6	20
Healthcare exposure	5		0		5	
No known healthcare exposure	1		0		1	

Work and Travel

Question Prompts:

- Q8. During this 2 week period (exposure period), did you work or volunteer, either full or part time?
- Q10. Visit, reside, or work in a long term care facility, nursing home, assisted living facility, or senior living facility?
- Q11. In the 2 weeks before you before you got sick, did you spend any nights away from home (excluding healthcare settings)?

	Healthcare Exposure		No Reported Healthcare Exposure		
	Flint water at residence N=9	Other water at residence N=10	Flint water at residence N=4	Other water at residence N=7	TOTAL N=30
Q8. Work outside of the home, n (%)	1 (11)	0 (0)	1 (25)	3 (43)	**5 (17)**
Contractor/painter	1	0	0	0	
Construction	0	1	0	0	
HR technician	0	0	0	1	
Industrial painter	0	0	0	1	
Welder	0	0	0	1	
Q8. Volunteer outside of the home, n (%)	0 (0)	0 (0)	0 (0)	0 (0)	**0 (0)**
Q10. Reside or visit an assisted living facility or rehab facility, n (%)	0 (0)	3 (30)*	0 (0)	0 (0)	**3 (10)**
Q11. Spend nights away from home, n (%)	0 (0)	0 (0)	0 (0)	2 (29)**	**2 (7)**

* Patients visited three different locations; none on City of Flint Water

1. Three night stay in rehab facility; Flushing, MI
2. Visited assisted living facility; Flint, MI
3. Visited rehab facility; Grand Blanc, MI

**Patients stayed in two different hotels outside of Flint and stayed ≤2 nights each.

Community Exposures

Question prompt:

Q12. In the 2 weeks before you before you got sick (_____to _____), did you visit any of the following community venues?

n (%)	Healthcare Exposure		No Reported Healthcare Exposure		Total N=30
	Flint water at residence N=9	Other water at residence N=10	Flint water at residence N=4	Other water at residence N=7	
Hotel but did not stay overnight	0 (0)	0 (0)	0 (0)	0 (0)	**0 (0)**
Auditorium	0 (0)	1 (10)	0 (0)	0 (0)	**1 (3)**
Barbershop or Hair salon (different locations)	2 (22)	2 (20)	1 (25)	2 (29)	**7 (23)**
Salon on Flint water supply	0	1	0	0	
Salon not on Flint water supply	1	1	0	2	
Unknown location	1	0	1	0	
Car Wash (different locations)	1 (11)	1 (10)	1 (25)	2 (29)	**5 (17)**
Car wash on Flint water supply	0	0	1	0	
Car wash not on Flint water supply	0	1	0	2	
Unknown location	1	0	0	0	
Casino (different locations, outside Flint)	1 (11)	1 (10)	0 (0)	1 (14)	**3 (10)**
Place of worship	3	2	1	2 (29)	**8 (27)**
St. John Vianney; on Flint water supply	2	0	0	0	
Places not on Flint water supply	0	1	1	2	
Unknown location	1	0	0	0	
Gym or Work-out facility	1 (11)	0 (0)	0 (0)	0 (0)	**1 (3)**
Grocery Store	6 (67)	6 (60)	2 (50)	6 (86)	**20 (67)***
Stores on Flint water supply:					
Save-a-Lot (Dort Hwy, Flint)	1	0	0	0	1
Aldi (Center St, Burton)	0	0	0	2	2
Kroger (Richfield Rd, Flint)	0	0	0	1	1
Kroger (Davison Rd, Flint)	1	0	0	0	1
Stores not on Flint water:					
Aldi (Pierson Rd, Flushing)	1	1	0	0	1
Aldi (Corunna Rd, Flint)	0	1	0	0	1
Kroger (Saginaw Rd, Mount Morris)	0	2	0	0	2

	Healthcare Exposure		No Reported Healthcare Exposure		
	Flint water at residence N=9	Other water at residence N=10	Flint water at residence N=4	Other water at residence N=7	Total N=30
Grocery stores, not on Flint water (continued)					
Kroger (State Rd, Davison)	1	0	0	1	2
Kroger (Pierson Rd, Flushing)	1	0	0	0	1
Kroger (Corunna Rd, Flint)	1	0	1	0	2
Meijer (Center Rd, Flint)	1	0	0	4	5
Meijer (Birch Run Rd, Birch Run)	0	0	0	1	1
Meijer (M21, Corunna)	0	1	0	0	1
Meijer (Swartz Creek, MI)	0	1	0	0	1
Meijer (Pierson Rd, Flint)	2	0	0	0	1
Walmart (Linden Rd, Clio)	0	1	0	1	2
Walmart (Court St, Burton)	0	0	0	1	1
Walmart (Corunna Rd, Flint)	0	0	1	0	1
Other	1	2	0	0	3
Home improvement store; none on Flint water supply	3 (33)	0 (0)	2 (50)	3 (43)	8 (27)**
Lowes (Mansour Blvd, Flint)	1	0	0	0	1
Lowes (Court St, Burton)	1	0	0	0	1
Home Depot (Corunna Rd, Flint)	1	0	0	0	1
Home Depot (Pierson Rd, Flushing)	1	0	0	0	1
Home Depot (Court St, Burton)	0	0	1	1	2
Menards (Linden Rd, Clio)	0	0	0	1	1
Menards (Court St, Davison)	0	0	0	1	1
Unknown	0		1	0	1
Spa or nail salon	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Mall or Department store	0 (0)	1 (10)	0 (0)	0 (0)	1 (3)
Movie Theater	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)

* Do not sum to 20 because people visited multiple locations.

** Do not sum to 8 because people visited multiple locations.

Community Exposures by Location of Healthcare Exposure

	Healthcare Exposure (N=17)								No known healthcare exposure (N=12)		TOTAL	
	Hurley		McLaren		McLaren & Hurley		Total					
	n	%	n	%	n	%	n	%	n	%	n	%
Auditorium	0	0.00	1	5.88	0	0.00	0	0.00	0	0.00	1	3.45
Barbershop	1	5.88	2	11.76	1	5.88	4	23.53	3	25.00	7	24.14
Car Wash	1	5.88	0	0.00	1	5.88	2	11.76	3	25.00	5	17.24
Casino	1	5.88	0	0.00	0	0.00	1	5.88	2	16.67	3	10.34
Church	0	0.00	4	23.53	1	5.88	5	29.41	3	25.00	8	27.59
Gym	1	5.88	0	0.00	0	0.00	1	5.88	0	0.00	1	3.45
Grocery	1	5.88	9	52.94	1	5.88	11	64.71	9	75.00	20	68.97
Home Improvement Store	0	0.00	3	17.65	0	0.00	3	17.65	4	33.33	7	24.14
Spa/Nail Salon	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Mall	0	0.00	0	0.00	1	5.88	1	5.88	1	8.33	2	6.90
Movie Theater	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00

Water Exposures in the Home

Question prompt:

Q13. In the 2 weeks before you got sick (__/__/__ to __/__/__), did you have exposure to any of the following water sources, either *at home* or while *away from home*?

	Healthcare Exposure		No Reported Healthcare Exposure		
	Flint water at residence N=9	Other water at residence N=10	Flint water at residence N=3*	Other water at residence N=7	TOTAL N=29*
Shower	8 (89)	10 (100)	2 (75)	7 (100)	27 (93)
Use a detachable shower head or hose	2 (22)	2 (20)	1 (33)	3 (43)	8 (28)
Hot tub, whirlpool spa, Jacuzzi tub	0 (0)	0 (0)	1 (33)	1 (14)	2 (7)
Sat NEAR hot tub or whirlpool spa	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Steam room or wet sauna	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Humidifier	2 (22)	2 (20)	0 (0)	2 (29)	8 (28)
Respiratory therapy machine	4 (44)	2 (20)	0 (0)	0 (0)	6 (21)
CPAP	1	0	0	0	
Nebulizer	3	2	0	0	

* Number decreased compared to previous tables because of the one partial interview.

Water Exposures Outside of the Home

	Healthcare Exposure		No Reported Healthcare Exposure		
	Flint water at residence N=9	Other water at residence N=10	Flint water at residence N=3	Other water at residence N=7	TOTAL N=29
Use a detachable shower head or hose	1 (11)	0 (0)	0 (0)	0 (0)	1 (3)
Hot tub, whirlpool spa, Jacuzzi tub	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Sat NEAR hot tub or whirlpool spa	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Humidifier	0 (0)	0 (0)	1 (33)	0 (0)	1 (3)
Pool/splash pad/waterpark (different locations)	1 (11)	1 (10)	0 (0)	1 (14)	3 (10)
Recreational or cooling misters	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Steam room or wet sauna	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Decorative fountain	1 (11)	0 (0)	0 (0)	0 (0)	1 (3)
Outdoor watering hose or sprinkler	2 (22)	0 (0)	1 (33)	2 (29)	5 (17)
Beach, lake, pond, river, creek, etc.	1 (11)	0 (0)	0 (0)	1 (14)	2 (7)

Self-reported Comorbidities by Healthcare Exposure and Residential Water Supply

	Healthcare Exposure		No Reported Healthcare Exposure		TOTAL N=29
	Flint water at residence N=9	Other water at residence N=10	Flint water at residence N=3	Other water at residence N=7	
≥1 comorbidity	8 (89)	10 (100)	2 (67)	5 (71)	25 (86)
Chronic kidney disease	3 (33)	6 (60)	1 (33)	1 (14)	11 (38)
Immunocompromised	1 (11)	4 (40)	2 (67)	2 (29)	9 (31)
Diabetes	4 (44)	4 (40)	1 (33)	3 (43)	12 (41)
Chronic lung disease	3 (33)	6 (60)	1 (33)	2 (29)	12 (41)
Asthma or chronic bronchitis	3 (33)	2 (20)	1 (33)	1 (14)	7 (24)
Heart disease or congestive heart failure	4 (44)	5 (50)	1 (33)	2 (29)	12 (41)
Liver disease	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)

Number of Self-reported Comorbidities by Healthcare Exposure and Healthcare Location

Comorbidities are self-report from interviews, hospital exposure from medical records

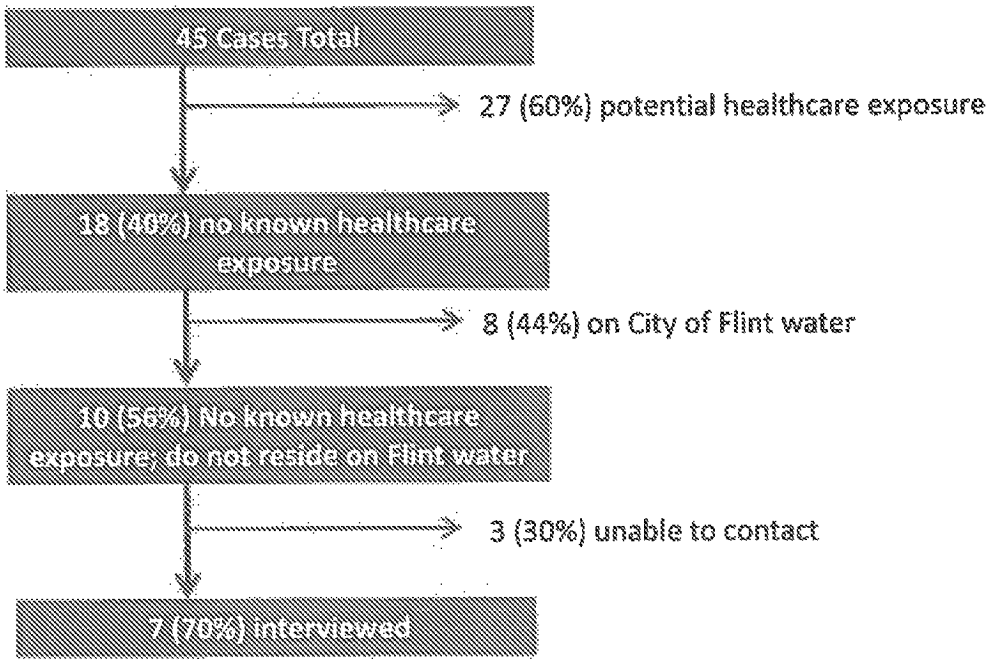
	Healthcare Exposure (N=19)								No known healthcare exposure (N=10)		TOTAL N=29	
	Hurley N=1		McLaren N=15		McLaren & Hurley N=3		Total					
	n	%	n	%	n	%	n	%	n	%	n	%
≥1 comorbidity	1	5.88	14	82.35	3	5.88	18	94.12	7	75.00	25	86.21
0 comorbid conditions	0	0.00	1	5.88	0	0.00	1	5.88	3	25.00	4	13.79
1 comorbid conditions	1	5.88	6	35.29	0	0.00	7	41.18	3	25.00	10	34.48
2 comorbid conditions	0	0.00	2	11.76	0	0.00	2	11.76	1	8.33	3	10.34
3 comorbid conditions	0	0.00	2	5.88	1	0.00	3	5.88	1	25.00	4	13.79
4 comorbid conditions	0	0.00	3	23.53	2	5.88	5	29.41	1	8.33	6	20.69
5 comorbid conditions	0	0.00	1	5.88	0	0.00	1	5.88	0	0.00	1	3.45
6 comorbid conditions	0	0.00	0	0.00	0	0.00	0	0.00	1	8.33	1	3.45

Patient-reported Health Behaviors by Healthcare Exposure and Residential Water Supply

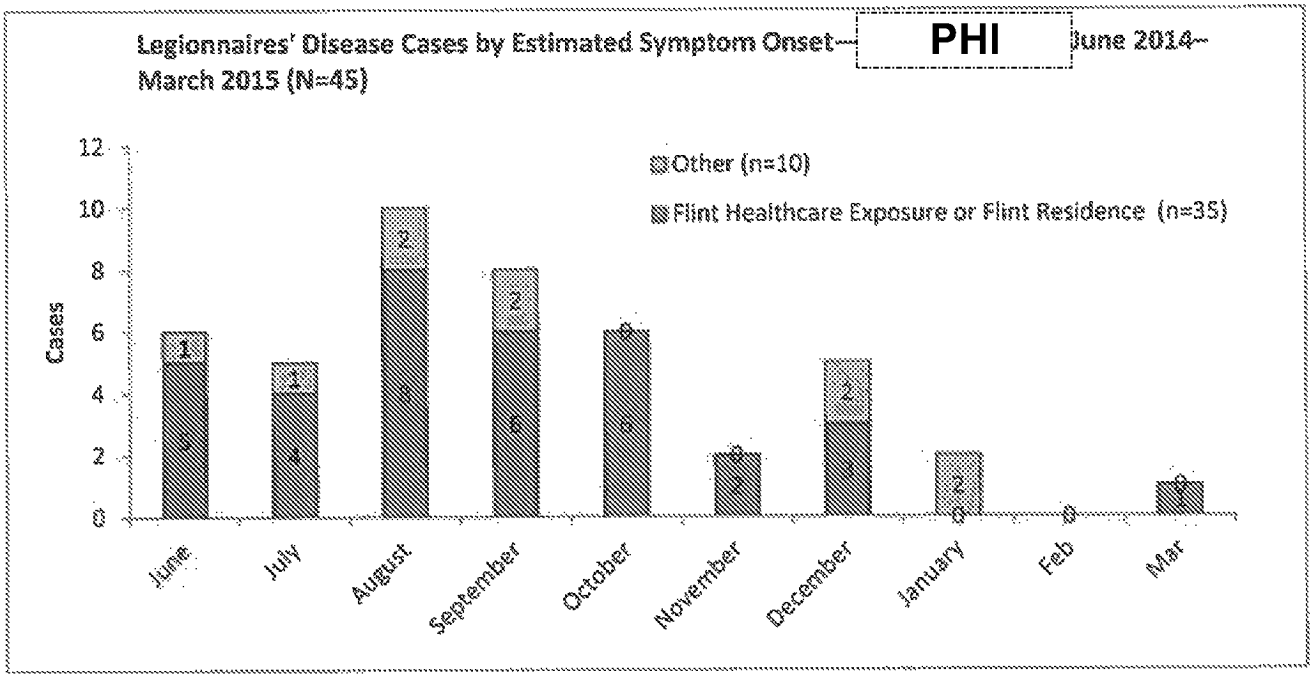
	Healthcare Exposure		No Reported Healthcare Exposure		
	Flint water at residence N=9	Other water at residence N=10	Flint water at residence N=3	Other water at residence N=7	TOTAL N=29
Former or current smoker, n (%)	8 (89)	6 (60)	3 (100)	7 (100)	24 (83)
Median packs per day (range)	1 (0.15–2)	1 (0.5–2)	1 (0.14–3.5)	1 (0.21–3.5)	1 (0.14–3.5
Median years (range)	35 (25–45)	32.5(20–48)	30	30 (15–35)	30 (15–48)
Drinks alcohol, n (%)	4	2	0	3	9 (31)
Median drinks per day (range)	2	0.15 (0.1–0.2)	n/a	1 (0.2–2)	1 (0.1–2)
Median years (range)	1	51 (45–57)	n/a	UNK	45 (1–57)

Cases with No Known Healthcare Exposure and Residence not on Flint Water Supply

Case Flow-chart

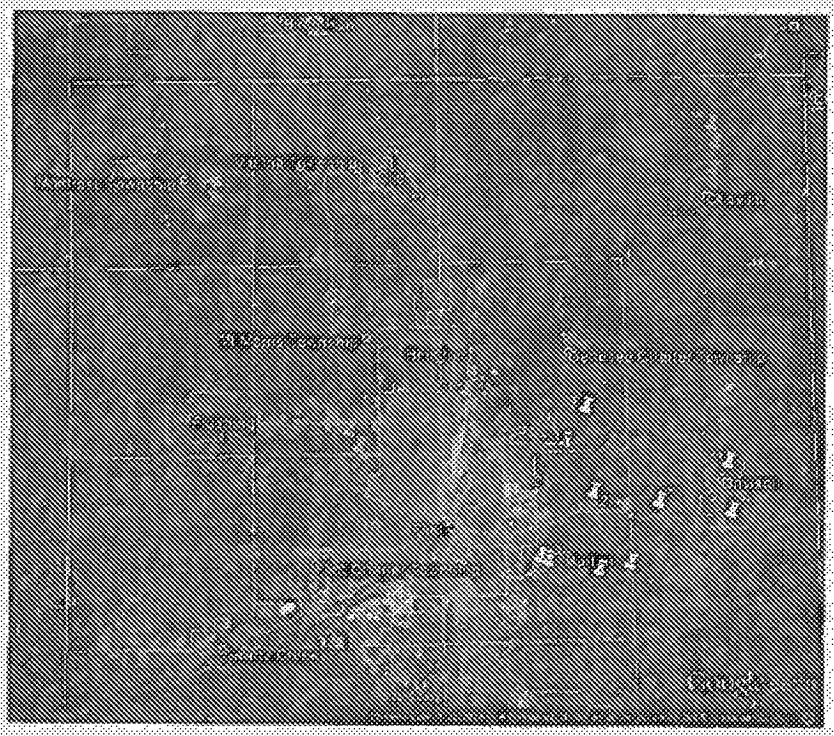


Epi Curve

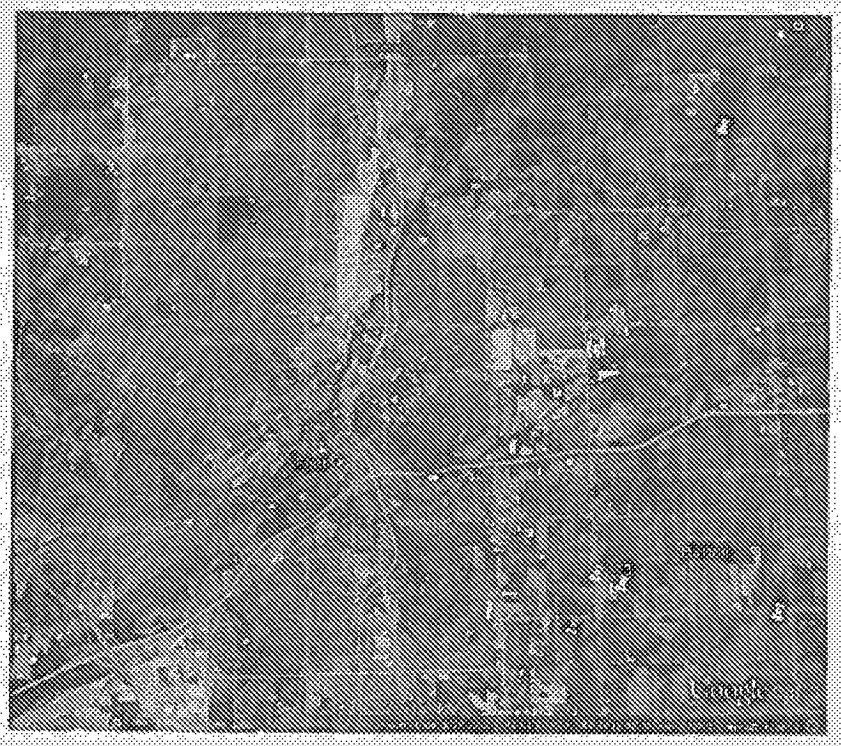


Map of Community Exposures

We mapped the community locations visited by the 10 cases with unknown exposures (no known healthcare exposure and do not reside on Flint water supply) during the 14 days prior to symptom onset. Pins are color-coded by case. With exception of 2 grocery stores, none of the cases reported visiting the same locations. The majority of community locations were located outside of Flint or in Flint but were not supplied by City of Flint water.



Same map, zoomed in



Potential Exposures

Epi Info Case ID	Symptom Onset Date	Exposure	Notes
3	PHI	Potential occupational	48-year-old male who is a painter and works inside of large industrial tanks with exposure to misty water. He reports wearing an air hood and using an air compressor. He cleaned a tank containing stagnant water 8 days prior to illness onset
16		Unknown	47-year-old female who did not report any healthcare visits or community exposures to locations supplied by Flint water.
15		Potential community (Flint water)	68-year-old male who reported visiting Flint grocery store that is supplied by City of Flint water. He spent 2 nights at hotel outside of Flint during exposure period.
32		Potential community (Flint water)	Not interviewed with Legionellosis questionnaire. While hospitalized, 31-year-old female reported staying in a Flint motel, which is supplied by City of Flint water, during her exposure period.
10		Unknown	48-year-old male who works as a welder and lives in a trailer park community with his 65 year old mother, who also had a positive Legionella urinary antigen test but was asymptomatic. The mother was tested while son was hospitalized.
36		Unknown	Not interviewed
20		Potential Healthcare	69-year-old female who was hospitalized 10 days for cancer treatment at McLaren and discharged the day before her exposure period began.
38		Unknown	Not interviewed
18		Potential community (Flint water)	48 year old male who visited two Flint grocery stores that are supplied by City of Flint water. Had a outpatient visit to a Clinc that borders Flint water
22		Unknown	62 year old male with no reported exposures to locations on Flint water.

Summary of December and January Cases

Cases with unknown exposure may represent sporadic cases; however, cases in December and January are rare. The table below summarizes the 4 cases with symptom onset during December 2014–January 2015 that did not report a healthcare exposure or residence on Flint water supply.

Epi Info Case ID	Age (years), Sex	Symptom onset date	Legionellosis diagnosis date	Medical History	History of Smoking and Alcohol use	Notes
20	69, F	PHI		Metastatic ovarian cancer, recently diagnosed PHI PHI	Quit smoking 20 years ago (smoked for 30 years); Does not drink	Patient was hospitalized in McLaren for whole brain radiation PHI (prior to exposure period). Patient died.
38	71, M			Diabetes, prostate cancer, hypertension	Denied smoking and alcohol use	Not interviewed.
18	48, M			COPD, CAD	Smoker (1 pack per day for >35 years); Chronic alcohol abuse	Patient reports visiting two Flint grocery stores that are supplied by City of Flint water. He had an outpatient visit to a practice that is not on Flint water. He is unemployed.
22	62, M			Diffuse large cell PHI PHI that relapsed PHI PHI transplant in last year but not on immunosuppressive meds at time of symptom onset.	Smoker (60-80 pack year history for 35 years); 1–2 drinks per week	No reported exposures to Flint water in community. Patient spent one night at hotel outside of Flint during exposure period.

Report 8: Epi-Curve Graph

Time Period: 01/01/2010 - 06/26/2015

Time Breakdown: by Month

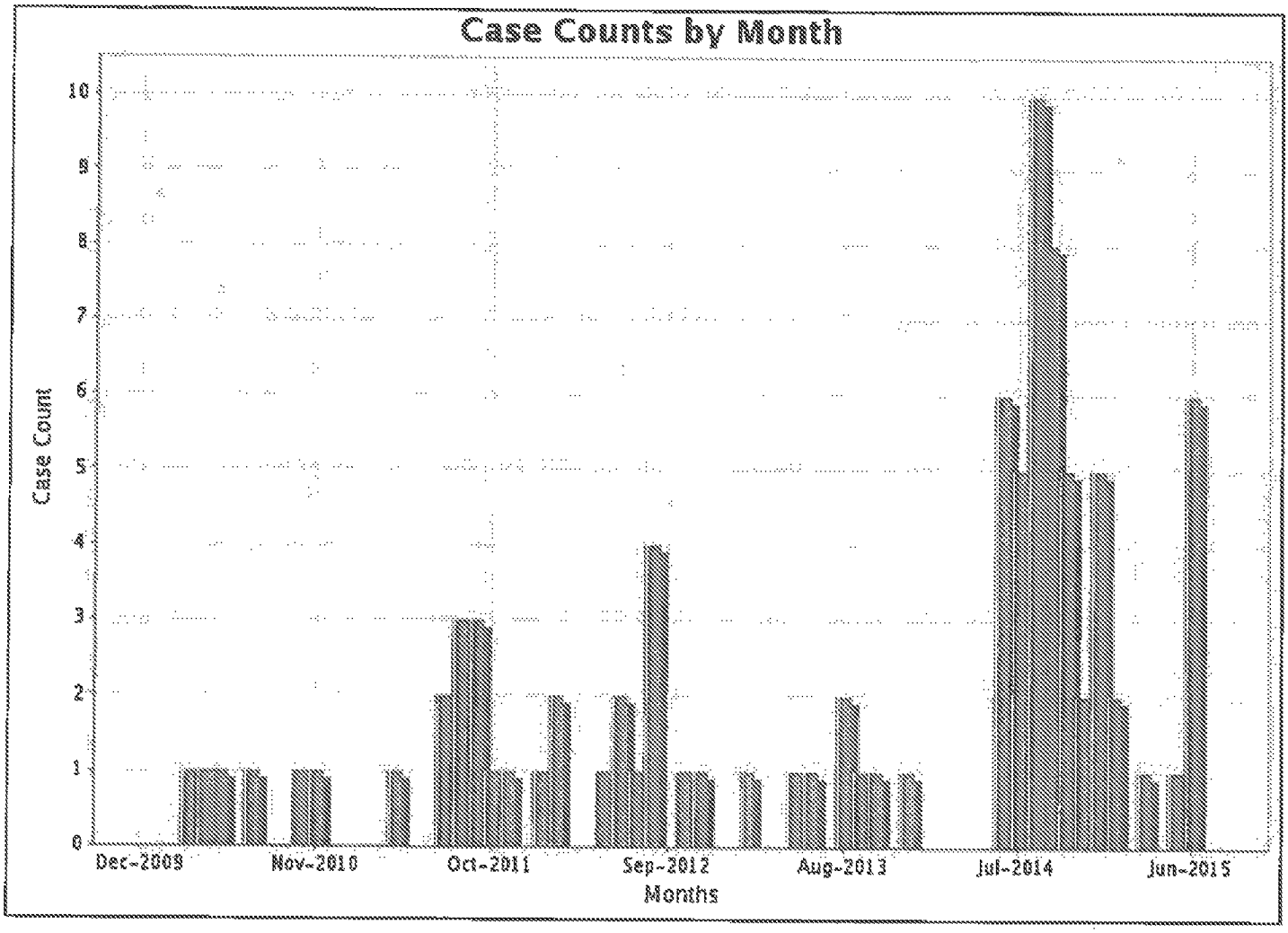
Reportable Condition: Legionellosis

Case Status: Confirmed, Probable, Suspect, Unknown

Investigation Status: Active, Completed, Completed - Follow Up, New, Review

Jurisdictions:
Genesee County

Case Types: Individual and Aggregate



Month	Total
MAR 2010	1
APR 2010	1
MAY 2010	1
JUL 2010	1
OCT 2010	1
NOV 2010	1
APR 2011	3
JUL 2011	2
AUG 2011	3
SEP 2011	3
OCT 2011	1
NOV 2011	1
JAN 2012	1
FEB 2012	2
MAY 2012	1
JUN 2012	2
JUL 2012	1
AUG 2012	4
OCT 2012	1
NOV 2012	1

Month	Total
FEB 2013	1
MAY 2013	1
JUN 2013	1
AUG 2013	2
SEP 2013	1
OCT 2013	1
DEC 2013	1
JUN 2014	6
JUL 2014	5
AUG 2014	10
SEP 2014	8
OCT 2014	5
NOV 2014	2
DEC 2014	5
JAN 2015	2
MAR 2015	1
MAY 2015	1
JUN 2015	6

Report 8: Epi-Curve Graph

Time Period: 06/01/2015 - 11/20/2015

Time Breakdown: by Month

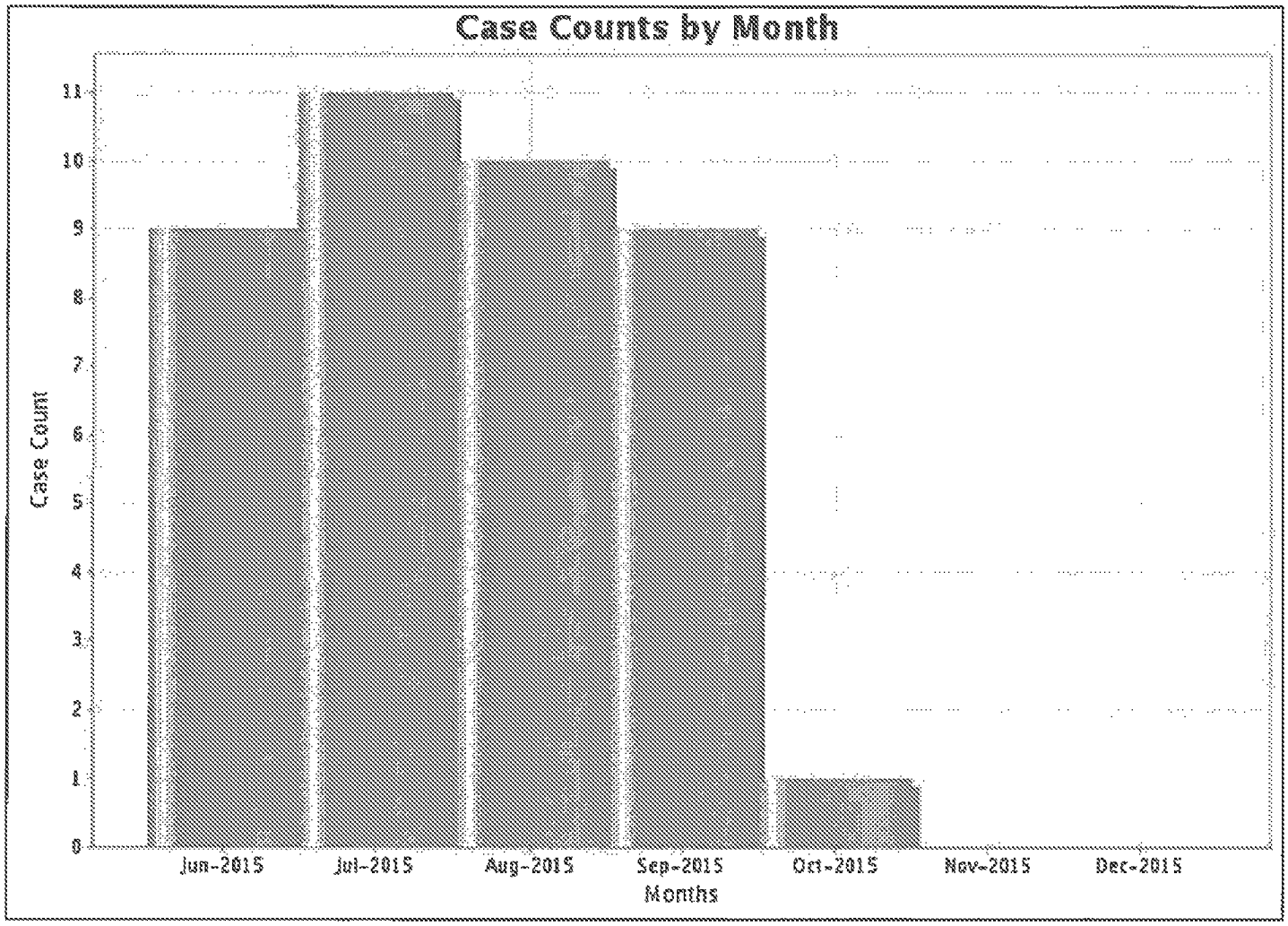
Reportable Condition: Legionellosis

Case Status: Confirmed

Investigation Status: Active, Canceled, Completed, Completed - Follow Up, New, Review, Superceded

Counties:
Genesee

Case Types: Individual and Aggregate



Month	Total
JUN 2015	9
JUL 2015	11
AUG 2015	10
SEP 2015	9
OCT 2015	1

40

- Since June 2014 elevated Legionella cases
- use of Legionella spec Q. was administered
- identification of hospital cluster
  - remediation
  - flow consultant in Spring 2015

Key - Brief on Legionella

Re: Effort into assist

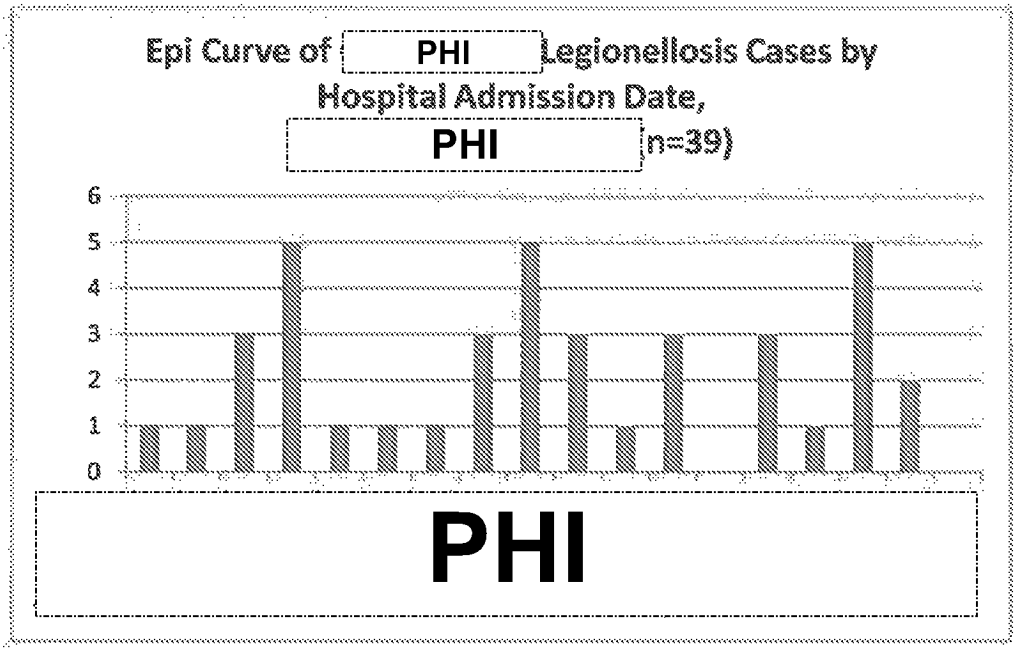
Summary: Analysis

Sept 28, 2015

Update on Legionellosis cases – PHI, Summer, 2015

Current Case Count

- 39 cases reported since 6/1/2015 (38 Legionnaires disease, 1 Pontiac Fever)
- 20 (51%) male; median age 65 years (range 35–89 years)
- 39 patients were hospitalized; 2 deaths
- **11 respiratory specimens are at BOL awaiting PFGE**



Based on the previous analysis given below on 31 cases as of Sept 4, 2015

- We continue to see subclustering with previous hospital exposure to McLaren Flint (58%). Cases are said to be clustered on several floors of one tower (to be confirmed)
- 29% have reported no prior hospitalization during their incubation period
- 13% prior hospitalization status unknown

Actions McLaren Flint has taken/is taking (filtered through GCHD)

- Hospital has been testing monthly at various locations since Fall of 2014
- McLaren is now working with a consultant, The Legionella Experts, Special Pathogens Lab, headed up by Dr Janet Stout, University of Pittsburgh, Swanson School of Engineering
- Hospital has been hyperchlorinating since last fall, but recently switched to monochloramine
- Upgrades have been made to the infrastructure (details unknown)
- McLaren is preemptively treating symptomatic patients who have been previously hospitalized in 2-week period prior to onset
- Staff receiving additional education about Legionella
- Using bottled water

Sept 28, 2015

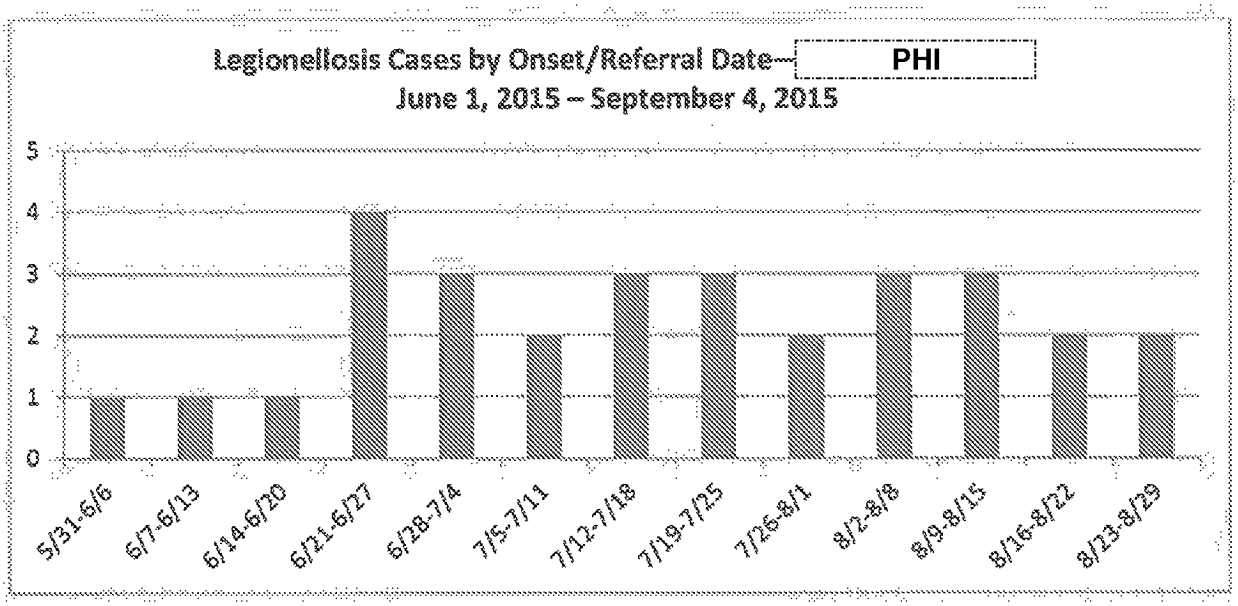
- Monitoring water temperatures
- Communication is now with Risk Management team

MDHHS Activities

- Continue to monitor case counts
- MDHHS staff attended a BugFuzz meeting Sept 11 with GCHD & hospitals
- MDHHS meeting planned with just McLaren and Genesee County Health Department shortly (as soon as Genesee can confirm at meeting) to learn specifics about the remedial work McLaren and the consultant are conducting
- Conference call planned with GCHD & hospitals

****

Previous analysis of 31 cases as of Sept 4, 2015 (M Weinberg)



5-year History of Confirmed Legionellosis Cases in PHI from June–August

	June	July	August	TOTAL (Jun-Aug)
2015	10	11	9	30
2014	6	5	10	21
2013	1	0	2	3
2012	2	1	4	7
2011	0	1	0	1
2009	1	1	2	4

- Previous hospitalization status (based on questionnaire and MDSS notes)
  - 18/31 (58%) were hospitalized within 2 weeks prior to current admission
    - 16 at McLaren

        - 1 at McLaren (5 days) and UofM (5 days)
        - 1 at McLaren (9 days) and Hurley (1 day)
    - 9/31 (29%) denied any hospitalizations 2 weeks prior to current admission
    - 4/31 (13%) with unknown previous hospitalization status. Of those,
        - 1 person previously hospitalized at Hurley, unknown dates
        - 1 person previously hospitalized at unknown location, unknown dates
        - 1 person was in McLaren ER for 2 hours
        - 1 person (Pontiac Fever case) was not interviewed
    - Note: I have not looked at outpatient visits or visits to hospitals as visitors.
- Lab results:
    - 31 (100%) were Legionella Urinary Antigen positive
    - 5 (16%) were culture confirmed; all *L. pneumophila* SG1.
    - Symptom onset dates of culture confirmed cases are PHI
    - Among the culture-confirmed,
        - 1 patient was hospitalized for 6 days at McLaren. Symptom onset began 8 days after discharge.
        - 2 patients deny hospitalization 2 weeks prior to onset.
        - 2 patients have an unknown hospitalization status.
- Additional risk factors based on enhanced Legionellosis questionnaire
    - 26/31 (84%)were interviewed
    - 19/26 (73%) report NOT receiving City of Flint water at residence
    - 4/26 (15%) report overnight travel 2 weeks prior to symptom onset
        - 1 person in Genesee County Jail for 2 nights
        - 1 person stayed at private cabin in Hubbard Lake
        - 1 person stayed at St. Ignace hotel for 1 night
        - 1 person stayed at an RV resort in Durand, MI for 1 night
    - 2/26 (8%) report hot tub use
        - 1 person used hot tub at St. Ignace hotel
        - 1 person reports daily hot-tub use
    - Note: I have not looked at the remaining potential community exposures (ie: grocery stores, salons, recreational water use, etc).

DRAFT REPORT
LEGIONELLOSIS OUTBREAK
SUMMARY
GENESEE COUNTY

May 2015 – November 2015

Abstract

This report provides a draft summary of the Legionellosis Outbreak Investigation in Genesee County, May 2015 – November 2015

Michigan Department of Health and Human Services

Draft Legionellosis Outbreak Summary — Genesee County

May 2015 – November 2015

Contents

Legionellosis Outbreak — Genesee County, May 2015–November 2015 2

Summary 2

Working Case Definitions 3

Data Sources 3

Epidemiology 3

Epi Curves 4

Five-year History 4

Cases Analyzed in Current Report 4

Residence Water Source 5

Inpatient Healthcare Exposure 5

Inpatient Healthcare Exposure by Residence Water Source 5

Prior Inpatient Hospitalization by Length of Stay and Residence Water Source 6

Enhanced Questionnaire Data 7

Water Changes at Residence 7

Work and Travel 8

Community Exposures 9

Water Exposures in the Home 9

Water Exposures Outside of the Home 10

Patient or Proxy Reported Comorbidities 10

Patient or Proxy Reported Health Behaviors 11

Laboratory Testing 11

PFGE Testing Summary 12

Case Flow-chart 13

Epi Curve 13

Legionellosis Outbreak — Genesee County, May 2015–November 2015

Summary

From May 2015 to November 2015, 42 legionellosis cases, all confirmed Legionnaires' disease (LD), were reported in Genesee County, Michigan. Four of these cases have died. The Michigan Department of Health and Human Services (MDHHS) assisted the Genesee County Health Department (GCHD) during their investigation.

Data were collected from patient medical record review, the Michigan Disease Surveillance System case report form, and interviews with case-patients or their proxies with an enhanced legionellosis questionnaire. In an attempt to identify community sources, case-patients or proxies were interviewed about travel, work, and locations visited during the 2 weeks prior to symptom onset (considered the incubation period for LD).

Median patient age was 65.5 years (range: 35–89); 22 (52%) were male. Illness onset dates ranged from PHI PHI and peaked in July and August with 11 cases in both months. Case-patients were interviewed by GCHD using an enhanced questionnaire; interviews were conducted for 39 of 42 (93%) cases.

All 42 cases were laboratory confirmed by *Legionella* urinary antigen test. Eleven respiratory specimens were submitted for culture to the MDHHS Bureau of laboratories for pulsed-field gel electrophoresis (PFGE) testing. Three samples were unsuitable for typing due to lack of culture growth or mold contamination. PFGE typing was completed on eight samples; 2 samples had matching PFGE patterns, while 6 had unique patterns.

Healthcare-associated LD was suspected for a subset of cases. Over half of the cases (23/42) had an inpatient (overnight) healthcare facility exposure in the two weeks prior to their illness onset (22 of these were hospitalized at the same healthcare facility). Short-term hospital exposure data, such as outpatient and hospital visits, for the current summary period are in the process of being evaluated.

The source of water at the primary residence was evaluated for all cases. Ten of 42 (24%) cases occurred in people whose residence received City of Flint water. Of the 19 persons (45%) that did not have an inpatient (overnight) healthcare facility exposure in the two weeks prior to their illness onset, three (16%) had residences on the City of Flint water system. Sixteen of 42 cases (38%) had no inpatient (overnight) exposure to a Flint hospital in the 2 weeks prior to illness, nor were their residences on the City of Flint water system.

Questionnaire interview data are currently being evaluated for other potential common exposures. At this time, beyond the healthcare facility exposure, no other known community exposures have been identified as a potential source of infection.

Enhanced surveillance will continue in 2016. Although in recent months reports of legionellosis cases in Genesee County have declined, MDHHS has recommended continued vigilant legionellosis awareness and surveillance, including interviewing of cases or proxies with the enhanced legionellosis questionnaire within one week of reporting. MDHHS also recommends the assistance of clinical community in LD surveillance through identification, testing, and reporting of all suspect cases. **Obtaining respiratory specimens in addition to urinary antigen testing is of critical importance in these increased surveillance efforts.** Because *Legionella* bacteria are commonly found in the environment, clinical isolates are necessary to interpret the findings of an environmental investigation in an outbreak. MDHHS has distributed updated legionellosis guidance to health care providers via the Michigan Health Alert Network.

Working Case Definitions

Confirmed Legionnaires' Disease (LD) – meets the CDC clinical and laboratory case definition for confirmed LD and illness occurred since May 1, 2015 in residents of Genesee County or those who had visited the Flint area in 2 weeks prior to their illness onset date.

Data Sources

1. Legionellosis Case Report Form in Michigan Disease Surveillance System (MDSS)
2. Medical record review from:
    a. Hospital A; Flint, MI
    b. Hospital B; Flint, MI
    c. Hospital C; Grand Blanc, MI
3. Patient interview using Genesee County-specific Legionellosis Questionnaire

Epidemiology

Number of lab-confirmed cases of Legionnaires' disease: 42

Geographic distribution: 42/42 Genesee County (15/42 City of Flint)

Age:

Range: 35-89 years
Average age: 65.7 years
Median age: 65.5 years

Sex: Males, 22/42 (52.4%)

Range of illness onset dates (n=42): PHI

Deaths (note added 1/15/16):* 4/42 (9.5%)

*Death associated with legionellosis was defined as one that occurred during hospitalization, within 30 days of hospital discharge, or Legionella was listed as a cause of death on the death certificate.
(Ref. Mykietiuk A et al. Clin Infect Dis. 2005 Mar 15;40(6): 794-9.)

Cases interviewed: 39 (38 completed plus 1 partial interview) /42 (92.9%)

Cases hospitalized: 42/42 (100%)

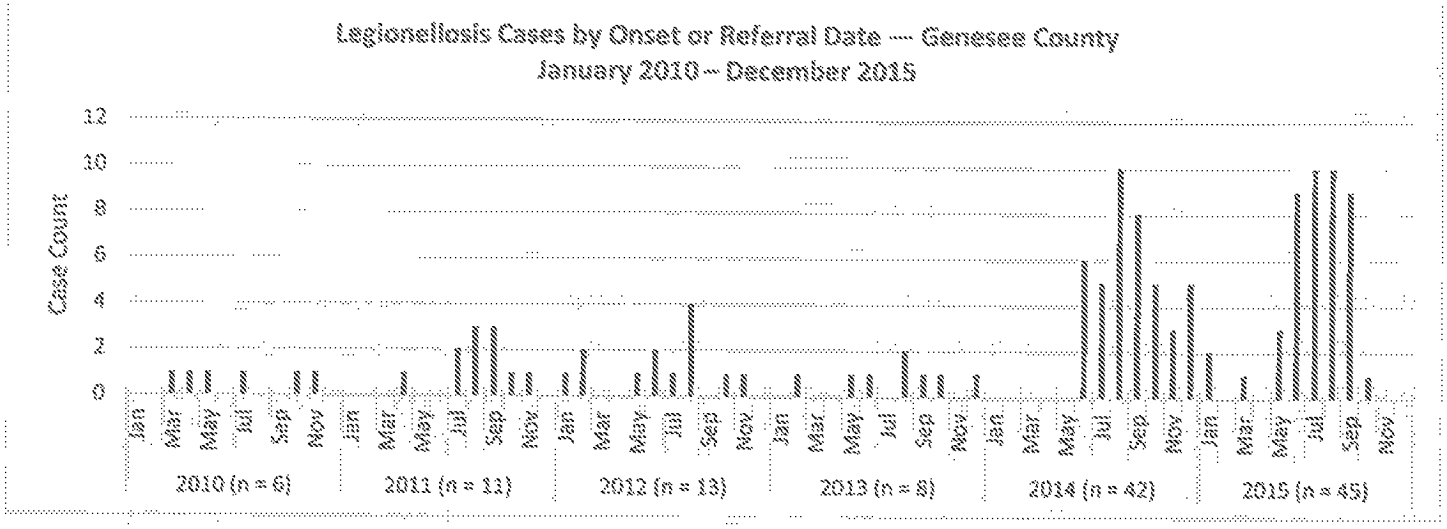
Cases with an inpatient (overnight) hospital exposure in the 2 weeks prior to illness onset: 23/42 (54.8%)

Cases with ≥1 co-morbidity: 32/39 (82.1%)

Cases who are current or former smokers: 28/39 (71.8%)

Epi Curves

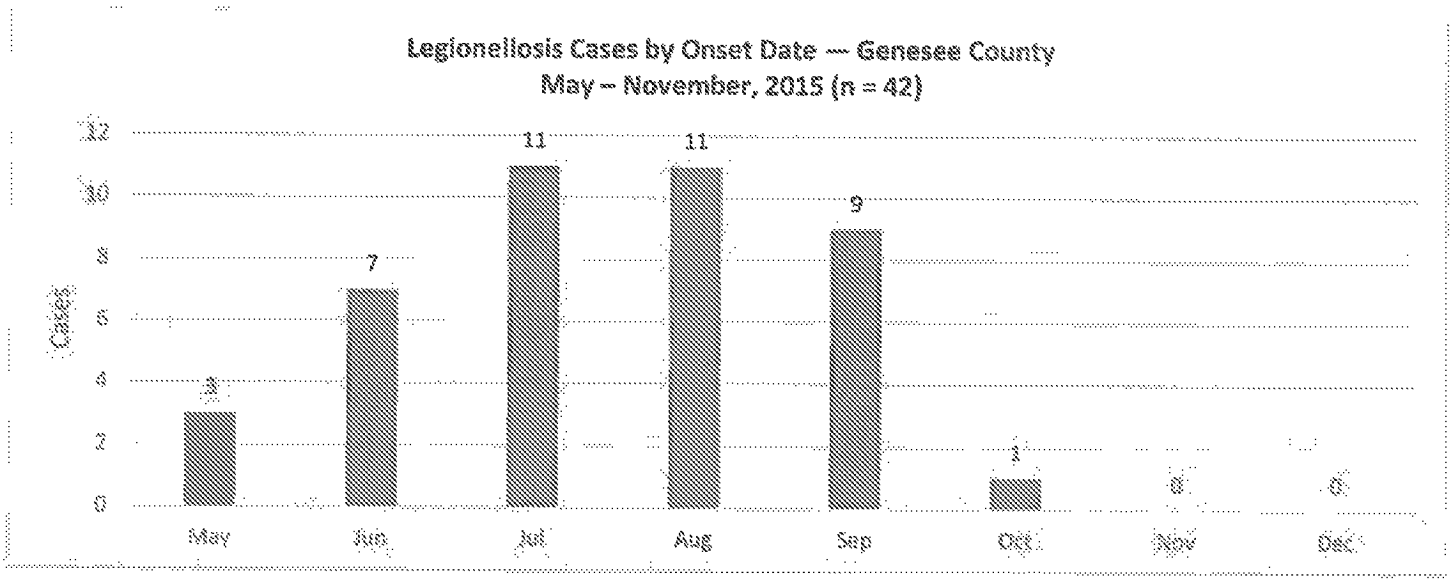
Five-year History



Note: If onset date was not available, referral date was used (i.e., date that the case was referred to public health). Cases in 2014 include one non-Genesee County resident associated with the 2014 outbreak.

Cases Analyzed in Current Report

This report summarizes data collected from 42 confirmed legionellosis cases that were reported May, 2015 through November, 2015. The final case included in the analysis had an illness onset at the end of October, but was reported the beginning of November.



Residence Water Source

Residence water source refers to the source of tap water at a patient's home residence during the 14 days before symptom onset and was determined by patient interview and verified by City of Flint water distribution map. Of the 42 cases, one case had exposure to both a private well and other municipal source during the 14 days prior to onset, accounting for the increase in the total (n = 43) in the table below.

Water Source at Residence	Total n = 43	
	n	%
City of Flint water	10	23.3
City of Flint Township water	0	0.0
Other municipal water system	14	32.6
Private well	17	39.5
Unknown*	2	4.7

*Represents two questionnaires that were not completed. Per the water distribution map, neither of these residences is on the City of Flint water system; it is unknown if the residence water sources were private wells or other municipal systems.

Inpatient Healthcare Exposure

A case was defined as having an inpatient healthcare exposure if they stayed overnight at Hospital A, B, or C in the Flint, Michigan area. Short-term exposures, such as outpatient and hospital visits, for the current summary period are in the process of being evaluated.

Inpatient Healthcare Exposure by Residence Water Source

	Total n = 42		Inpatient healthcare exposure n = 23		No known inpatient healthcare exposure n = 19	
	n	%	n	%	n	%
City of Flint Water	10	23.8	7	30.4	3	15.8
Other water at residence	32	76.2	16*	69.6	16	84.2

*One person who spent significant time at a hospital, but did not stay overnight, was included in the inpatient healthcare exposure category and calculations.

Prior Inpatient Hospitalization by Length of Stay and Residence Water Source

Location	n	Length of Stay	
		Median (days)	Range
Hospital A*	21	5	1–10
City of Flint water at patient residence	6	9	1–9
Other water at patient residence	15	4	1–10
Hospital A and Hospital C (residence on Flint water)	1		
Hospital A		1	
Hospital C		6	
Total	22**	5	1–10

Note: Length of stay = Number of days hospitalized during 14 days prior to symptom onset date.

*One person was also an inpatient at a hospital outside of Genesee County for 11 days during the 14 days prior to symptom onset date.

**The person who spent significant time at a hospital, but did not stay overnight, was excluded from the length of stay calculation.

Water Changes at Residence

Question Prompts:

Q4. During the last year, has the water pressure at your residence changed?

Q5. During the last year, has the water quality (appearance, taste, smell) at your residence changed?

Q6. Prior to your illness, did you make any recent plumbing changes or repairs at your residence?

Q7. Prior to your illness, were there any water main breaks or other water line issues that affected the water at your residence, including boil water advisories?

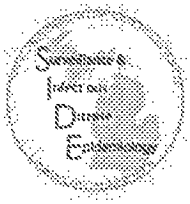
		City of Flint Water at Residence n = 9		Other Water Source at Residence n = 30		Total n = 39	
		n	%	n	%	n	%
Q4. Noticed changes in water pressure	Yes	2	22.2	6	20.0	8	20.5
	No	4	44.4	23	76.7	27	69.2
	Unknown	3	33.3	1	3.3	4	10.3
Q5. Noticed changes in water quality	Yes	7	77.8	5	16.7	12	30.7
	No	1	11.1	23	76.7	24	61.5
	Unknown	1	11.1	2	6.7	3	7.7
Q6. Made recent plumbing changes or repairs at residence	Yes	0	0.0	0	0.0	0	0.0
	No	9	100	30	100	39	100
	Unknown	0	0.0	0	0.0	0	0.0
Q7. Experienced water main breaks or water line issues that affected residence	Yes	1	11.1	1	3.3	2	5.1
	No	8	88.9	26	86.7	34	87.2
	Unknown	0	0.0	3	10.0	3	7.7

Work and Travel

Question Prompts:

- Q8. During this 2 week period (exposure period), did you work or volunteer, either full or part time?
- Q10. Visit, reside, or work in a long term care facility, nursing home, assisted living facility, or senior living facility?
- Q11. In the 2 weeks before you before you got sick, did you spend any nights away from home (excluding healthcare settings)?

	Total n = 39	
	n	%
Q8. Work outside of the home	8	20.5
Auto factory worker		
Bank teller		
Communications company worker		
Community health coach		
Construction company office worker		
Line worker		
Train engineer		
Yard worker/landscaper		
Q8. Volunteer outside of the home	0	0.0
Q10. Reside or visit an assisted living facility or rehab facility	3	7.7
Q11. Spend nights away from home	4	10.3



Community Exposures

Question prompt:

Q12. In the 2 weeks before you before you got sick, did you visit any of the following community venues?

	Total n = 38*	
	n	%
Hotel but did not stay overnight	1	2.6
Auditorium	1	2.6
Barbershop or Hair Salon	9	23.7
Car Wash	2	5.3
Casino	0	0.0
Place of Worship	11	28.9
Gym or Work-out Facility	2	5.3
Grocery	25	65.8
Home Improvement Store	9	23.7
Spa or Nail Salon	1	2.6
Mall or Department Store	4	10.5
Movie Theater	3	7.9

*One person refused to answer this portion of the interview

Water Exposures in the Home

Question prompt:

Q13. In the 2 weeks before you got sick, did you have exposure to any of the following water sources, either *at home* or while *away from home*?

	Total n = 38*	
	n	%
Shower	35	92.1
Use a detachable shower head or hose	18	47.4
Hot tub, whirlpool spa, Jacuzzi tub	2	5.3
Sat NEAR hot tub or whirlpool spa	0	0.0
Steam room or wet sauna	0	0.0
Humidifier	6	15.8
Respiratory therapy machine	3	7.9

*One person refused to answer this portion of the interview

Water Exposures Outside of the Home

	Total n = 38*	
	n	%
Showered outside the home	6	15.8
Use a detachable shower head or hose	4	10.5
Hot tub, whirlpool spa, Jacuzzi tub	1	2.6
Sat NEAR hot tub or whirlpool spa	0	0.0
Humidifier	0	0.0
Pool/splash pad/waterpark	1	2.6
Recreational or cooling misters	2	5.3
Steam room or wet sauna	0	0.0
Decorative fountain	0	0.0
Outdoor watering hose or sprinkler	6	15.8
Beach, lake, pond, river, creek	1	2.6

*One person refused to answer this portion of the interview

Patient or Proxy Reported Comorbidities

	Total n = 39	
	n	%
≥1 comorbidity	32	82.1
Chronic kidney disease	7	17.9
Immunocompromised	8	20.5
Diabetes	15	38.5
Chronic lung disease	7	17.9
Asthma or chronic bronchitis	6	15.4
Heart disease or congestive heart failure	25	64.1
Liver disease	1	2.6

Patient or Proxy Reported Health Behaviors

	Total n = 39	
	n	%
Smoking Status		
Never smoker	10	25.6
Current smoker	11	28.2
Former smoker	17	43.6
Lives with smoker	1	2.6
Drinks alcohol		
Yes	13	33.3
No	18	46.2
Not specified	8	20.5

Laboratory Testing

	Total n = 42	
	n	%
Urinary Antigen Positive	42	100
Sputum Culture Positive		
Yes (*Legionella pneumophila* – serogroup 1)	8	19.0
No	5	11.9
Specimen culture not collected	29	69.0
PFGE Match		
Yes	2	4.8
No	6	14.3
PFGE not performed due to lack of culture/isolate, or negative culture	34	81.0

PFGE Testing Summary

Number of legionellosis cases with PFGE performed: 8

Geographic residence distribution: 3 Flint, 3 Burton, 1 Mount Morris, 1 Grand Blanc

Age range: 45-85 years

Average age (median): 60.3 years (56 years)

Sex: Males, 50% (4/8)

Number of (%) cases interviewed: 6 completed + one partial (75% complete)

-6/8 specimens had unique patterns:

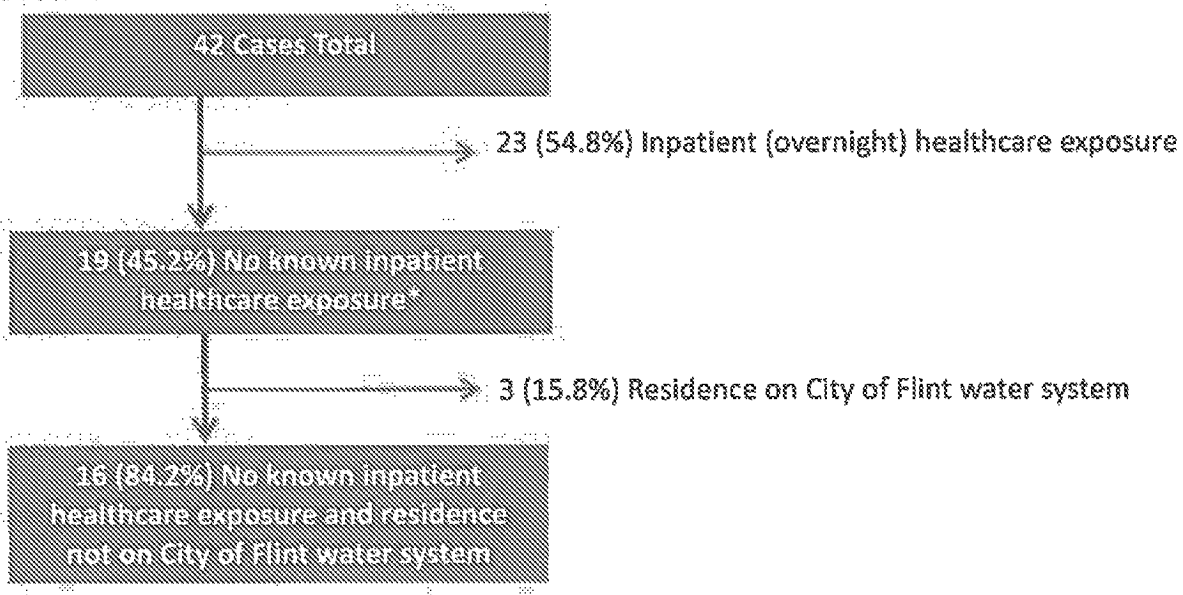
Onset	Hospitalization within 2 weeks prior to onset?	Residence on City of Flint water?
PHI	No	No
	No	No
	No	No
	No	No
	Yes- Hospital A & Hospital C	Yes
	No	No

-2/8 specimens had matching patterns:

Onset	Hospitalizations within 2 weeks prior to onset?	Residence on City of Flint water?
PHI	Yes- Hospital A	No
	No	No

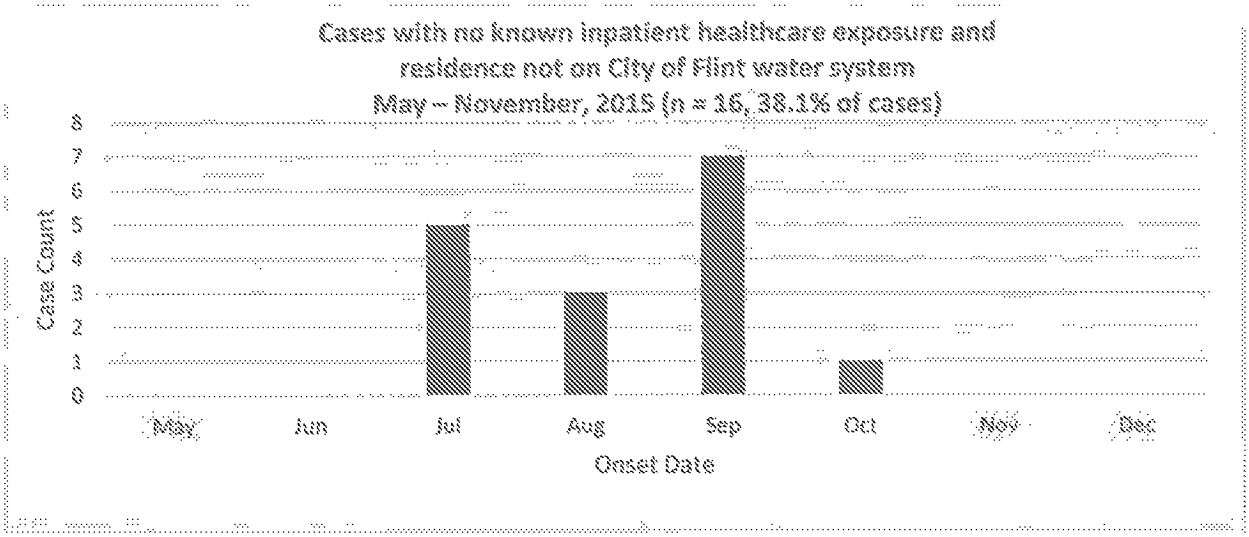
Cases with No Known Healthcare Exposure and Residence not on Flint Water Supply

Case Flow-chart



*Outpatient and visitor healthcare exposures for the current summary period are in the process of being evaluated.

Epi Curve



Legionellosis Outbreak — PHI June 2014–March 2015

Contents

Legionellosis Outbreak — PHI June 2014–March 2015 2
Summary 2
Working Case Definitions 3
Data Sources 3
Epidemiology 3
Epi Curves 4
Five-year History 4
Cases Analyzed in Current Report 4
Cases by Residence Water Source 5
Healthcare Exposure 5
Healthcare Exposure by Residence Water Source 5
Hospitalized Cases By Length of Stay and Residence Water Source 6
Water Changes at Residence 7
Work and Travel 8
Community Exposures 9
Water Exposures in the Home 10
Water Exposures Outside of the Home 10
Patient or Proxy reported Comorbidities 11
Patient or Proxy reported Health Behaviors 11
Cases with No Known Healthcare Exposure and Residence not on Flint Water Supply 12
Case Flow-chart 12
Epi Curve 12

Legionellosis Outbreak — PHI June 2014–March 2015

Summary

From PHI 45 legionellosis cases, all confirmed Legionnaires' disease (LD), were reported in Genesee County, Michigan. Seven of these cases have died; one death was attributable to *Legionella* pneumonia. The Michigan Department of Health and Human Services (MDHHS) assisted the Genesee County Health Department (GCHD) in the investigation.

Data were collected from patient medical record review, the Michigan Disease Surveillance System case report form, and interviews with case-patients or their proxies with an enhanced legionellosis questionnaire. In an attempt to identify community sources, case-patients or proxies were interviewed about travel, work, and locations visited during the 2 weeks prior to symptom onset (considered the incubation period for LD).

All 45 cases were laboratory confirmed by *Legionella* urinary antigen test; one sputum specimen was collected, which was *Legionella* culture negative. Median patient age was 62 years (range: 26–94); 23 (51%) were male. Illness onset dates ranged from PHI and peaked in PHI with 10 cases. Multiple attempts by phone and letter were made to contact all case-patients; interviews using the enhanced questionnaire were completed on 30 of 45 (67%).

Healthcare-associated LD was suspected for a subset of cases. Results demonstrated that over half (27/45) of the cases had a healthcare facility exposure in the two weeks prior to their illness onset (23 were hospitalized at or had visited the same healthcare facility). In response, the healthcare facility has implemented multiple environmental and procedural measures to alleviate the situation.

The source of water at the primary residence was evaluated for all cases. Twenty-one of 45 (47%) cases occurred in people whose residence received City of Flint water. Of the 18 persons that did not report healthcare visits, 8 (44%) were exposed to Flint water at their home.

Ten cases had no exposure to a Flint hospital in the 2 weeks prior to illness nor were their homes on the Flint water system.

Other possible exposures were evaluated and no other known community exposures were identified.

Enhanced surveillance has continued for the remainder of 2015. All cases reported in 2015 will be summarized at year end. The lack of clinical *Legionella* isolates during the time period described in this summary precludes our ability to link cases to an environmental source. MDHHS has recommended vigilant legionellosis awareness and surveillance in Genesee County, including interviewing of cases or proxies with the enhanced legionellosis questionnaire within one week of reporting. MDHHS also recommends the clinical community assist in LD surveillance through accurate identification, testing, and reporting of all suspect cases. Obtaining respiratory specimens in addition to urinary antigen testing is of critical importance in these increased surveillance efforts. Because *Legionella* spp. are commonly found in the environment, clinical isolates are necessary to interpret the findings of an environmental investigation in an outbreak. To assist, MDHHS prepared updated legionellosis guidance to be distributed to health care providers via the Michigan Health Alert Network.

Working Case Definitions

Confirmed Legionnaires' Disease (LD) – meets the CDC clinical and laboratory case definition for confirmed LD and illness occurred since June 1, 2014 in residents of Genesee County or those who had visited the Flint area in 2 weeks prior to their illness onset date.

Suspected LD – meets the CDC clinical and laboratory case definition for suspected LD and illness occurred since June 1, 2014 in residents of Genesee County or those who had visited the Flint area in 2 weeks prior to their illness onset date.

Data Sources

1. Legionellosis Case Report Form in Michigan Disease Surveillance System (MDSS)
2. Medical record review from:
    a. Hospital A; Flint, MI
    b. Hospital B; Flint, MI
    c. Hospital C; Grand Blanc, MI
3. Patient interview using Genesee County-specific Legionellosis Questionnaire

Epidemiology

Number of lab-confirmed cases of Legionnaires' disease: 45

Geographic distribution:

PHI

Age range: 26-94 years

Average age (median): 62.1 years (63 years)

% Males: 51% (23/45)

Range of illness onset dates (n=45): **PHI** 9 mo.

Number (%) of deaths: 15.6% (7/45) 5/45 = 11.1%

Number of cases interviewed: 29 completed + one partial (63% complete; 95.7% in total attempted/completed)

Number (%) of cases hospitalized: 45/45 (100%). Number in ICU: 22/45 (48.8%)

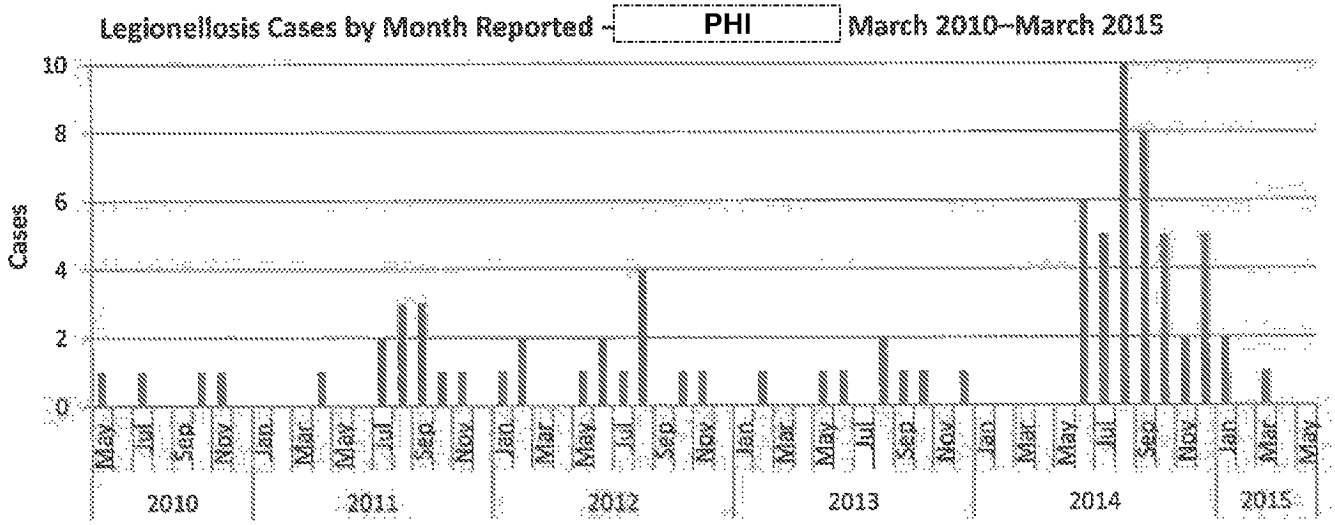
Number (%) of cases who had been hospitalized in 2-weeks prior to onset: 19/45 (37.8%)

Number (%) of cases with ≥1 co-morbidity: 25/29 interviewed (86%)

Number (%) of cases who are current or former smokers: 24/29 interviewed (83%)

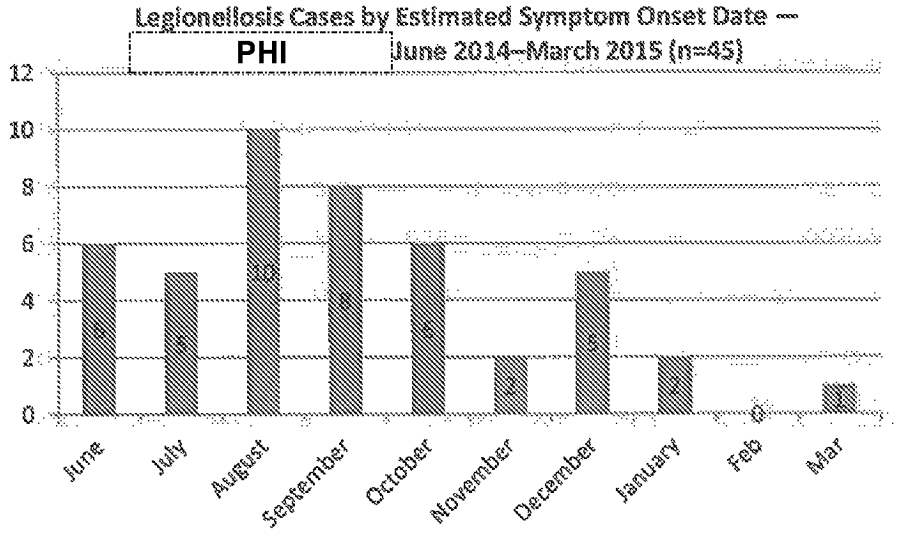
Epi Curves

Five-year History



Cases Analyzed in Current Report

This report summarizes data collected from the 45 confirmed legionellosis cases that occurred June 1, 2014 through March 31, 2015.



Cases by Residence Water Source

Residence water source refers to the source of tap water at patient's home residence during the 14 days before symptom onset and was determined by patient interview and verified by City of Flint water distribution map.

Water Source at Residence	Total N=45	
	n	%
City of Flint water	21	47
City of Flint Township water	3	7
Other municipal water system	4	9
Private well	7	16
Unknown	10	22

Healthcare Exposure

A person was defined as having a healthcare exposure if they visited a hospital or clinic in Flint, Michigan as an inpatient, outpatient, or visitor during the 14 days prior to their symptom onset date.

Healthcare Exposure by Residence Water Source

	Total N=45		Healthcare exposure N=27		No known healthcare exposure N=18	
	n	%	n	%	n	%
City of Flint Water	21	47	13	48	8	44
Other water at residence	24	53	14	52	10	56

Hospitalized Cases By Length of Stay and Residence Water Source

Location	Length of Stay*		
	N	Median (days)	Range
Hospital A	16	2	0.5–14
City of Flint water at patient residence	7	2	0.5–7
Other water at patient residence	9	5	1–14
Hospital B	2	1.5	1–2
City of Flint water at patient residence	1	1	
Other water at patient residence	1	2	
Hospital A and Hospital B; Residence on Flint water	1	5	
Hospital A		3	
Hospital B		2	
Total	19	3	0.5–14

* Length of stay = Number of days hospitalized during 14 days prior to symptom onset date.

Water Changes at Residence

Question Prompts:

Q4. During the last year, has the water pressure at your residence changed?

Q5. During the last year, has the water quality (appearance, taste, smell) at your residence changed?

Q6. Prior to your illness, did you make any recent plumbing changes or repairs at your residence?

Q7. Prior to your illness, were there any water main breaks or other water line issues that affected the water at your residence, including boil water advisories?

	Flint Water at Residence (N=13)		Other Water Source at Residence (N=17)		Total (N=30)	
	n	%	n	%	n	%
Q4. Noticed changes in water pressure	2	15	1	6	3	10
Q5. Noticed changes in water quality	10	77	0	0	10	33
Q6. Made recent plumbing changes or repairs at residence	1	8	2	12	3	10
Q7. Experienced water main breaks or water line issues that affected residence	6	46	0	0	6	20

Work and Travel

Question Prompts:

- Q8. During this 2 week period (exposure period), did you work or volunteer, either full or part time?
- Q10. Visit, reside, or work in a long term care facility, nursing home, assisted living facility, or senior living facility?
- Q11. In the 2 weeks before you before you got sick, did you spend any nights away from home (excluding healthcare settings)?

	Total N=30	
	n	%
Q8. Work outside of the home	5	17
Contractor/painter		
Construction		
HR technician		
Industrial painter		
Welder		
Q8. Volunteer outside of the home	0	0
Q10. Reside or visit an assisted living facility or rehab facility	3*	10
Q11. Spend nights away from home	2**	7

* Patients visited three different locations; none on City of Flint Water

**Patients stayed in two different hotels outside of Flint and stayed ≤2 nights each.

Community Exposures

Question prompt:

Q12. In the 2 weeks before you before you got sick (_____to _____), did you visit any of the following community venues?

	Total N = 29*	
	n	%
Hotel but did not stay overnight	0	0
Auditorium	1	3
Barbershop or Hair Salon	7	24
Car Wash	5	17
Casino	3	10
Place of Worship	8	28
Gym or Work-out Facility	1	4
Grocery	20	69
Home Improvement Store	7	24
Spa or Nail Salon	0	0
Mall or Department Store	2	7
Movie Theater	0	0

* Number decreased compared to previous tables because of the one partial interview.

Water Exposures in the Home

Question prompt:

Q13. In the 2 weeks before you got sick (__/__/__ to __/__/__), did you have exposure to any of the following water sources, either *at home* or while *away from home*?

	Total N = 29	
	n	%
Shower	27	93
Use a detachable shower head or hose	8	28
Hot tub, whirlpool spa, Jacuzzi tub	2	7
Sat NEAR hot tub or whirlpool spa	0	0
Steam room or wet sauna	0	0
Humidifier	8	28
Respiratory therapy machine	6	21

Water Exposures Outside of the Home

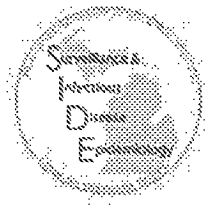
	Total N = 29	
	n	%
Use a detachable shower head or hose	1	3
Hot tub, whirlpool spa, Jacuzzi tub	0	0
Sat NEAR hot tub or whirlpool spa	0	0
Humidifier	1	3
Pool/splash pad/waterpark	3	10
Recreational or cooling misters	0	0
Steam room or wet sauna	0	0
Decorative fountain	1	3
Outdoor watering hose or sprinkler	5	17
Beach, lake, pond, river, creek	2	7

Patient or Proxy reported Comorbidities

	Total N = 29	
	n	%
≥1 comorbidity	25	86
Chronic kidney disease	11	38
Immunocompromised	9	31
Diabetes	12	41
Chronic lung disease	12	41
Asthma or chronic bronchitis	7	24
Heart disease or congestive heart failure	12	41
Liver disease	0	0

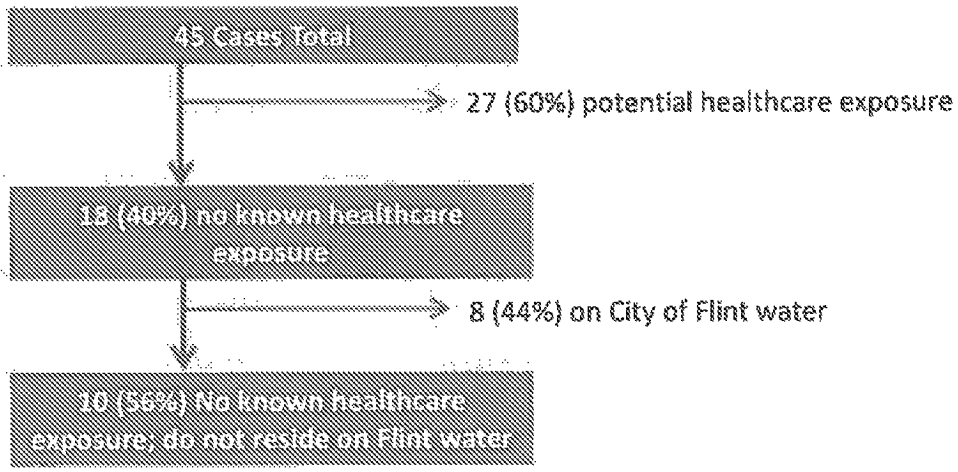
Patient or Proxy reported Health Behaviors

	Total N=29
Former or current smoker, n (%)	24 (83)
Median packs per day (range)	1 (0.14–3.5)
Median years (range)	30 (15–48)
Drinks alcohol, n (%)	9 (31)
Median drinks per day (range)	1 (0.1–2)
Median years (range)	45 (1–57)

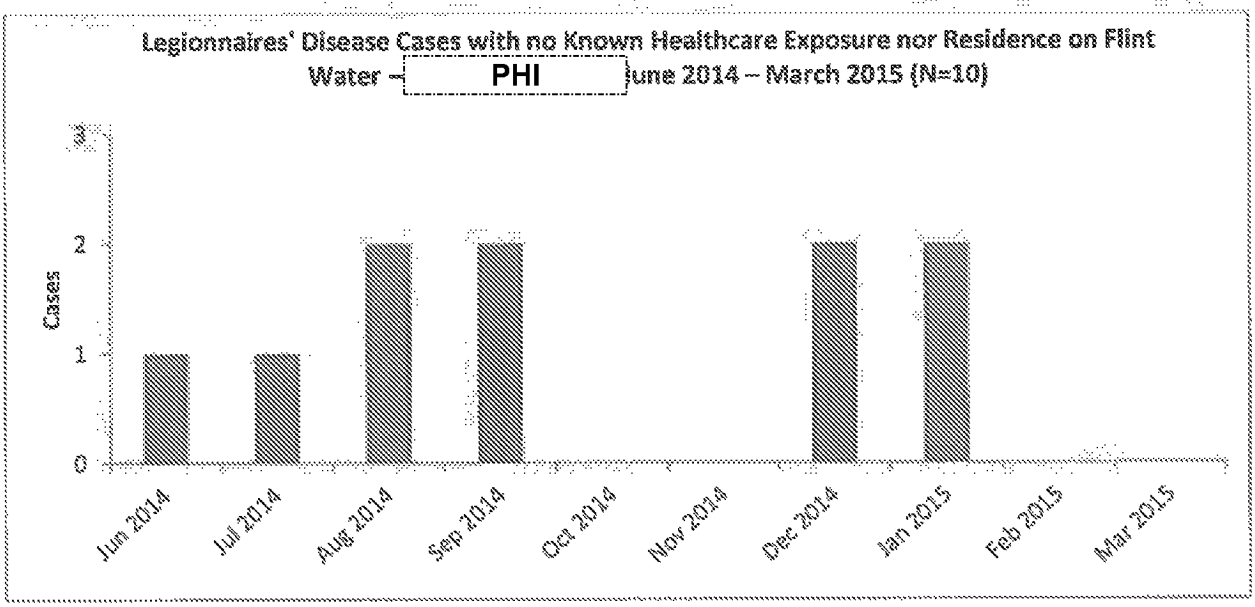


Cases with No Known Healthcare Exposure and Residence not on Flint Water Supply

Case Flow-chart



Epi Curve



DRAFT 11/24/15

MDHHS Talking Points

2014-2015 Genesee County Health Department Legionellosis Public Health Investigation

Legionellosis Background:

Legionella is a type of bacteria found naturally in fresh water environments. This bacteria grows best in warm water, like the kind found in hot tubs, cooling towers, hot water tanks, potable water systems, and decorative fountains. When people are exposed to the bacteria, it can cause illness. Legionellosis is a respiratory disease caused by *Legionella* bacteria. Sometimes the bacteria infect the lungs and cause pneumonia, called Legionnaires' disease. The bacteria can also cause a less serious infection that presents more like a mild case of the flu; this form of legionellosis is called Pontiac fever. People are exposed to *Legionella* when they breathe in a mist or vapor containing the bacteria.
Legionella cannot spread from one person to another person. Most people exposed to the bacteria do not become ill. People at higher risk of getting sick include: individuals over 50 years old; current or former smokers; those with chronic lung disease; people with a weakened immune system from diseases like cancer, diabetes, or kidney failure; and individuals who take medications that weaken the immune system, such as steroids or chemotherapy. Cases of legionellosis are most common during the late spring through early fall.

Timeline of MDHHS Assistance to GCHD:

Fall 2014 - DHHS increased surveillance of GCHD legionellosis cases, requested need for clinical specimens, and offered assistance to GCHD re environmental testing

- **Created a comprehensive linelist of cases**

- Offered to help with creating a questionnaire

Jan 23, 2015 Email from Jim Collins officially offering our assistance to GCHD and request for conference call

Jan 27. 2015 Call with GCHD – identified gaps in investigation that need to be addressed (need for questionnaire to reinterview cases, continued request for clinical specimens, get complete epi data on cases, map cases, and areas in which MDCH could offer of assistance)

Jan 28, 2015 Call with hospitals and DEQ at Hurley's request

Feb 11, 2105 - DHHS **provided Legionellosis Guidance for Clinicians** to be included with HAN to providers (GCHD sent email not HAN on Feb 13 to hospitals only)

Feb 13-20, 2015 - Finalized an **outbreak-specific Legionella questionnaire** to be administered to all cases

Feb 19, 2015 -Call with GCHD to discuss questionnaire and investigation

Feb-May 2015-DHHS Team of four **conducted interviews with patients**

- **Conducted medical chart reviews on all cases** (June 2014 – March 2015) to complete epi data. Obtained death certificates for deceased cases

- **Updated MDSS case records**

- DHHS **mapped cases on Flint water system map**

April 7, 2015 DHHS & DEQ call with GCHD to discuss investigation progress and to wrap up interviewing. DHHS **provided updated stats**

April 14, 2015 DHHS met with DEQ

April 22, 2015 Call with CDC and GCHD

April 29, 2015 **Finalized epi analysis from survey results.** DEQ met with McLaren & Hurley to review HACCP programs re plumbing systems

April 30, 2015 Call with GCHD & CDC & call with DEQ

May 18, 2015 **Provided updated clinical guidance to GCHD; drafted letter to be mailed out to cases not yet interviewed as a last call**

June 4, 2015 Shared a copy of the epi summary of June 2014 – March 2015 cases with GCHD and hospitals

Sept 8, 2015 DHHS completed **new analysis of 2015 cases since June. Lab testing of clinical specimens**

Oct 22, 2015 Call with GCHD and assisted with data for Bug Fuzz meeting on Oct 23

Analysis Highlights:

June, 2014- March, 2015:

- 45 cases of Legionnaires' disease (LD) including 7 deaths were reported in PHI Michigan.

-Median patient age was 62 years (range: 26--94); 23 (51%) cases were male.

-Illness onset dates ranged from PHI and peaked in PHI with 10 cases.

- 45/45 (100%) cases were laboratory confirmed by *Legionella* urinary antigen test; one sputum specimen was collected, which was *Legionella* culture negative.

Beginning at the end of February, 2015 enhanced data were collected from patient medical record review, the Michigan Disease Surveillance System case report form, and interviews with case-patients or their proxies with an extended/detailed legionellosis questionnaire that included questions regarding travel, work, and locations visited during the 2 weeks prior to symptom onset.

- 30/45 (67%) cases were able to be contacted and interviewed using the enhanced questionnaire

Potential healthcare-associated cases

-19/45 (42%) patients were hospitalized (admitted) during the 2 weeks prior to symptom onset.16 (84%) were hospitalized at hospital A, 2 (11%) at hospital B, and 1 (5%) at hospitals A and B.

- 8 persons were exposed to Flint hospitals as outpatients or visitors; 5 (63%) to hospital A, 2(25%) to hospital B, and 1 (15%) to hospitals A and B.

-In total, 23/45 (51%) patients were exposed to hospital A as an inpatient, outpatient, or visitor.

-10/4/14 Hospital A hyperchlorinated their water system and continued to monitor for *Legionella*

Exposure to the municipal water system

-21/45 (47%) cases occurred in people whose residence received City of Flint water.

-10/13 (77%) people interviewed who lived on Flint water reported changes in water quality

- 6/13 (46%) experienced water main breaks or water line issues at or near their residence prior to illness.

-8/18 (44%) persons that did not report healthcare visits had Flint water at their home.

-10/45 (22%) cases had no exposure to a Flint hospital in the 2 weeks prior to illness and their homes were not on the Flint water system.

May, 2015- November, 2015: (Preliminary data, the current season is still being evaluated and analyzed)

- 42 cases of Legionellosis reported (41 Legionnaires disease, 1 Pontiac Fever) including 2 deaths.

- Median age 67 years (range 35--89 years); 22/42 (52%) male

- Illness onset dates ranged from PHI and peaked in July and August with 11 cases each month.

- 42/42 (100%) of patients were hospitalized for their illness

- 42/42 (100%) cases were Legionella Urinary Antigen positive

- 11 respiratory specimens were received at the MDHHS Bureau of Labs for culture/typing

-8/11 were culture confirmed; all *L. pneumophila* Serogroup 1

-3/11 specimens unsuitable for PFGE: 2 no growth, 1 specimen overgrown with mold

-8/11 specimens were able to have PFGE performed

-6/8 specimens had unique patterns; 0/8 had hospitalizations in 2 weeks prior to onset, 1/8 had City of Flint water at residence

-2/18 had matching PFGE patterns; 1/2 was hospitalized at Hosp A during 2 weeks prior to onset, 0/2 had City of Flint water at their residence

-38/42 (90%) cases interviewed with supplemental questionnaire

Potential healthcare-associated cases

- 20*/42 (48%) cases hospitalized (admitted) during the 2 weeks prior to onset

- 19/20 (95%) were hospitalized at Hospital A in the 2 weeks prior to their onset

- The last case with a hospitalization exposure to Hospital A during the 2 weeks prior to onset occurred in August

-*1/20 (5%) was not hospitalized, but spent significant time at Hospital B during the 2 weeks prior to onset

- 22/42 (52%) cases have no prior hospitalization reported during the 2 weeks prior to onset

- Outpatient visits and visitations to hospitals are still being assessed for the current season.

Exposure to the municipal water system

- 10/42 (23%) cases occurred in people whose residence received City of Flint water.

    - 6/10 (60%) of cases with residence on the City of Flint water system also had a hospitalization at Hospital A during the 2 weeks prior to onset.

- 32/42 (76%) case residences NOT on the City of Flint water system

-15/42 (36%) cases had no reported admissions to a Flint hospital in the 2 weeks prior to illness and their homes were not on the Flint water system.

MDHHS recommendations from ongoing investigation: Because *Legionella* spp. are commonly found in the environment, clinical isolates are necessary to interpret the findings of an environmental investigation in an outbreak. The small number of clinical *Legionella* isolates collected from patients hinders our ability to link cases to an environmental source as only 2/8 isolates match and no common exposure among those patients is known. As epidemiologic data did not indicate a common community source, locations for environmental testing have been unable to be determined. MDHHS recommends continued vigilant legionellosis awareness and surveillance in Genesee County, including immediate interviewing of cases or proxies with the enhanced legionellosis questionnaire within one week of reporting. MDHHS also recommended the clinical community assist in LD surveillance through accurate identification, testing, and reporting of all suspect cases. Obtaining respiratory specimens in addition to urinary antigen testing is of critical importance in these increased surveillance efforts.

2010 County Population on Flint Water	68,237
2010 County Population Not On Flint Water	356,732
2010 County Population	424,969

	June 2014-March 2015		May 2015-November 2015	
	No.	%	No.	%
City of Flint water				
Healthcare Exposure	13	29%	7	16%
No healthcare exposure	8	18%	3	7%
Other water at residence				
Healthcare Exposure	14	31%	17	40%
No healthcare exposure	10	22%	16	37%
	45	100%	43	100%

	June 2014-March 2015		May 2015-November 2015	
	%	per 100,000	%	per 100,000
City of Flint water (n=68237)				
Healthcare Exposure	0.0191%	19.1	0.0103%	10.3
No healthcare exposure	0.0117%	11.7	0.0044%	4.4
Other water at residence (n=356732)				
Healthcare Exposure	0.0039%	3.9	0.0048%	4.8
No healthcare exposure	0.0028%	2.8	0.0045%	4.5

	June 2014-March 2015		May 2015-November 2015	
	No.	%	No.	%
Healthcare Exposure				
City of Flint Water	13	29%	7	16%
Other water at residence	14	31%	17	40%
No healthcare exposure				
City of Flint Water	8	18%	3	7%
Other water at residence	10	22%	16	37%
	45	100%	43	100%

	June 2014-March 2015		May 2015-November 2015	
	%	per 100,000	%	per 100,000
Healthcare Exposure				
City of Flint Water (n=68237)	0.0191%	19.1	0.0103%	10.3
Other water at residence (n=356732)	0.0039%	3.9	0.0048%	4.8
No healthcare exposure				
City of Flint Water (n=68237)	0.0117%	11.7	0.0044%	4.4
Other water at residence (n=356732)	0.0028%	2.8	0.0045%	4.5

From CDC

not age-adjusted

EXECUTIVE SUMMARY

Special Pathogens Laboratory (SPL) was contacted by McLaren Flint Health Care to assist the hospital in responding to an increase in the incidence of Legionnaires' disease due to *Legionella pneumophila*, serogroup 1. The Genesee County Health Department had also been in contact with the hospital regarding cases of Legionnaires' disease in patients that had been diagnosed and treated at the hospital. This increase in cases had been observed over the past year when water quality in Flint was adversely affected when the city switched from Detroit water to the Flint River last year.

SPL was asked to provide consultation services, including an on-site risk assessment, review of the facility's current Legionella policy, and development of a Water Safety Plan for the facility.

Assessments of McLaren Flint Hospital buildings were performed from August 11 – 13, 2015. The assessment including collection of samples for *Legionella* culture from distal hot water sites, distal cold water sites, hot water heaters, a hot water return, and the cold water entries. Physicochemical measurements, including pH, temperature, and free chlorine, were also taken.

Legionella pneumophila serogroup 1 was detected across all systems, with the majority of hot water distal sites (water outlets) showing some level of positivity.

McLaren Flint Hospital Administration, Infectious Diseases, Facilities Engineering and Infection Control acted aggressively to address the potential risk for hospital-acquired Legionnaires' disease. Staff worked with SPL to expedite both short and long-term approaches to prevention. This included recommendations for rapid identification and treatment of cases as well as recommendations regarding options for installation of secondary water treatment (disinfection).

The hospital staff performed a "shock" hyperchlorination disinfection in Buildings F, A, and B/C. The hyperchlorination disinfection for Building F Upper System was completed on August 14-15, 2015 and re-sampled for *Legionella* on August 17, 2015.

The "post-disinfection" culture results showed that *Legionella* concentrations were significantly lower—indicating the hyperchlorination disinfection was a successful short-term remediation which temporarily reduced *Legionella*.

Long-term secondary disinfection with monochloramine was recommended in patient care areas because of its proven efficacy and ability to rapidly reduce *Legionella* in hospital hot water systems. A Water Safety Plan is being developed to provide on-going risk management and to comply with the new ASHRAE 188 Legionella standard.

These efforts have resulted in successfully reducing *Legionella* in the hospital water systems. No cases of healthcare-acquired Legionnaires' disease were identified following these measures.

McLaren
FLINT

SPECIAL UPDATE

Over the past several weeks, there has been an increase in the number of Legionella cases throughout Genesee County. Although a clear source for this increase has not been specifically identified, McLaren Flint is taking proactive and precautionary measures to ensure that we are implementing all recommended practices and safety measures in the prevention and elimination of Legionella in the water system at our facility. In this initiative, we are working in partnership with the Genesee County Health Department and have engaged with leading experts in this field.

Beginning Friday, August 14, we are taking the following steps:

1. Adding additional chlorine to our water supply, while still maintaining levels well within safe drinking standards.
2. Providing bottled water for drinking while we are implementing specific measures. Patients will receive bottled water with all meals, and it will also be available on the unit throughout the day. Employees will also have access to bottled water for drinking purposes.
3. Implementing hyperchlorination of our water system to reinforce the routine, twice-a-year hyperchlorination process that was last implemented in April.
4. Continuing surveillance testing of our water to ensure consistent quality standards.

We understand these implementations may interrupt daily routines and appreciate your support as we work together to maintain a healthy environment for our patients, visitors and staff.

As additional resources, we are including with this update information outlining frequently asked questions and facts about Legionella.

For any further information, please contact Infection Control at (810) 342-2290.

Frequently Asked Questions about Legionnaires' Disease

What is Legionnaires' disease?

Legionnaires' disease is a lung infection (pneumonia) caused by a bacterium named Legionella pneumophila. The name Legionella pneumophila was derived from the original outbreak at the 1976 American Legion Convention in Philadelphia. Pneumophila means "lung loving" in Greek.

Where do Legionella bacteria come from?

Legionella are natural inhabitants of water and can be detected in rivers, lakes, and streams. The bacteria are commonly found in the water systems of buildings and households, but pose little risk to healthy adults and children. One type of Legionella species (L. longbeachae) has been found in potting soil.

What are the most common symptoms?

Legionnaires' disease can have symptoms like many other forms of pneumonia, so it can be hard to diagnose at first. Signs of the disease can include: a high fever, chills, cough, and confusion. Some people may also suffer from muscle aches and headaches. Symptoms usually begin two to 10 or 14 days after being exposed to the bacteria

Is Legionnaires' disease contagious?

Legionnaires' disease is not contagious. No special precautions, or isolation of the patient is necessary. The disease is transmitted via drinking water not by infected persons. It requires direct exposure to the bacteria – usually by aerosolized water mist that is inhaled or aspiration.

Who is at greatest risk for contracting Legionnaire's disease?

People at risk for contracting Legionnaires' disease following exposure to water that contains Legionella are usually 65 years or older, smokers, patients with chronic lung disease, and those with weakened immune systems. People who have had a bone marrow or solid organ transplant have the greatest risk of contracting Legionella pneumonia.

How is Legionnaires' disease treated?

Many antibiotics are highly effective against Legionella bacteria. The two most effective antibiotics are levofloxacin and azithromycin.

Legionella Facts

1. Legionnaires' disease is a form of bacterial pneumonia caused by the bacteria Legionella found in building water systems.
2. Legionella bacteria are naturally found in municipal cold water, but can grow in high numbers in warm water after entering a building's hot water system.
3. How much Legionella grows depends on the temperature. The ideal temperature range is between 95 and 110 degrees.
4. Brown water events and water pressure changes in pipes can increase Legionella in building water systems.
5. Legionnaires' disease causes a small percentage, only about 2 to 5% of the average 600,000 pneumonia cases that require hospitalization each year.
6. Even if the bacteria enter the lungs, either by inhalation or aspiration drinking water or water droplets, the majority of persons exposed won't become ill. The likelihood for illness is greatest for persons with chronic lung disease (smokers, COPD), those taking high dose steroids, diabetics, patients who have had transplants or persons with compromised immune systems, i.e., cancer treatments.
7. Not all antibiotics are effective against Legionnaires' disease. Two that are very effective are levofloxacin or azithromycin.
8. Diagnosis of Legionnaires' disease requires a specific test—urine antigen—which must be ordered by a physician. Cases are often missed when physicians don't consider Legionnaires' disease as a possible illness. It is often not diagnosed and is under reported for these reasons.
9. Rapid diagnosis and effective treatment are key to minimizing the severity of the disease and in preventing mortality.
10. Approaches to preventing exposure of at risk patient populations to Legionella bacteria in water include:
    - Using sterile water with equipment such as nasogastric and endotracheal tubes, TEE probes, etc.
    - Providing bottled water for drinking when cases of hospital-acquired Legionnaires' disease have been identified and until after water is treated to control Legionella.
    - Since there is no person-to-person spread of Legionella bacteria, disease prevention is accomplished by additional treatment of the warm water system to control and prevent the growth of Legionella.

Source: Special Pathogens Laboratory, Pittsburgh, PA

Genesee County Health Department

Draft

Mark Valacak, M.P.H., Health Officer
Gary K. Johnson, M.D., M.P.H., Medical Director

Date: November 30, 2015

Release Date: For Immediate Release End Date: ??????

Contact: Name
Title

Phone: (810) 257-

Re: Legionnaires Disease Increase in Genesee County

The Genesee County Health Department (GCHD) is reporting a significant increase in the number of legionellosis cases in Genesee County: 41 cases of legionellosis were reported in 2014 and 45 cases to date in 2015. From 2009 to 2013, an average of nine cases per year had been reported in Genesee County. Legionellosis is a respiratory infection caused by *Legionella* bacteria and can present as either Legionnaires' disease or as a milder illness called Pontiac fever. Legionnaires' disease symptoms include cough, shortness of breath, high fever, pneumonia, muscle aches, headaches, and sometimes diarrhea and abdominal pain. Pontiac fever has similar symptoms but does not progress to pneumonia. Symptoms usually occur 2 to 14 days after exposure to the bacteria. People who are most at risk of developing legionellosis are those who are older, smokers/former smokers, immunosuppressed, or who have other underlying or chronic health conditions. The incubation period (time from exposure to the onset of illness) ranges from 2 to 14 days. More illness is usually found in the summer and early fall, but it can happen any time of year.

Legionella bacteria are commonly found in the environment, usually in water. The bacteria grow best in warm water, such as the water found in hot tubs, cooling towers, hot water tanks, decorative fountains, and large plumbing systems. People are exposed to *Legionella* when they breathe in a mist or vapor that is contaminated with the bacteria. Legionnaires' disease is not spread from one person to another. One cannot become ill from drinking water containing *Legionella*.

A review has been completed on the 45 cases reported from June 2014 to March 2015. Seven of these cases have died with only one of those specifying a cause of death that was attributed to *Legionella* pneumonia. The median age of the cases was 62 years. The majority of cases had at least one underlying

medical condition. Results demonstrated that over half (27/45) of the cases had a healthcare facility exposure in the two weeks prior to their illness onset (23 were hospitalized at or had visited the same healthcare facility). In response, the healthcare facility has implemented multiple environmental and procedural measures to alleviate the situation.

GCHD has worked closely with the local medical centers to provide information about *Legionella* and clinical guidance about legionellosis infections. A fact sheet of Legionnaires' disease is posted on the GCHD website [GCHD, please provide link]. GCHD continues to conduct surveillance for legionellosis cases.

Genesee County Health Department

Mark Valacak, M.P.H., Health Officer
Gary K. Johnson, M.D., M.P.H., Medical Director

Draft

Date: November 30, 2015

Release Date: For Immediate Release **End Date:** ??????

Contact: Name
Title

Phone: (810) 257-

Re: Legionnaires Disease Increase in Genesee County

The Genesee County Health Department has been monitoring a significant increase in the number of Legionnaires cases observed in Genesee County during 2014 and 2015. During calendar year 2014, there were 41 cases of Legionella. To date in 2015, we have observed 45 cases of Legionella. Legionella bacteria are commonly found in the environment, usually in water. The bacteria grow best in warm water like the water found in hot tubs, cooling towers, hot water tanks, pools, decorative fountains and large plumbing systems Legionnaires Disease is a respiratory condition caused by when individuals breathe in a mist or vapor (small droplets of water in the air) containing the bacteria. One example might be from breathing in droplets sprayed from a hot tub or pool that has not been properly cleaned and disinfected. The bacteria are not spread from one person to another person. The bacteria do not cause illness by drinking the infected water. Individuals who are most at risk of developing Legionnaires Disease are those who have other underlying or chronic health conditions.

Legionnaires Disease is often observed seasonally, with more cases observed between May and October when the weather is warmer. Symptoms of Legionnaires Disease include cough, shortness of breath, high fever, muscle aches, headaches and gastrointestinal issues. These symptoms usually occur 2 to 14 days after being exposed to the bacteria. Legionnaires Disease is diagnosed through primary care evaluation and laboratory testing and is treated with antibiotics. Like other respiratory illnesses, individuals with other health issues are at greater risk of complications.

The Genesee County Health Department has been working closely with the infection control staff members of our local medical centers. They have communicated Legionella information with their staff members. GCHD has had concerns regarding hospital environments and has worked to ensure that appropriate actions have been taken to address those concerns. Clinical guidance was shared with local physicians. An extensive questionnaire has been used by GCHD staff to identify potential common sources of exposure in those who were ill. GCHD posted a Legionnaires Disease fact sheet to our website during the warm weather months to educate the community about this respiratory condition. GCHD has also collaborated with our colleagues at Michigan Department of Health and Human Service (MDHHS) Epidemiology section regarded this observed increase in cases. These Legionnaires Disease cases are being observed throughout Genesee County. There is no specific geographic pattern identified among the cases. There has not been a single source of exposure identified in common among the cases. The majority of individuals diagnosed with Legionnaires Disease have had other chronic or underlying health conditions and are those most at risk for complications of Legionnaires Disease.

We are now seeing the expected seasonal decline in Legionnaires Disease cases. We remain vigilant with our surveillance efforts and are reaching out to the Environmental Protection Agency for their expertise in reviewing our data. A formal report has been submitted to the Centers for Disease Control through our MDHHS colleagues. GCHD continues to seek out Legionella expertise to address this observed increase in disease. The Genesee County Health Department continues to work to prevent the presence of Legionnaires Disease in our community.

Genesee County Health Department

Mark Valacak, M.P.H., Health Officer
Gary K. Johnson, M.D., M.P.H., Medical Director

DATE: January 14, 2016 **END DATE:** January 30, 2016

CONTACT: Suzanne Cupal, MPH

PHONE: (810) 768-7970

RE: Legionnaires Disease Increase in Genesee County

The Genesee County Health Department (GCHD) would like to provide additional information regarding the announcement of an increase in the number of legionellosis cases in Genesee County. Legionellosis is a respiratory infection characterized by the bacteria *Legionella* and can present as either Legionnaire's disease or as a milder illness called Pontiac fever. Legionnaire's symptoms include fever, cough, shortness of breath, muscle aches, clinical pneumonia, and sometimes diarrhea and abdominal pain. Pontiac fever has similar symptoms but does not progress to pneumonia. Antibiotics are highly effective against *Legionella* bacteria.

Legionella bacteria are commonly found in the environment (rivers, lakes, streams). It is a waterborne disease, usually located in man-made water supplies that aerosolize water, such as showers, hot water tanks, humidifiers, cooling towers, whirlpool spas, and decorative fountains. People get Legionnaire's disease when they breathe in a mist or vapor containing the bacteria. Aspiration is the most common way that bacteria enters the lungs. The bacteria are not spread from one person to another person. **One cannot become ill from drinking water containing *Legionella*.** Water does not need to be filtered to remove *legionella*. People who are at most risk of developing legionellosis are those who are older, smokers/former smokers, immunosuppressed, or who have other underlying or chronic health conditions.

Proper maintenance and disinfection of hot water tanks, humidifiers, cooling towers, whirlpool spas, and decorative fountains are the most effective measures in preventing outbreaks. Maintaining hot water systems at 50°C or higher may reduce the risk of transmission.

Floyd J. McCree Courts & Human Services Building ◆ 630 S. Saginaw Street, Ste. 4 ◆ Flint, Michigan 48502-1540
Burton Branch ◆ G-3373 S. Saginaw Street ◆ Burton, Michigan 48529
Main Phone 810-257-3612 ◆ Visit us at: www.gchd.us

GCHD has worked closely with the local medical centers to provide information about *Legionella* and clinical guidance about legionellosis infections. A Legionnaire's disease fact sheet is posted on the GCHD website at www.gchd.us. GCHD continues to conduct surveillance for legionellosis cases. Our motto is "Better Life Through Better Health."

###

Better Life Through Better Health

Floyd J. McCree Courts & Human Services Building ◆ 630 S. Saginaw Street, Ste. 3 ◆ Flint, Michigan 48502-1540

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Main Phone 810-257-3612 ◆ Visit us at: www.gchd.us

Information needed on Legionella Cases in Genesee County for 10/22/2015

Summary of 2015 data – Shannon preparing, working on updating Meghan's Sept summary

Questions for GCHD

1. What information have you requested from McLaren?
    a. Have you received it?

2- Has GCHD distributed last yrs summary report?

Questions for McLaren

1. For cases with a McLaren exposure during incubation period, where were they hospitalized during incubation period prior to LD? Last year vs this year – any change? [In same tower on different floors is all GCHD has told us]. Specific information on this would help identify problem areas for hospital re treatment. Assume they are working on this with consultants?

2. Is McLaren going to share environmental testing results that they have done over the past year? Are the samples being retained (to match potential clinical samples)?

3. Over the past year, since this began with McLaren, what were the hyperchlorination dates?
    - Need to know to see if any impact on number of cases after these dates

4. When did McLaren switch to monochloramine? Is this a one-time treatment?
    a. Monitor cases post-monochloramine treatment

5. Testing for Legionella: are test numbers available for 2013, 2014, 2015? – to show increase in testing performed, as this will impact what you're finding. When did McLaren change policy about testing all admissions with pneumonia?

Bohm, Susan (DHHS)

From:	Johnson, Shannon (DHHS)
Sent:	Friday, October 16, 2015 3:33 PM
To:	Collins, Jim (DHHS)
Cc:	Bohm, Susan (DHHS); Weinberg, Meghan (DHHS)
Subject:	Legionnaire's numbers

From 5/1/14-4/30/15:
17/45 cases were hospitalized at McLaren during their exposure period 37.8%
23/45 had inpatient or outpatient exposure at McLaren during their exposure period 51.1%

13/45 cases' residences were not on city of Flint water and had no know healthcare exposures to McLaren (possible sporadic cases)

From 5/1/15-present:
19/42 cases were hospitalized at McLaren during their exposure period. Current data available doesn't yet have complete information for outpatient visits

14/42 cases' residences were not on city of Flint water and had no know healthcare exposures to McLaren (possible sporadic cases)

48.3%

So since the increase started in May 2014, at least 42/87 cases had some type of exposure to McLaren during their incubation period.

Shannon Andrews Johnson, MPH
Infectious Disease Epidemiologist
Michigan Dept. of Health and Human Services
201 Townsend St., CVB 5th Floor
Lansing, MI 48913
Phone: 517-335-8165
Fax: 517-335-8263

Bohm, Susan (DCH)

From: Soehnlen, Marty (DCH)
Sent: Tuesday, September 22, 2015 10:58 AM
To: Johnson, Shannon (DCH)
Cc: Scott, Kelly L. (DCH); Bohm, Susan (DCH)
Subject: RE: Legionella PFGE

And another one for the list. The latest positive to come through is PHI We will do our best to keep you updated when we see them. This one was located at the Hurley Medical Center in Flint.

From: Soehnlen, Marty (DCH)
Sent: Tuesday, September 22, 2015 8:28 AM
To: Johnson, Shannon (DCH)
Cc: Scott, Kelly L. (DCH); Bohm, Susan (DCH)
Subject: RE: Legionella PFGE

It's the cutting with restriction enzymes and the time run that differs between types of samples, so while it is a different gel than other isolates we run we do have the capability to add in samples as we go. There is some extra time involved on the front end, but we are happy to do what we can to ensure that Epi has all the info it needs for the investigation portion. Just let us know when you would like us to stop running new isolates.

Marty

From: Johnson, Shannon (DCH)
Sent: Tuesday, September 22, 2015 8:18 AM
To: Soehnlen, Marty (DCH)
Cc: Scott, Kelly L. (DCH); Bohm, Susan (DCH)
Subject: RE: Legionella PFGE

Hi Marty,

Yes, that would be great. I thought they had to be batched together with other Legionella, but if we can incorporate them into the standard run as we get them, that would be wonderful.

Thanks,
Shannon

From: Soehnlen, Marty (DCH)
Sent: Tuesday, September 22, 2015 8:16 AM
To: Johnson, Shannon (DCH)
Cc: Scott, Kelly L. (DCH); Bohm, Susan (DCH)
Subject: RE: Legionella PFGE

Good morning Shannon,

We have another Legionella that just came up positive from the Genesys med center. The number is PHI
Would you like us to add any new ones we get into the PFGE runs as we get them?

Marty

From: Johnson, Shannon (DCH)
Sent: Thursday, September 17, 2015 9:12 AM
To: Soehnlen, Marty (DCH)
Cc: Scott, Kelly L. (DCH); Bohm, Susan (DCH)
Subject: RE: Legionella PFGE

Hi Marty,

Yes, that would be great, please include that new one from yesterday as well.

Thanks so much,
Shannon

From: Soehnlen, Marty (DCH)
Sent: Thursday, September 17, 2015 9:11 AM
To: Johnson, Shannon (DCH)
Cc: Scott, Kelly L. (DCH)
Subject: RE: Legionella PFGE

Hi Shannon,

We have another one from the Genesys Medical Center that we had come up as positive yesterday afternoon if you would like that one added as well we can do so. The number for that one is PHI and was collected on the 3rd.

The reference team is going to go ahead and keep the culture of it growing so it can go in with the rest for PFGE if you would like.

Marty

Marty K. Soehnlen, PhD, MPH
Microbiology Section Manager
Michigan Department of Health and Human Services
Bureau of Laboratories
3350 N ML King Jr Blvd
Lansing, MI 48906
Phone: 517-335-8064
Fax: 517-335-9631

From: Johnson, Shannon (DCH)
Sent: Thursday, September 17, 2015 8:10 AM
To: Soehnlen, Marty (DCH); Scott, Kelly L. (DCH)
Cc: Bohm, Susan (DCH)
Subject: Legionella PFGE

Hi Marty and Kelly,

Here are the IDs for the positive legionella samples we'd like to have PFGE done on. Please let me know if you need any additional information.

PHI

8

Thanks,
Shannon

Shannon Andrews Johnson, MPH
Infectious Disease Epidemiologist
Michigan Dept. of Health and Human Services
201 Townsend St., CVB 5th Floor
Lansing, MI 48913
Phone: 517-335-8165
Fax: 517-335-8263

Report 8: Epi-Curve Graph

Time Period: 01/01/2010 - 07/21/2015

Time Breakdown: by Month

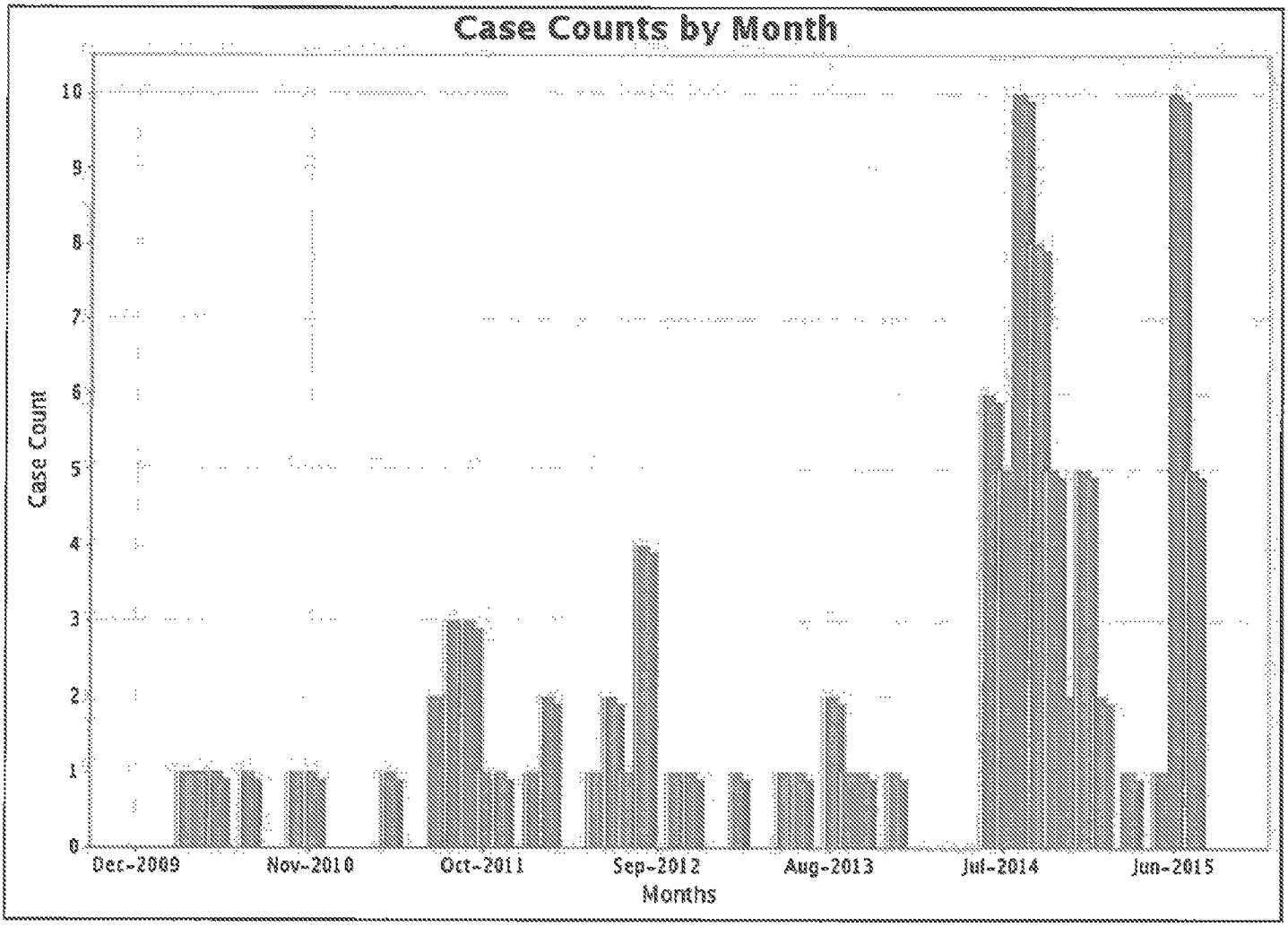
Reportable Condition: Legionellosis

Case Status: Confirmed, Probable, Suspect

Investigation Status: Active, Completed, Completed - Follow Up, New, Review

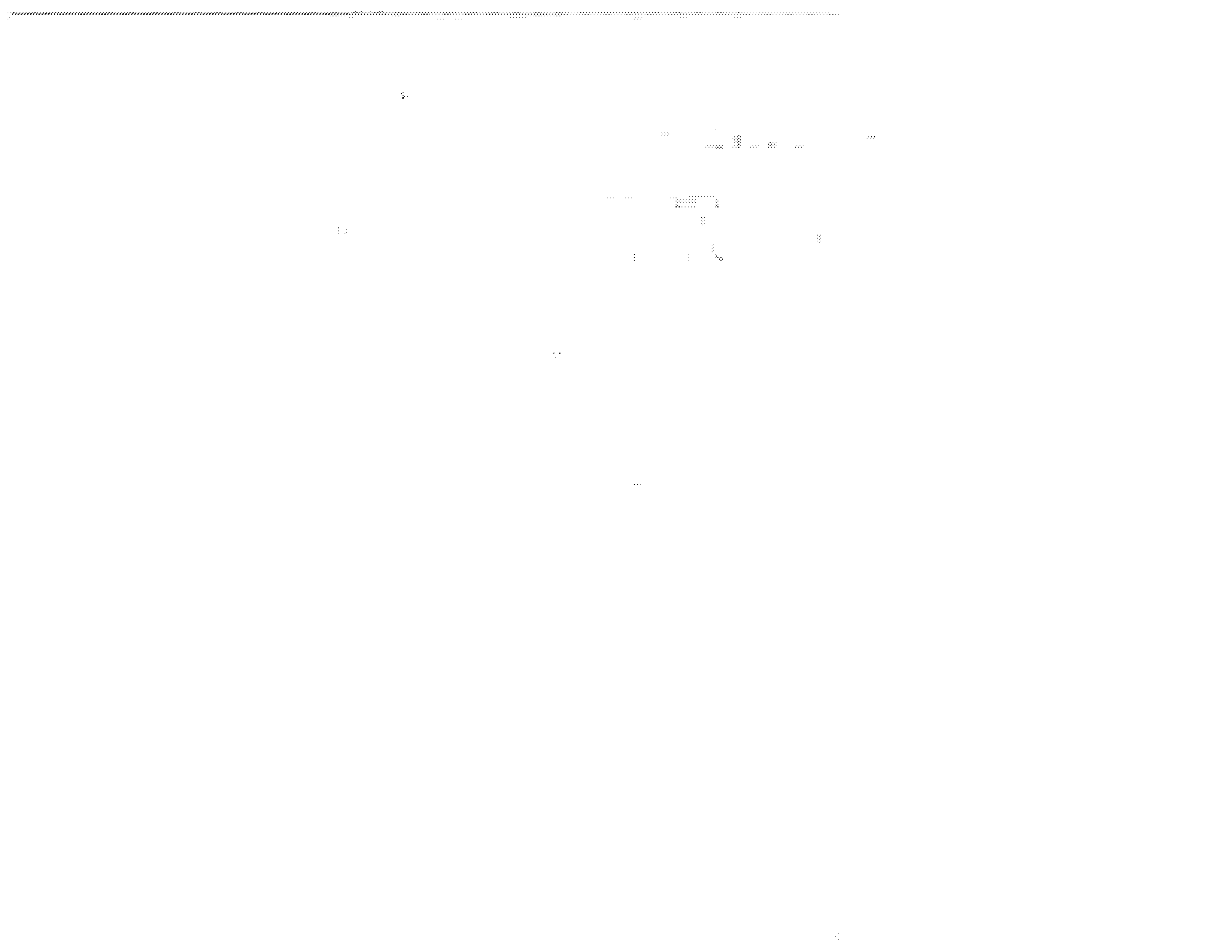
Counties: Genesee

Case Types: Individual and Aggregate



Month	Total
MAR 2010	1
APR 2010	1
MAY 2010	1
JUL 2010	1
OCT 2010	1
NOV 2010	1
APR 2011	1
JUL 2011	2
AUG 2011	3
SEP 2011	3
OCT 2011	1
NOV 2011	1
JAN 2012	1
FEB 2012	2
MAY 2012	1
JUN 2012	2
JUL 2012	1
AUG 2012	4
OCT 2012	1
NOV 2012	1

Month	Total
FEB 2013	1
MAY 2013	1
JUN 2013	1
AUG 2013	2
SEP 2013	1
OCT 2013	1
DEC 2013	1
JUN 2014	6
JUL 2014	5
AUG 2014	10
SEP 2014	8
OCT 2014	5
NOV 2014	2
DEC 2014	5
JAN 2015	2
MAR 2015	1
MAY 2015	1
JUN 2015	10
JUL 2015	5



Genesee Legionellosis Conference Call 6/26/15

Updates/information on the new June cases:

Any new information from McLaren:

Any recent environmental test results?:

Any updates from Genesee water department? :

Aware of any changes to water processing in the city system?:

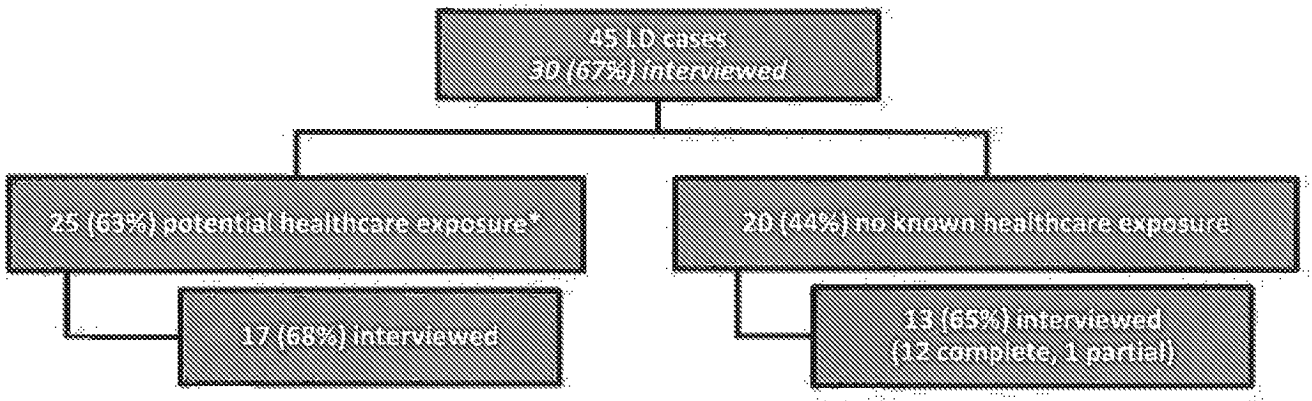
Discussion on any modifications to data collection tools :

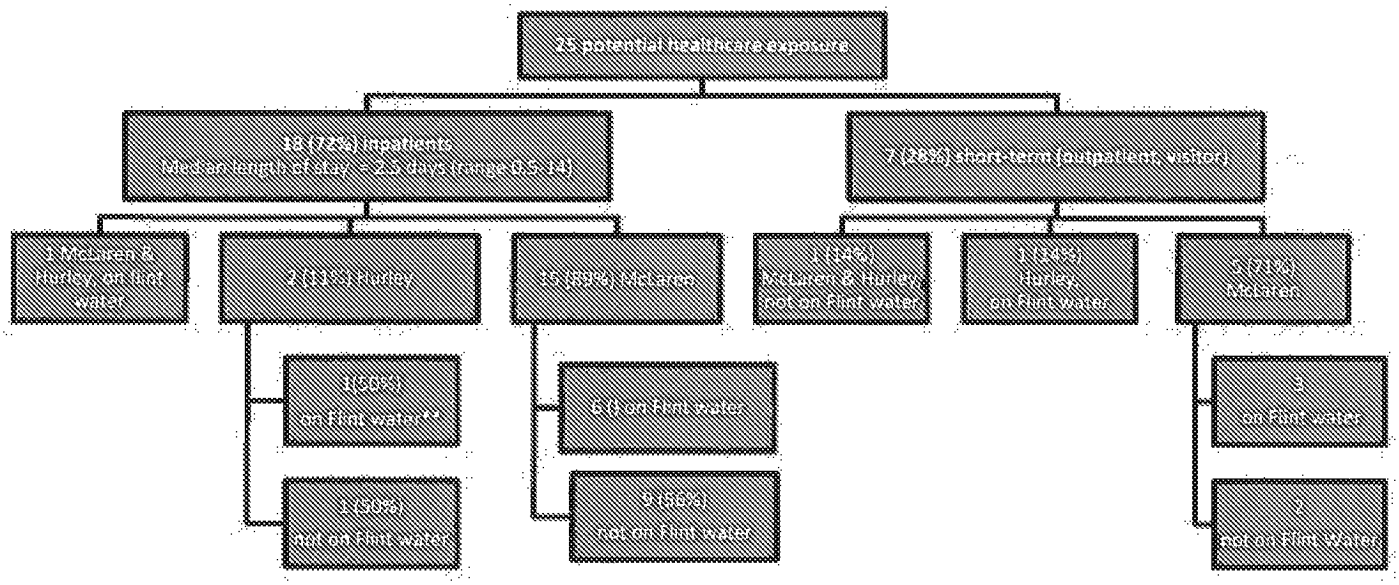
Lab results on 2 sputum specimens- pending at BoL

Genesee POC?:

Future investigation plans:

Legionellosis Cases by Healthcare Exposure (as of May 15, 2015)





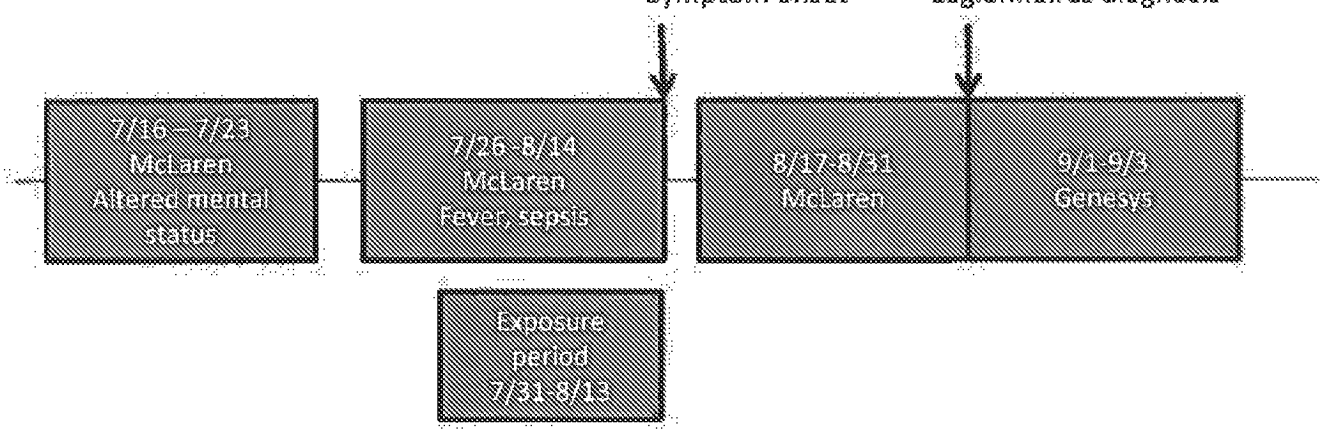
* Healthcare exposure = inpatient, outpatient or visitor to McLaren or Hurley health systems during 14 days prior to symptom onset date (exposure period)

** On Flint water = patient's residential water (during exposure period) supplied by City of Flint

Type of Healthcare Exposure

	# cases	McLaren			Hurley			Live on Flint water	Epi Info Record #
		IN	OUT	VISIT	IN	OUT	VISIT		
McLaren (n=10)	7	Y	N	N	N	N	N	N	2, 5, 6, 12, 19, 25, 29
	1	Y	Y	N	N	N	N	N	17
	1	N	Y	N	N	N	N	N	14
	1	N	N	Y	N	N	N	N	33
McLaren & Flint H_2O (n=10)	6	Y	N	N	N	N	N	Y	4, 9, 23, 27, 30, 44
	3	N	Y	N	N	N	N	Y	13, 39, 45
	1	Y	N	Y	N	N	N	Y	37
Hurley (n=1)	1	N	N	N	Y	N	N	N	26
Hurley & Flint H_2O (n=2)	1	N	N	N	Y	N	N	Y	40
	1	N	N	N	N	N	Y	Y	11
McLaren & Hurley (n=1)	1	N	N	Y	N	N	Y	N	7
McLaren, Hurley, Flint H_2O (n=1)	1	Y	N	N	Y	N	N	Y	35 (gillespie)
total	*25*	*16*	*5*	*3*	*2*	*0*	*2*	*13*	

1 patient (EpiInfo Record #6) spent entire exposure period in McLaren

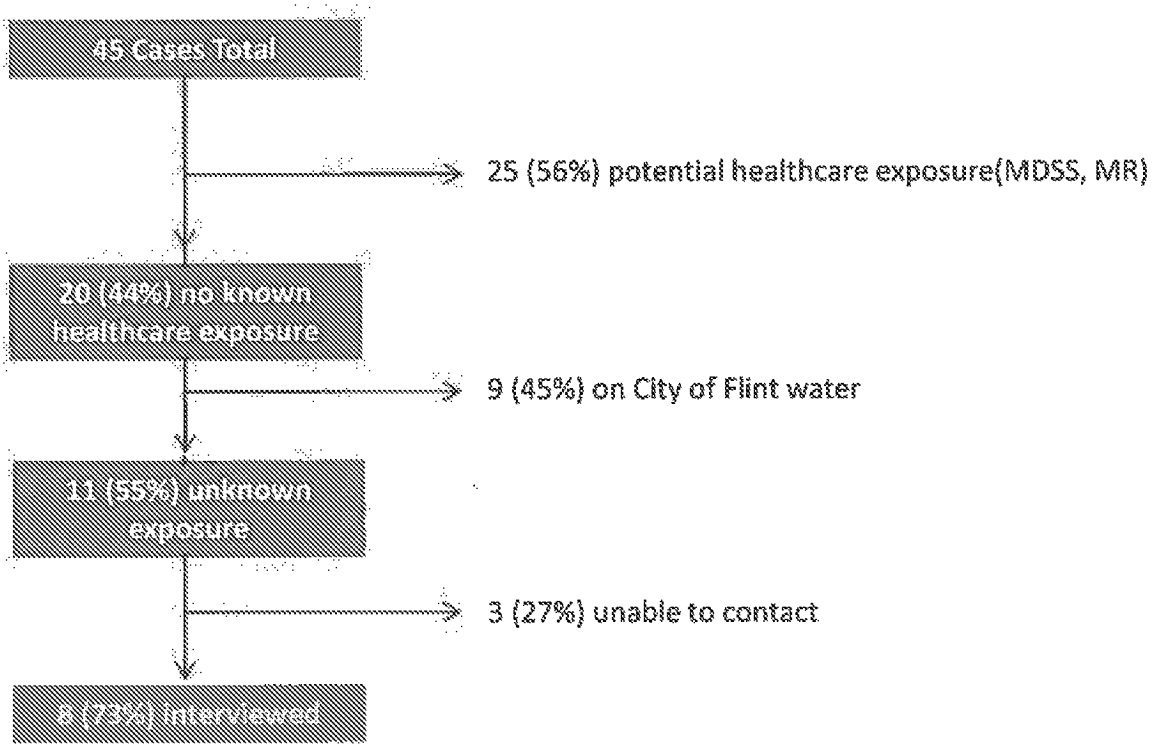


Patient reported comorbidities and health behaviors by healthcare exposure

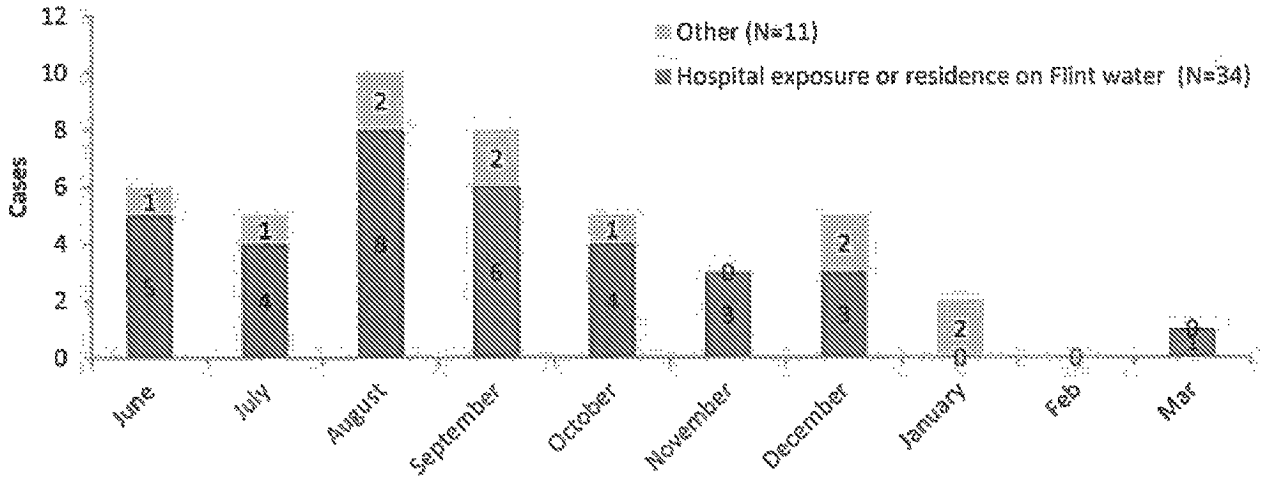
	Total		Healthcare exposure (N=17)		No known healthcare exposure (N=12)	
	n	%	n	%	n	%
≥1 comorbidity	25	86.2	16	94.1	9	75.0
Chronic kidney disease	11	37.9	7	41.2	4	33.3
Immunocompromised	9	33.3	4	26.7	5	41.7
Diabetes	11	39.3	8	47.1	3	27.3
Chronic lung disease	12	41.4	8	47.1	4	33.3
Asthma, chronic bronchitis	7	24.1	4	23.5	3	25.0
Heart disease	12	41.4	8	47.1	4	33.3
Liver disease	0	0.0	0	0.0	0	0.0

	Total		Healthcare exposure (N=17)		No known healthcare exposure (N=12)	
	N	%	N	%	N	%
Former or current smoker	24	82.8	14	82.4	10	83.3
Current smoker	11	37.9	7	41.2	4	33.3
Median packs per day (range)			1 (0.15-2)		1 (0.14-2)	
Median years (range)			35 (20-45)		30 (15-35)	
Former smoker	14	53.8	7	50.0	7	58.3
Median packs per day (range)			1 (0.5-1.5)		1 (0.2-3.5)	
Median years (range)			35 (20-45)		30 (15-35)	
Drinks alcohol	9	31.0	6	35.3	3	25.0
Median drinks per day (range)			1.1 (0.1-2)		1 (0.2-2)	
Median years (range)			45 (1-57)		no data	

Legionellosis Cases with Unknown Exposures (as of May 15, 2015)



Legionnaires' Disease Cases by Estimated Symptom Onset—Genesee County, June 2014–March 2015 (N=45)



Cases with no known hospital exposure and not on City of Flint water

EpiInfo Number	City of Flint Exposure	Exposure
3	No	Industrial Painter
10	No	Probably drove through Flint(?)
15	Yes (?)	Aldi
16	Yes	HR Technician, Hurley
18	Yes	Kroger & Aldi
20	No	Had Mclaren visit prior to exposure period
22	No	
32	Yes	Motel 6; Not interviewed
36	?	Not interviewed
38	?	Not interviewed
44	Yes	Visit wife at Hurley and McLaren

Barbershop visit during exposure period?	
Yes	7
Not on Flint Water	
1209 E Wackerly St, Midland MI 48642	1
12163 N State Rd., Ottisville, MI 48463	1
Atherton Rd Burton MI	1
Pasadena St, Flint MI	1
On Flint water	
3122 Clio Road, Flint MI 48504	1
"Beauty School" Flint	1
Pierson Road	1
No	22
Not on Flint Water	12
On Flint water	10
Unknown	1
Missing	16

Place of Worship visit during exposure period?	
Yes	8
Not on Flint Water	
First Baptist	1
804 W Main St, Durand MI 48429	
First United Church	1
1116 W Hill Rd, Flint MI 48507	
Kingdom of Heaven Ministries	1
2430 Dutcher Rd, Flint, MI	
Shawn Baptist Church	1
2493 N Genesee Rd. Burton, MI 48509	
On Flint water	
St John Vianney Catholic Church	2
2415 Bagley St Flint MI 48504 (corner of N Chevrolet Ave)	
Unsure	2
No	21
Not on Flint Water	12
On Flint water	9
Unknown	0
Missing	17

Carwash visit during exposure period?	
Yes	5
Not on Flint Water	
Center Rd and Atherton Rd, Burton MI	1
Clio, MI?	1
Pierson Rd, Flushing MI	1
On Flint water	
112 W 5th Ave Flint, MI 48503	1
Flint, MI ?	1
No	24
Not on Flint Water	13
On Flint water	11
Unknown	1
Missing	16

'Yes' to Home Improvement Store exposure:	
Not on Flint Water	**Interview Total=3**
Home Depot	
4245 E Court St. Burton, MI	1
Menards	
11357 Linden Rd, Clio MI	1
7410 E Court Davison MI 48423	1
On Flint Water	**Interview Total= 4**
Home Depot	
4380 W Corunna Rd, Flint, MI 48532	1
5300 Pierson Road Flushing, MI 48433	1
4245 E Court St. Burton, MI	2
Lowes	
2100 T A Mansour Blvd Flint, MI 48532	1
4274 Court St. Burton	1

'Yes' to grocery store exposure:

Not on Flint Water	Interview Total=12
Kroger	
7188 N Saginaw Rd, Mount Morris, MI 48458	2
700 N State Rd Davison MI 48423	1
3838 Richfield Rd Flint, MI 48506	1
Meijer	
2333 Center Rd. Flint MI 48519	4
9515 Birch Run Rd, Birch Run MI	1
2591 E M21, Corunna MI 48817	1
4141 Morrish Road, Swartz Creek MI 48473	1
Aldi	
Center St. Burton	2
5340 W Pierson Rd, Flushing, MI 48433	1
Corunna Rd Flint MI	1
WalMart	
11493 N Linden Rd, Clio, MI, 48420	2
5323 E Court St N Burton, MI 48509	1
Other (Not in Flint)	4

On Flint Water	Interview Total= 8
Kroger	
5249 Corunna Rd, Flint, MI 48532	2
1542 E Pierson Rd, Flushing	1
1916 Davison Rd, Flint	2
Meijer	
2333 Center Rd. Flint MI 48519	1
4333 W Pierson Rd	3
WalMart	
4313 Corunna Rd, Flint	1
Save-a-Lot	
1918 N Dort Hwy Flint, MI 48506	1

Bohm, Susan (DHHS)

From: Johnson, Shannon (DCH)
Sent: Wednesday, February 04, 2015 2:39 PM
To: Hasan, Shurooq; Henry, James
Cc: Cupal, Suzanne; Childs, Bonnie; Johnson, M.D., Gary; Valacak, Mark; Fiedler, Jay (DCH); Bohm, Susan (DCH); Collins, Jim (DCH); Miller, Corinne (DCH)
Subject: RE: Genesee Legionellosis Investigation
Attachments: MDCH Response 2-4-15.docx

Dear GCHD,

Thank you all for your response. I have attached the Word document with additional MDCH answers to your questions (in blue). Moving forward, we've identified some next steps in our collaboration on the investigation. I spoke with Shurooq today and we made decisions on the division of labor for these points.

1) Genesee will send MDCH a copy of their current line list by this Friday, Feb 6th. We will use this as the master line list for the investigation.

2) Please provide an estimated date of when the HAN discussing clinical testing will be sent to providers in the community. We would appreciate seeing a copy of the final HAN prior to it being sent out. I discussed some points of clarification about the HAN language with Shurooq on the phone today. The hospitals will be following their own protocols for respiratory culture testing to attempt to isolate legionella. Genesee may want to include language in the HAN suggesting bronchial washes be used as they are more likely to contain sufficient bacteria for culture growth compared to a sputum specimen. If the legionella bacteria is identified at the hospital lab, those isolates will be sent along to the MDCH lab for additional testing.

3) We would like to have an outbreak-specific questionnaire finalized by the end of next week, Friday Feb 13th. Per Shurooq, Genesee is collaborating with Joan Rose from MSU on water system-specific questions. MDCH will begin creating a questionnaire template to be combined with Genesee's questions and a final version will be reviewed by both agencies.

4) MDCH has requested medical record access for the legionellosis investigation from Genesys, Hurley, and McLaren hospitals. After discussing with Shurooq, MDCH will begin to collect information on previous hospitalizations (dates, admission complaint, etc.) for cases.

5) Onset dates (or estimated onset dates) for all cases need to be determined. Genesee will work to collect this information on new cases (since 1/1/15). MDCH will review medical records in MDSS and contact hospitals as needed to determine onset dates for previous cases (6/1/14-12/31/14).

6) Considerations for defining the investigation. In this situation, the term outbreak is being used in the epidemiologic sense, meaning an increase in cases of above baseline. Based on this, the current Genesee outbreak began in June, 2014 with 5 reported cases. Until further information is collected and analyzed the definition will be general: Cases of legionellosis (Legionnaires' Disease and Pontiac fever) in Genesee County since 6/1/14. In the future, we may be able to refine the definition as additional data is obtained. If Genesee prefers, they may mark all cases in MDSS meeting the current definition as outbreak-associated and assign an outbreak ID. This is generally more useful when needing to search the MDSS for a subset of cases in the system. Since the outbreak currently includes all Genesee legionellosis cases since 6/1/14, it is not as urgent.

If there are other initial steps you would like to include please feel free to add them to the list.

Best wishes,
Shannon

Shannon Andrews Johnson, MPH
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201 Townsend St., CVB 5th Floor
Lansing, MI 48913
Phone: 517-335-8165
Fax: 517-335-8263

From: Cupal, Suzanne [mailto:scupal@gchd.us]
Sent: Friday, January 30, 2015 3:22 PM
To: Collins, Jim (DCH); Johnson, M.D., Gary; Childs, Bonnie; Henry, James; Hasan, Shurooq; Valacak, Mark
Cc: Fiedler, Jay (DCH); Bohm, Susan (DCH); Bolen, Timothy (DCH); Miller, Corinne (DCH); Johnson, Shannon (DCH)
Subject: RE: Genesee Legionellosis Investigation

Dear MDCH Colleagues,

We appreciated the opportunity to discuss the increase in legionellosis cases that Genesee County is experiencing. Collaboration is one of our core values as a local health department. MDCH has been a valued partner who brought resources and expertise to assist in solving some very challenging situations in the past. We look forward to the positive elements you can bring to this investigation.

As discussed during our call, we have concerns not only about legionellosis, but are involved in multiple investigations concerning the safety of local water. We were appreciative of the opportunity to share our investigation to date and our plans for continued investigative work. We are also appreciative of the opportunity to request MDCH's assistance in moving our investigation forward. We look forward to continued and improved communication and collaboration and appreciate your offers of assistance.

We appreciate your acknowledgment of the sensitive nature of our work in an environment of anxiety and suspicion. We do not want to jump to conclusions based upon very limited and inconclusive evidence and your assistance in filling some of the information gaps we have identified would be of great help. We specifically asked for your assistance in identifying someone at MDCH with expertise in type 1 water supplies and communicable disease. That was not reflected in your response. Please let us know if there is an identified resource for this at MDCH. In addition, we requested your support in identifying someone on your staff who could function as a liaison with your fellow state colleagues at MDEQ since a number of questions have come up regarding the type 1 water supply where the state has regulatory authority and access to important data.

As we indicated in our call, we continue to identify and reach out to those that can inform our investigation and provide more information regarding water and legionellosis. The feedback that we are receiving has been very helpful in evolving our investigation. However, additional expertise is being sought as the investigation unfolds.

We have met internally and collaborated on our responses to your questions. In your response, you make reference to the scope of the outbreak. We encourage you to review the case notes in MDSS. If we are referring to this as an outbreak, we would like to request that we designate it as such and include an outbreak identifier in MDSS. We would also like to discuss criteria for inclusion for this outbreak. During our call, we informed you of our work in identifying close contacts of our cases that subsequently became cases themselves or tested positive but did not meet the case definition to be reported as a confirmed case. We also described the challenges in recording onset dates (see the notes). You have requested line listings on a regular basis. We would like to propose regular meetings via conference

call to discuss details of how we record information in MDSS as well as to share our mutual findings. Based on our experiences regarding this investigation, we would also like to make recommendations regarding the reporting process.

We look forward to our collaborative process. We want to remind you that in addition to our legionellosis investigation, we are also investigating water related issues. As we continue to learn more through this process, we hope to be in a position to share our findings with others.

Your GCHD Colleagues

Suzanne Cupal, M.P.H.
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scupal@gchd.us

From: Collins, Jim (DCH) [mailto:CollinsJ12@michigan.gov]
Sent: Friday, January 30, 2015 1:21 PM
To: Johnson, M.D., Gary; Childs, Bonnie; Cupal, Suzanne; Henry, James; Hasan, Shurooq; Valacak, Mark
Cc: Fiedler, Jay (DCH); Bohm, Susan (DCH); Bolen, Timothy (DCH); Miller, Corinne (DCH); Johnson, Shannon (DCH)
Subject: RE: Genesee Legionellosis Investigation
Importance: High

Good Afternoon All,

While you all at the Genesee County Health Department are reviewing Shannon's post from a couple of days ago (Copied below. We look forward to hearing your thoughts on this as well), I thought I'd go ahead and provide some additional information that we've compiled after the conference call.

During our conversation, there was a request for information about the public health outreach to the clinical community in response to an increase in legionella infections being reported from the metropolitan Detroit area and several other states (spring/summer 2013). Specifically, we discussed the text of a health alert message that was shared with the region's hospitals via the Michigan Health Alert Netork (MIHAN) and any accompanying documentation.

I've got both to offer to you today.

I've attached the document, "Legionellosis Guidance for Clinicians" that was distributed with the following MIHAN message:

Text from SE Legionellosis increase HAN in 2013:

"*Subject: Legionellosis in S.E. Michigan*

Detroit City, Wayne and Macomb Counties have reported 35 cases of Legionellosis in June. This represents the highest number of Legionellosis cases for the month of June over the past decade and new cases continue to be identified in these jurisdictions. Most patients were or are still hospitalized (some in the ICU) and symptoms reported include fever, vomiting, abdominal pain, nausea and diarrhea. The CDC has also provided notification indicating an increase in Legionellosis cases in the Northeast (NY, DE, CT & PA).

Investigations are ongoing in Southeast Michigan to determine common sources of exposure. We are asking that the clinical community assist in this investigation through accurate identification, testing and reporting of all suspect cases of Legionellosis.

Attached, please find guidance that has been prepared to assist clinicians in case evaluation and facilitate specimen collection/testing as well as an updated "Supplemental Interview Form" for local health department use in evaluating reported cases."

Please note that in the attachment, there is introductory room to offer a local assessment of the situation and the rationale behind distributing the MIHAN message. We feel that GCHD is best positioned distribute a message to the healthcare community and to provide local context to that message but are certainly available to provide assistance to either function if you'd prefer.

Again, we do look forward to hearing your thoughts on Shannon's previous post and stand ready to assist in whatever capacity might best serve the investigation.

All My Best,
Jim

Jim Collins MPH, RS
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Cell: PPI

From: Johnson, Shannon (DCH)
Sent: Tuesday, January 27, 2015 3:45 PM
To: gjohnson@gchd.us; bchilds@gchd.us; scupal@gchd.us; jhenry@gchd.us; shasan@gchd.us; mvalacak@gchd.us
Cc: Collins, Jim (DCH); Fiedler, Jay (DCH); Bohm, Susan (DCH)
Subject: Genesee Legionellosis Investigation

Greetings GCHD,

Thank you for the opportunity to speak with you this morning. After being updated on where GCHD is in the investigation process, we have identified some items that need additional details and/or may require additional data gathering efforts. In addition, we've listed areas where we can provide personnel to assist with data collection/analysis

or aid in communication between the involved governmental departments during the outbreak investigation. At this point, the priorities in the public health investigation are to determine the scope of the outbreak and to define as clearly as possible the characteristics of the cases of Legionnaire's Disease and Pontiac Fever. These data will be critical to help inform and provide direction for the environmental side of the investigation.

Data being requested by MDCH and/or suggested data collection needs to be addressed:

1) Please provide the name of the primary point-of-contact for the overall GCHD legionellosis investigation.
2) The current copy of the GCHD Legionnaires Disease outbreak data collection line list is requested and updates sent to MDCH on a regular basis.
3) Onset dates or estimated onset dates need to be determined for all cases.
4) A current map of the municipal water system needs to be obtained and cases' residences mapped in relation to the water system.
5) The investigation needs a Genesee-specific supplemental questionnaire beyond the MDCH supplemental form and the 6 questions in the email message dated 10/17/14.
6) All previous cases (since 5/1/14) and new cases should be re-interviewed as soon as possible with the new outbreak-specific questionnaire. If cases are not available, then a proxy should be interviewed, ideally someone from the same household.
7) To look for cases of milder illness such as Pontiac Fever, the questionnaire should ask if there are other household members who have had a similar respiratory illness. Any household contacts with legionellosis-consistent illness should also be interviewed with the outbreak-specific questionnaire.
8) Clinical culture specimens, in addition to urine antigen testing, should be collected from all suspect cases where individuals are seeking medical care.
9) Hospitals should be queried to determine whether any previously diagnosed cases had respiratory cultures collected and whether any of these culture specimens were retained. If so, it should be requested that these samples be held until a determination on environmental testing can be made.

Assistance that MDCH can provide to Genesee to aid in the outbreak investigation:

1) MDCH can provide language to GCHD for distribution to the medical community regarding the request for clinical respiratory culture collection on all suspect cases of legionellosis (Legionnaire's Disease and Pontiac Fever).
2) MDCH staff is available to conduct medical record extraction, as needed.
3) MDCH staff can assist with data entry into MDSS, as needed.
4) MDCH staff can help with the development of a Genesee-specific outbreak questionnaire.
5) MDCH is willing to assist with supplemental questionnaire data collection by conducting case interviews (on previously and/or newly diagnosed cases) and also by assisting with data analysis, as needed.
6) MDCH can assist with the coordination and communication with MDEQ for specific data requests by GCHD.
7) The MDCH PIO can work with the GCHD PIO to develop a coordinated public health message to respond to public and media inquiries.

If there are other issues that we have not addressed where our assistance would be helpful, please do not hesitate to ask. We appreciate your efforts and recognize the delicate situation you are dealing during this investigation. We look forward to continued communication and collaboration with you.

Regards,
Shannon Johnson

Shannon Andrews Johnson, MPH
Infectious Disease Epidemiologist

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Lansing, MI 48913
Phone: 517-335-8165
Fax: 517-335-8263

MDCH response 2/4/2015

Data being requested by MDCH and/or suggested data collection needs to be addressed:

1) **Please provide the name of the primary point-of-contact for the overall GCHD legionellosis investigation.** Shurooq Hasan is lead on the CD investigation. Jim Henry is the lead on the water system investigation. Our entire CDIRT team is involved in both investigations.
Shannon Johnson will serve as the primary point-of-contact for MDCH. Shannon will coordinate directly with Shurooq and Jim at GCHD.

2) **The current copy of the GCHD Legionnaires Disease outbreak data collection line list is requested and updates sent to MDCH on a regular basis.** Let us know the time table you are proposing. We would like to request a regular meeting schedule so we can discuss our mutual findings.
The Genesee line list will serve as the master line list for the outbreak investigation. The Genesee line list should be provided to MDCH weekly and any data gathered by MDCH will be added.

3) **Onset dates or estimated onset dates need to be determined for all cases.** As discussed during our call, we can provide estimated onset dates. We would like your input...would you prefer we report the onset date reported by the patient, their primary care physician or the ID Physician consulting? There are differences. Please keep this in mind when reviewing the data.
For new cases, the onset date from the patient interview should be used. For older cases, the medical record should be used to assist in determining the estimated onset date. The Influenza Hospitalization Surveillance Project uses the following recommendations for determining estimated onset dates from medical records:

- "In some cases you will need to calculate the date of onset based on notes in the Admission H&P or Discharge Summary that indicate that fever or cough began days earlier.
  - Couple of days = 2 days
  - Few days = 3 days
  - Several days = 5 days
  - Week = 7 days
  - For example if a patient is admitted 10/15 (Day 0) and the Admission H&P indicates the patient complained of fever/cough for "a few" days, then the earliest date of onset of respiratory symptoms is 10/12:

Date:	10/12	10/13	10/14	10/15
Day Number:	-3	-2	-1	0
	Onset	←		Admission

- If date of onset is provided as a range of dates, use the earliest date as date of onset of respiratory symptoms.
    - For example, if a date of onset is given as "3 to five days ago", list the date corresponding to 5 days ago."

Date:	10/10	10/11	10/12	10/13	10/14	10/15
Day Number:	-5	-4	-3	-2	-1	0
	Onset	←				Admission

4) **A current map of the municipal water system needs to be obtained and cases' residences mapped in relation to the water system.** As discussed in our call, we are experiencing difficulty in obtaining the information we have requested from DWP and MDEQ. We have sent the FOIA request for the current map of the municipal water system. As discussed during our call, we have mapped our cases to look for commonalities and to identify the proximity of the cases to the boil water advisories.
MDCH will communicate with MDEQ about obtaining the water system map. If you have the information, please provide to MDCH a copy of the boil water advisories (or dates) and the areas they cover.

5) **The investigation needs a Genesee-specific supplemental questionnaire beyond the MDCH supplemental form and the 6 questions in the email message dated 10/17/14.** As discussed in our call, GCHD has been identifying and reaching out to individuals with expertise with type 1 water supplies. During our call, we asked specifically of anyone at MDCH has this expertise. Please let us know if you have a staff member we can consult with. Also stated during our call, we requested the assistance of MDCH in creating our Genesee specific questionnaire....the questionnaire we are currently using. We are reaching out to water experts to assist in the updating of our questionnaire. In the limited conversations we have had so far, we have learned a great deal which will inform the questions we need to ask. We also look forward to additional conversations with our MDCH colleages.
MDCH does not have staff with expertise in type 1 water supplies, this falls under the purview of MDEQ and the local water authority. MDCH is able to advise specifically on legionella related to human illness. The compiled data provided by the cases on the questionnaire will be vital to directing the focus and scope of potential future environmental testing.
A general supplemental data form developed by MDCH was provided to Genesee on 10/17/14. MDCH will work with GCHD to develop a Genesee-specific questionnaire for the outbreak.

6) **All previous cases (since 5/1/14) and new cases should be re-interviewed as soon as possible with the new outbreak-specific questionnaire. If cases are not available, then a proxy should be interviewed, ideally someone from the same household.** See me notes below...

7) **To look for cases of milder illness such as Pontiac Fever, the questionnaire should ask if there are other household members who have had a similar respiratory illness. Any household contacts with legionellosis-consistent illness should also be interviewed with the outbreak-specific questionnaire.** As discussed on the call in the review of our invesitgations, we have found this and, we have been reporting this... and have reported them in MDSS. This is the

reason why we asked for testing of clinical samples not only of the patients, but, also of their close contacts.

8) **Clinical culture specimens, in addition to urine antigen testing, should be collected from all suspect cases where individuals are seeking medical care.** As discussed in our call, this is what we have requested from MDCH. In addition, we requested testing of close contacts, environmental testing of the patient home environments and potentially testing of key locations in the community with high heterotrophic plate counts. Based on the feedback from our consultations, this may be very helpful.
As detailed in the HAN language provided by MDCH to GCHD, hospitals should collect culture specimens in addition to the urine antigen test. If an isolate of Legionella is found from the culture, the hospital will send the isolate to the MDCH Bureau of Laboratories for further testing.

9) **Hospitals should be queried to determine whether any previously diagnosed cases had respiratory cultures collected and whether any of these culture specimens were retained. If so, it should be requested that these samples be held until a determination on environmental testing can be made.** This was discussed at our Bug Fuzz meeting on 1/22/15. We will also be requesting more information regarding previous years legionella testing. We suspect a significant increase in the numbers of tests conducted, particularly during August/September than in previous years. Remember, the hyperchlorination done at our hospital of interest was completed 10/4/15. That may also influence the number of tests conducted.

<u>Assistance that MDCH can provide to Genesee to aid in the outbreak investigation:</u>

1) **MDCH can provide language to GCHD for distribution to the medical community regarding the request for clinical respiratory culture collection on all suspect cases of legionellosis (Legionnaire's Disease and Pontiac Fever).** What we specifically requested was the specific testing protocols for sample collection, storage and transportation of clinical samples. We also requested testing of environmental samples from patient homes and key community sites. We would like the same protocol information for this type of testing as well. Jim's email covered some of this, but, we still have some questions.
Hospitals should be familiar with testing protocols for legionella culture specimens. If a legionella isolate is found by the hospital, the handling and shipment to BoL for additional testing is discussed in the language of the HAN.

2) **MDCH staff is available to conduct medical record extraction, as needed.** Medical records are attached in MDSS and we do not need assistance with this at this time.

3) **MDCH staff can assist with data entry into MDSS, as needed.** At this time, we do not need assistance with this. Please see the note below.

4) **MDCH staff can help with the development of a Genesee-specific outbreak questionnaire.** We welcome your participation in the revision of our Genesee specific questionnaire. We have already received some helpful feedback from our expert consultations.
We would like to have an outbreak-specific questionnaire finalized by the end of next week, Friday Feb 13th. Per Shurooq, Genesee is collaborating with Joan Rose from MSU on water

system-specific questions. MDCH will begin creating a questionnaire template to be combined with Genesee's questions and a final version will be reviewed by both agencies.

5) **MDCH is willing to assist with supplemental questionnaire data collection by conducting case interviews (on previously and/or newly diagnosed cases) and also by assisting with data analysis, as needed.** Our CD nurses can address newly diagnosed cases. We would like to discuss MDCH's assistance for conducting interviews with previously diagonosed/interviewed cases.
MDCH staff members are available to assist with interviewing older cases. We can discuss this issue further after the questionnaire is completed.

6) **MDCH can assist with the coordination and communication with MDEQ for specific data requests by GCHD.** As discussed in our call, we are requesting MDCH assistance with obtaining information from MDEQ. GCHD has sent a FOIA letter requesting the information we have not been able to obtain regarding the water system. If we do not receive the information or have other challenges we would request MDCH assistance in obtaining the information.
MDCH will communicate with MDEQ about obtaining the water system map.

7) **The MDCH PIO can work with the GCHD PIO to develop a coordinated public health message to respond to public and media inquiries.** As discussed in our call, the water system is an extremely sensitive topic. We are very careful in crafting messages. Should we need MDCH PIO assistance, we will request it.

Legionellosis Guidance for Clinicians

Intro discussing increase in Genesee cases.

Legionella bacteria can be found in natural, freshwater environments, but they are generally present in insufficient numbers to cause disease. Water systems such as potable (drinking) water systems, whirlpool spas, and cooling towers provide the conditions needed for Legionella growth and transmission-heat, stasis, and aerosolization; therefore, these are common sources of outbreaks.

Epidemiologic Risk Factors for Legionellosis

- Recent travel with an overnight stay outside of the home (up to 14 days prior to symptom onset)
- Exposure to whirlpool spas
- Recent repairs or maintenance work on domestic plumbing
- Renal or hepatic failure
- Diabetes
- Systemic malignancy
- Smoking
- Immune system disorders
- Age > 50 years

Diagnosing Legionellosis

	Legionnaires' disease	Pontiac fever
Clinical features	Pneumonia, cough, fever	Flu-like illness (fever, chills, malaise) without pneumonia
Radiographic pneumonia	Yes	No
Incubation period	2-14 days after exposure	24-72 hours after exposure
Etiologic agent	*Legionella* species	*Legionella* species
Attack rate	< 5%	> 90%
Isolation of organism	Possible	Never
Outcome	Hospitalization common Case-fatality rate: 5-30%	Hospitalization uncommon Case-fatality rate: 0%

Source: http://www.cdc.gov/legionella/clinicians.html

Who to Test for Legionnaires' Disease

- Patients with pneumonia in the setting of a Legionellosis outbreak
- Patients who have failed outpatient antibiotic therapy
- Patients with severe pneumonia, in particular those requiring intensive care
- Immunocompromised host with pneumonia
- Patients with a travel history [Patients that have traveled away from their home within two weeks before the onset of illness.]
- Patients suspected of healthcare-associated pneumonia

Testing for Legionnaires' Disease

- Urinary antigen assay AND culture of respiratory secretions on selective media are the preferred diagnostic tests for Legionnaires' disease
- Sensitivity varies depending on the quality and timing of specimen collection as well as technical skill of the laboratory performing the test

Advantages and Disadvantages of Diagnostic Tests

Test	Advantages	Disadvantages
Culture	• Clinical & environmental isolates can be compared • Detects all species & serogroups • 100% specific	• Technically difficult • Slow (>5 days to grow) • Sensitivity highly dependent on technical skill • May be affected by antibiotic treatment
Urine Antigen	• 100% specific... • Rapid (same day)	• ...but only for *L. pneumophila* serogroup 1 (Lp1) [which may account for up to 80% of cases] • Does not allow for molecular comparison to environmental isolates
Serology	• Less affected by antibiotic treatment • 80-90% sensitive; 99% specific	• Must have paired sera • 5-10% of population has titer 1:≥256. Single acute phase antibody titers of 1: ≥256 do not discriminate between cases of Legionnaires' disease and other causes of community-acquired pneumonia.
DFA	• Can be performed on pathologic specimens • >95% specific	• 25-75% sensitive
PCR	• Rapid	• Assays vary by laboratory and are not FDA-approved

Clinical Isolates and Shipping

Isolation of Legionella from respiratory secretions, lung tissue, pleural fluid, or a normally sterile site is still an important method for diagnosis, despite the convenience and specificity of urinary antigen testing. Investigations of outbreaks of Legionnaires' disease rely on both clinical and environmental isolates. Clinical and environmental isolates can be compared using monoclonal antibody and molecular techniques. Because Legionella are commonly found in the environment, clinical isolates are necessary to interpret the findings of an environmental investigation.

The Michigan Department of Community Health state laboratory will test clinical isolates shipped to the facility free of charge. Please freeze any clinical samples collected immediately and maintain the cold chain during shipment (use of dry ice during shipping is preferable). Also, please avoid freezing and thawing of isolates. For labs shipping a clinical isolate, a BYCE plate is acceptable. NOTE: Plates do not generally travel well so a courier should be used if possible.

Treatment

Recommended treatment for Legionella pneumonia in most patients includes either a fluoroquinolone (e.g. levofloxacin 750 mg once daily) or a macrolide (e.g. azithromycin 1 gram on day one, followed by 500 mg once daily) for a total treatment duration of 10–14 days. Antibiotic regimen and treatment duration may vary depending on specific patient risk factors or comorbidities.

Reporting

Legionellosis is a reportable disease in Michigan. We are asking health care professionals to report both Legionnaires' disease and Pontiac fever cases via the Michigan Disease Surveillance System (MDSS) or directly to the Local Health Department. Physicians are requested to collect and record illness onset dates as part of the patient record. An accurate illness onset date is extremely important to determine the patient's potential environmental exposures and is vital to the investigation of an outbreak. In patients with chronic respiratory conditions, the first appearance of fever may be a useful indicator of legionellosis onset date.

For additional information, please contact:

Internal meeting on GC Legionella Dec 17, 2015

Christine - end of 2015 numbers from May 1st

- Mclaren exp. on 19 cases.

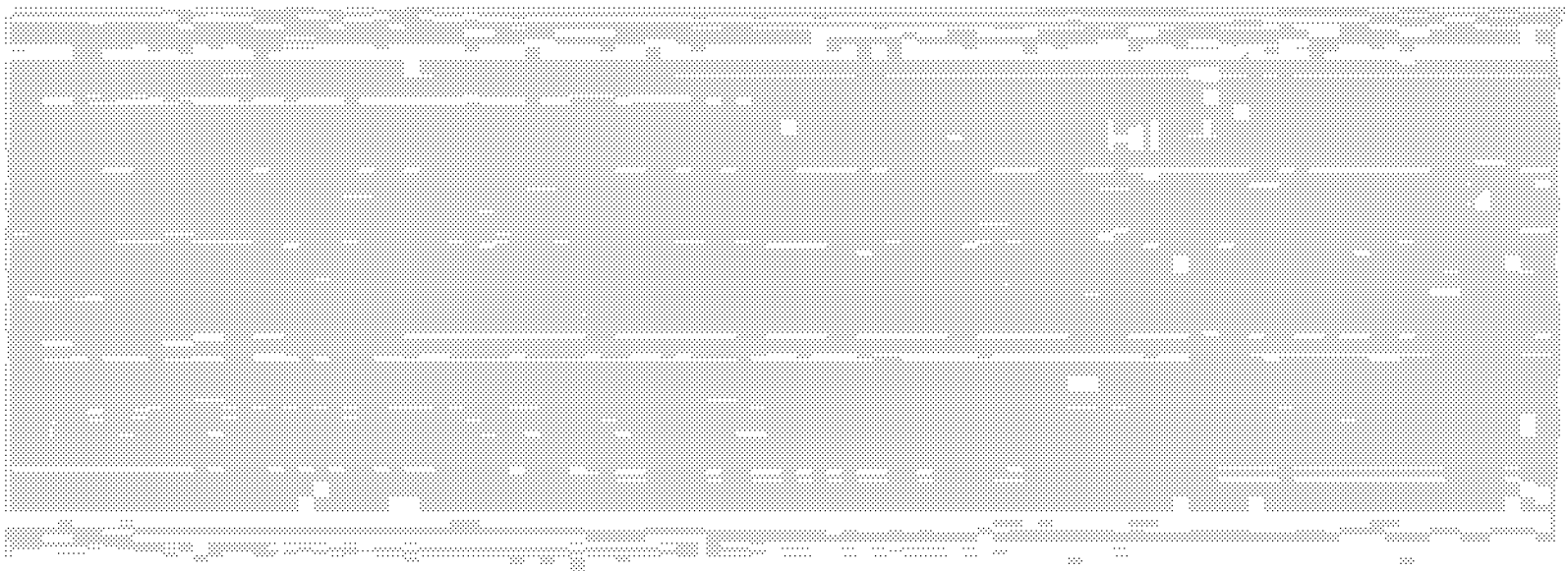
Jon - Do 2 diff analysis, then total.
Send to GC for review/comments.

Sean - confirm hospital exposure during incubation period.

PFGE - 8 patients with PFGE. (only 1 person had a Mclaren hx in)

Jon - data quality (look at interval (date onset - interview)

Shannon - checking Christine's dataset, adding onset to interview column



Genesee CHD call re Legionella 08.22.2015

Christine & Suzanne, Jim C., Tim B., Jay

Christine will explain table

- total # cases/yr for last 5 yrs

Suz. concerned about 2 that match

Consultants Sp Path.

EnviroLab - testing from prev. lab is significantly different

1 hyperchlorination last Oct - didn't do again till this yr. When another test was positive [Testing monthly]

another hyperchl. in Aug when test was positive

Treating pts symptomatic

Doing bottled water before hyperchlorination & after

Monitoring water temperature

When was switch to Spec Path. Group? In June 2015

GCHD has not rec'd test results

- are they monitoring, contin'g to
- test results
- dif. betw 2 test methods
- bottled H_2O - still using or not

Shannon - ask McLaren for Enviro lab #

& other 2 from present to last fall

Will give background talk

Mark Edwards Virg. Tech done
add'l heterotrophic testing – Legionella, Mycobacy, Pseudomonas
– 500 samples? – community samples
– residents

August last yr two water testing incidents
– what if Legionella may have been undiagnosed

HANS + communications with hospitals

Call with Jay + Shannon 10/21/2015

Prep for Call with Genesee Co tomorrow.

- 2015 Epi - Shannon will do.
- 1st case this season - May
  - 10/41 on Flint water 25% from 50%
  - exclude those with exp to McLaren = 5/41

18/41 exp. @ McLaren within 2 wks

1/41 " " Hurley

since switch to monochloramine @ McLaren - end of summer?

Last potential exp. @ McLaren mid Aug.

No one else with prev. hosp'n since end of Aug.

# of Ag tests done in last 3 yrs

Biofilms stripped by corrosive water

Policy on testing

Fewer cases on city water this yr.

Environmental testing - 8 clin specimens (2 didn't grow well)

6 unique

2 matches - 4

① onset 5/27

② 8/15

onset 5/13-5/19 McL

5/27 one hosp exp - not on FW

② one not on FW

onset 8/15 - exp to hosp outside of incubation

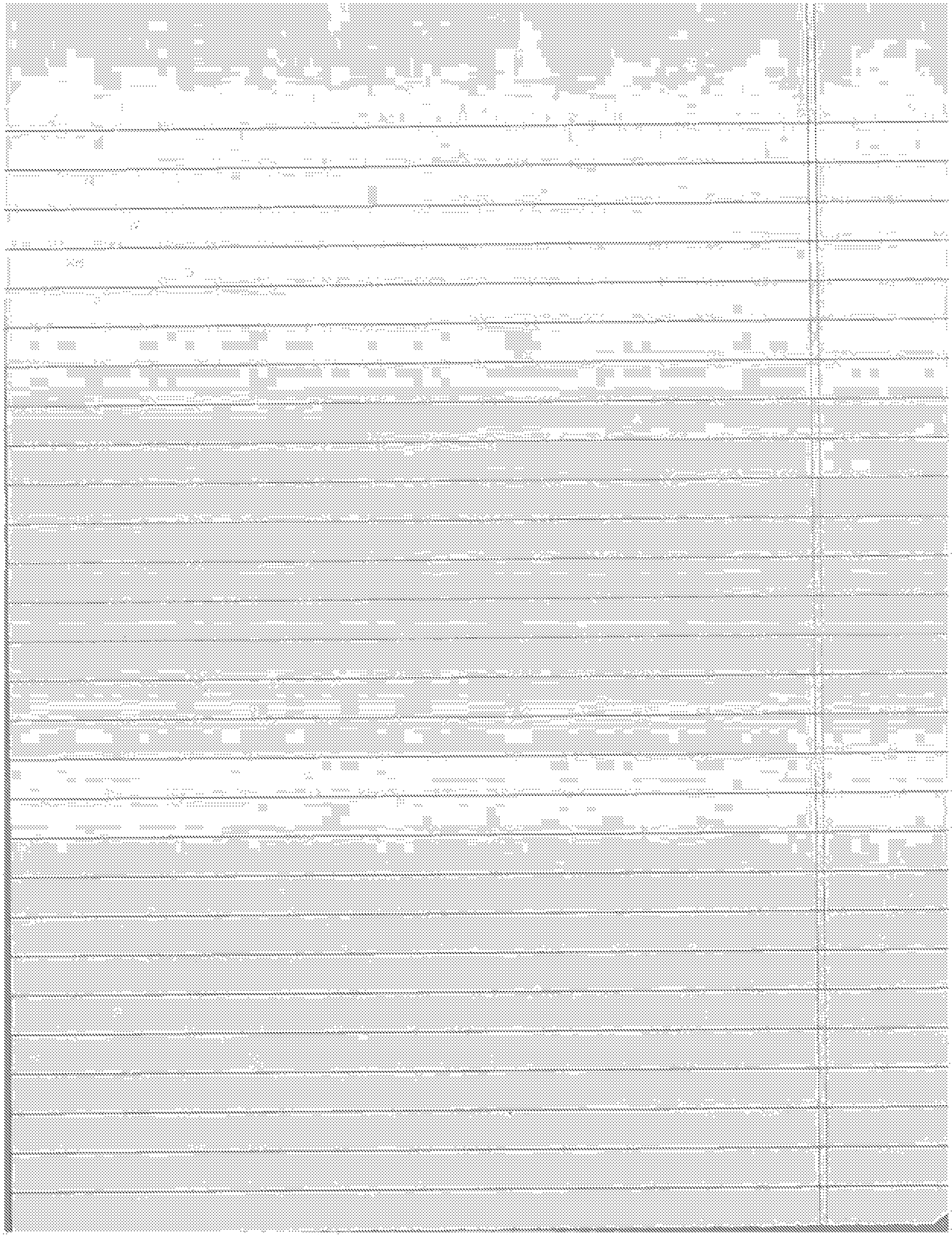
Unique pulse

7/6 onset no hosp. exp. not on FW

7/13 ~~[struck through]~~ 2 " " "

7/22 ~~exp~~ " " " " " "

9/7 " " " " " "



June 26. 2015

Jim Henry & Suzanne

Suzanne 5 new cases
4/5 assoc with McLaren
- interviews - last case yesterday

~~[illegible]~~

Shannon 1 in May
6 in June

Jim H - 2 new ones
- met with McL's Env. H & Safety Director, Russ.
- monthly test @ 4 locations at 4 sep. bldgs.
- identifying legionella @ all 4.
- hyperchlorinate every 6 months - last in Nov.
So 3x in past 8 months
- still identified same levels as before chlorination
- future - [illegible] then [illegible] [illegible]
- 2 ph of [illegible] of water - all cleared)
- 4 towers at McLaren
- policy: >100 - [illegible] [illegible] [illegible]
next day count was 15. ?
- option to [illegible] [illegible] - worried about scalding people
- cold water safe ie <1 problems with hot water

DEQ Mike Prysby & Steve Busch
20 parts/M injecting Cl until 4 parts/million
Is that effective? DEQ may be able to make rec's on chlorination

p. 2.

Requirement that Michael become Type I

EPC Environmental Consulting - hospital has hired them

Jim H - initially tested cooling towers, came back < 1

City Water

Jim H. - schedule for flushing hydrants
- when they open hydrants to flush rusty water - lots of sediment
- doing this in downtown Flint around hospitals
- water main breaks release brown water

Suzanne - City installing carbon filters in June/July

No Boil Water Advisories yet.

Still significant # of water main breaks.

200-300 by April

City is better @ communicating

Jim H sits on board.

Timeline on their website.

Jim H. Legionella is environ. sample - value in that

Outbreak identifier Genesee Legionellosis 2014-2015

Hospital just did some sampling 1.5 weeks ago.

STATE OF MICHIGAN

RICK SNYDER
GOVERNOR

DEPARTMENT OF HEALTH AND HUMAN SERVICES
LANSING

NICK LYON
DIRECTOR

FOR IMMEDIATE RELEASE
DRAFT, 2016

CONTACT: Jennifer Eisner
(517) 241-2112

MDHHS issues update to 2015 Legionnaires' disease report for Genesee County

LANSING, Mich. – As part of the ongoing investigation into the increase of Legionnaires' disease (LD) in Genesee County, the Michigan Department of Health and Human Services (MDHHS) today issued an updated summary for 2015. The update includes three additional LD cases (two deaths) identified since the last report.

"To date, 91 cases and 12 deaths have been identified in total for the 2014 and 2015 healthcare-associated outbreaks in Genesee County," said Eden Wells, M.D., Chief Medical Executive with the MDHHS. "All three additional cases had a hospitalization prior to their LD diagnosis. We remain vigilant in identifying any potential case associated with the outbreak."

All of the new cases were identified by MDHHS personnel from hospital testing data that was forwarded to the department in the past week. Of the three additional cases, two had not been appropriately referred to the public health system. The electronic messages generated by the hospital laboratory system were flawed and a healthcare provider failed to report the cases. The third case was reported in a different jurisdiction and there was no epidemiologic information available to link it to the outbreak.

The public health investigation has looked at a number of potential exposures that the ill people may have experienced; these included exposures to hospitals, water, and community venues. Of the 91 total confirmed cases between June 2014 and ~~November~~ December 2015, 55 percent had a prior hospital exposure at the same Flint hospital. Although 31 people of 91 (34 percent) received city of Flint water to their residence, 18 of 31 (58 percent) also had the hospital exposure. A total of 26 people, or 29 percent, had no known exposure to a Flint hospital in the two weeks prior to illness, nor were their homes on the Flint water system. No other community exposures were identified.

For the May 2015 to October 2015 time period, 46 LD cases and seven deaths have been confirmed in the Genesee County outbreak. Data previously indicated 43 cases and five LD-associated deaths for 2015. The number of cases for June 2014 through March 2015 time period remains unchanged with 45 LD cases confirmed, including five associated fatalities.

Legionella is a type of bacteria commonly found in the environment that grows best in warm water, such as potable water systems (hospitals, large buildings), hot tubs, cooling towers, and decorative fountains. When people are exposed to the bacteria, it can cause legionellosis, a respiratory disease that can infect the lungs and cause pneumonia. The bacteria can also cause a less serious infection called Pontiac fever. Legionella is not transmitted person to person.

MDHHS has partnered with Wayne State University and continues to work with the Genesee County Health

Department (GCHD) and the Centers for Disease Control and Prevention (CDC) on enhanced surveillance which will continue in 2016.

# # #

The 3 add'l cases strengthen the association to the hospital exposure. Jan '16

STATE OF MICHIGAN

RICK SNYDER
GOVERNOR

DEPARTMENT OF HEALTH AND HUMAN SERVICES
LANSING

NICK LYON
DIRECTOR

FOR IMMEDIATE RELEASE
DRAFT, 2016

CONTACT: Jennifer Eisner
(517) 241-2112

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LANSING, Mich. – As part of the ongoing investigation into the increase of Legionnaires' disease (LD) in Genesee County, the Michigan Department of Health and Human Services (MDHHS) today issued an updated report for 2015. The ~~report~~ identifies additional cases and deaths ~~identified~~ since the last report, ~~and provides further analysis regarding the investigation.~~

"To date, 91 cases and 12 deaths have been identified in total for the 2014 and 2015 ~~healthcare-associated~~ outbreaks in Genesee County," said Eden Wells, M.D., Chief Medical Executive with the MDHHS. "We remain vigilant in identifying any potential case associated with the outbreak, and will continue to update information as it becomes available."

The 3 additional cases all had a hospital stay prior to their illness

Of the additional cases, two had not been appropriately referred to the public health system. The electronic messages generated by the hospital laboratory system were flawed and ~~the~~ healthcare providers failed to report the cases. The third case was reported in a different jurisdiction and there was no epidemiologic information available to link it to the outbreak. All of the new cases were identified by MDHHS personnel ~~during a review of~~ hospital testing data that was forwarded to the department ~~in the past week~~.

Of the 91 total confirmed cases between June 2014 and November 2015, 31 people, or 34 percent, received city of Flint water to their residence. A total of 26 people, or 29 percent, had no known exposure to a Flint hospital in the two weeks prior to illness, nor were their homes on the Flint water system. ~~Other possible exposures were evaluated and no known~~ community ~~or residential~~ exposures ~~have been~~ identified.

For the May 2015 to October 2015 time period, 46 LD cases and seven deaths have been confirmed in the Genesee County outbreak. Data previously indicated 43 cases and five Legionnaires-associated deaths for 2015. The number of cases for June 2014 through March 2015 time period has remained unchanged with 45 LD cases confirmed, including five associated fatalities.

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MDHHS has partnered with Wayne State University and continues to work with the Genesee County Health Department (GCHD) and the Centers for Disease Control and Prevention (CDC) on enhanced surveillance which will continue in 2016.

###

11 in first wave on Flint work with McL exp.

10 pupils in 2nd wave.

January 18/31 on Flint work had McL exp.

2015-05-18

Legionellosis Guidance for Clinicians

During the past year, Genesee County has reported over 45 cases of legionellosis. This represents the highest number of legionellosis cases for this time frame over the past 5 years. Investigations are ongoing to determine common sources of exposure. We are asking that the clinical community assist in this investigation through accurate identification, testing and reporting of all suspect cases of legionellosis.

Legionella bacteria can be found in natural, freshwater environments, but they are generally present in insufficient numbers to cause disease. Water systems such as potable (drinking) water systems, whirlpool spas, and cooling towers provide the conditions needed for Legionella growth and transmission-heat, stasis, and aerosolization; therefore, these are common sources of outbreaks.

Epidemiologic Risk Factors for Legionellosis

- Recent travel with an overnight stay outside of the home (up to 14 days prior to symptom onset)
- Exposure to whirlpool spas
- Recent repairs or maintenance work on domestic plumbing
- Renal or hepatic failure
- Diabetes
- Systemic malignancy
- Smoking
- Immune system disorders
- Age > 50 years

Diagnosing Legionellosis

	Legionnaires' disease	Pontiac fever
Clinical features	Pneumonia, cough, fever	Flu-like illness (fever, chills, malaise) without pneumonia
Radiographic pneumonia	Yes	No
Incubation period	2-14 days after exposure	24-72 hours after exposure
Etiologic agent	*Legionella* species	*Legionella* species
Attack rate	< 5%	> 90%
Isolation of organism	Possible	Never
Outcome	Hospitalization common Case-fatality rate: 5- 30%	Hospitalization uncommon Case-fatality rate: 0%

Source: http://www.cdc.gov/legionella/clinicians.html

Who to Test for Legionnaires' Disease

- Patients with pneumonia in the setting of a Legionellosis outbreak
- Patients who have failed outpatient antibiotic therapy
- Patients with severe pneumonia, in particular those requiring intensive care
- Immunocompromised host with pneumonia
- Patients with a travel history [Patients that have traveled away from their home within two weeks before the onset of illness.]
- Patients suspected of healthcare-associated pneumonia

Testing for Legionnaires' Disease

- Urinary antigen assay AND culture of respiratory secretions on selective media are the requested diagnostic tests for Legionnaires' disease
- If a provider orders a urine antigen test on a patient with suspect Legionellosis, a respiratory culture for legionella should be collected at the same time
  - A bronchoalveolar lavage (BAL) or tracheal aspirate (TA) are the preferred methods for specimen collection
  - If a BAL or TA are not able to be performed, a sputum specimen may be used for culture, but the likelihood of recovering the bacteria may be decreased
- Any clinical specimen remaining from the respiratory culture should be frozen and stored immediately by the hospital laboratory
- If a Legionella isolate is recovered, a slant or plate should shipped to the state health department laboratory overnight on cold packs
  - A courier is recommended for plates, if possible, as they do not travel well

Advantages and Disadvantages of Diagnostic Tests

Test	Advantages	Disadvantages
Culture	• Clinical & environmental isolates can be compared • Detects all species & serogroups • 100% specific	• Technically difficult • Slow (>5 days to grow) • Sensitivity highly dependent on technical skill • May be affected by antibiotic treatment
Urine Antigen	• 100% specific... • Rapid (same day)	• ...but only for *L. pneumophila* serogroup 1 (Lp1) [which may account for up to 80% of cases] • Does not allow for molecular comparison to environmental isolates
Serology	• Less affected by antibiotic treatment • 80-90% sensitive; 99% specific	• Must have paired sera • 5-10% of population has titer 1:≥256. Single acute phase antibody titers of 1: ≥256 do not discriminate between cases of Legionnaires' disease and other causes of community-acquired pneumonia.
DFA	• Can be performed on pathologic specimens • >95% specific	• 25-75% sensitive
PCR	• Rapid	• Assays vary by laboratory and are not FDA-approved
Sensitivity varies depending on the quality and timing of specimen collection as well as technical skill of the laboratory performing the test		

Clinical Isolates and Shipping

Isolation of Legionella from respiratory secretions, lung tissue, pleural fluid, or a normally sterile site is still an important method for diagnosis, despite the convenience and specificity of urinary antigen testing. Investigations of outbreaks of Legionnaires' disease rely on both clinical and environmental isolates. Clinical and environmental isolates can be compared using monoclonal antibody and molecular techniques. Because Legionella are commonly found in the environment, clinical isolates are necessary to interpret the findings of an environmental investigation.

The Michigan Department of Health and Human Services state laboratory will test clinical isolates of legionella shipped to the facility free of charge. Please avoid freezing and thawing of isolates. For labs shipping a clinical isolate, a BYCE plate is acceptable. NOTE: Plates do not generally travel well so a courier should be used if possible.

Treatment

Recommended treatment for Legionella pneumonia in most patients includes either a fluoroquinolone (e.g. levofloxacin 750 mg once daily) or a macrolide (e.g. azithromycin 1 gram on day one, followed by 500 mg once daily) for a total treatment duration of 10–14 days. Antibiotic regimen and treatment duration may vary depending on specific patient risk factors or comorbidities.

Reporting

Legionellosis is a reportable disease in Michigan. We are asking health care professionals to report both Legionnaires' disease and Pontiac fever cases via the Michigan Disease Surveillance System (MDSS) or directly to the Local Health Department. Physicians are requested to collect and record illness onset dates as part of the patient record. An accurate illness onset date is extremely important to determine the patient's potential environmental exposures and is vital to the investigation of an outbreak. In patients with chronic respiratory conditions, the first appearance of fever may be a useful indicator of legionellosis onset date.

For additional information, please contact:

Genesee County Health Department: 810-257-1017 or 810-257-3815

Legionellosis Cases Genesee County,
June 2014-Jan 2015

Last	Prev_hosp_site	Prev_admit_date	Prev_disch_date	Duration_prev_hosp_days	Reason_prev_hosp	Occupation	Travel?	City801	Lodging/Other recent HCE exposures

PHI

Yellow – Hamilby hosp.
Red – McLaren hosp
Orange – McLaren affiliate)

Green – no prev. HC exposure

Legionellosis Cases Genesee County,
June 2014-Jan 2015

Last	Prev_hosp_site	Prev_admit_date	Prev_disch_date	Duration_prev_hosp_days	Reason_prev_hosp	Occupation	Travel?	City001	Lodging/Other recent HCF exposures

PHI

Legionellosis Cases Genesee County,
June 2014-Jan 2015

Last	Prev_hosp_site	Prev_admit_date	Prev_disch_date	Duration_prev_hosp_days	Reason_prev_hosp	Occupation	Travel?	City001	Lodging/Other recent HCF exposures

PHI

Legionellosis Cases Genesee County,
June 2014-Jan 2015

Last	Prev_hosp_site	Prev_admit_date	Prev_disch_date	Duration_prev_hosp_day	Reason_prev_hosp	Occupation	Travel?	City001	Lodging/Other recent HCF exposures

PHI

16 R. 9°
3 4
3 3
17 6

Line list from Harvey

Report 1: Line list of Disease Cases for a Given Timeframe and Geographic Location
Report generated: 02-06-2015
Time Period: 01/01/2014 - 02/06/2015
Case Status: Confirmed, Confirmed-Non Resident, Not a Case, Probable, Suspect, Unknown
Investigation Status: Active, Canceled, Completed, Completed - Follow Up, New, Review, Supervised

Reportable Conditions: Legionellosis
Counties: PHI

Invest ID	Name	Address	Age	DOB	Race	Ethnicity	Sex	Condition	Status	Onset	Referral

PHI

(nothing on page 3)

not to be released to
unauthorized pers...
protected by MC...

PHI

Name	MR#	Age	Admit Date	Legionella Positive Date	Last Discharge Date	Length of Prior Admission	Days between last discharge and admission	Days between last discharge & onset of symptoms	Locations in Hospital from prior admission	Medical History	ABX on prior admission	ID	Notes

PHI

Name	MRN	Age	Admit Date	Legionella Positive Date	Last Discharge Date	Length of Prior Admission	Days between last discharge and admission	Days between last discharge & onset of symptoms	Locations in Hospital from prior admission	Medical History	ABX on prior admission	ID	Notes

PHI

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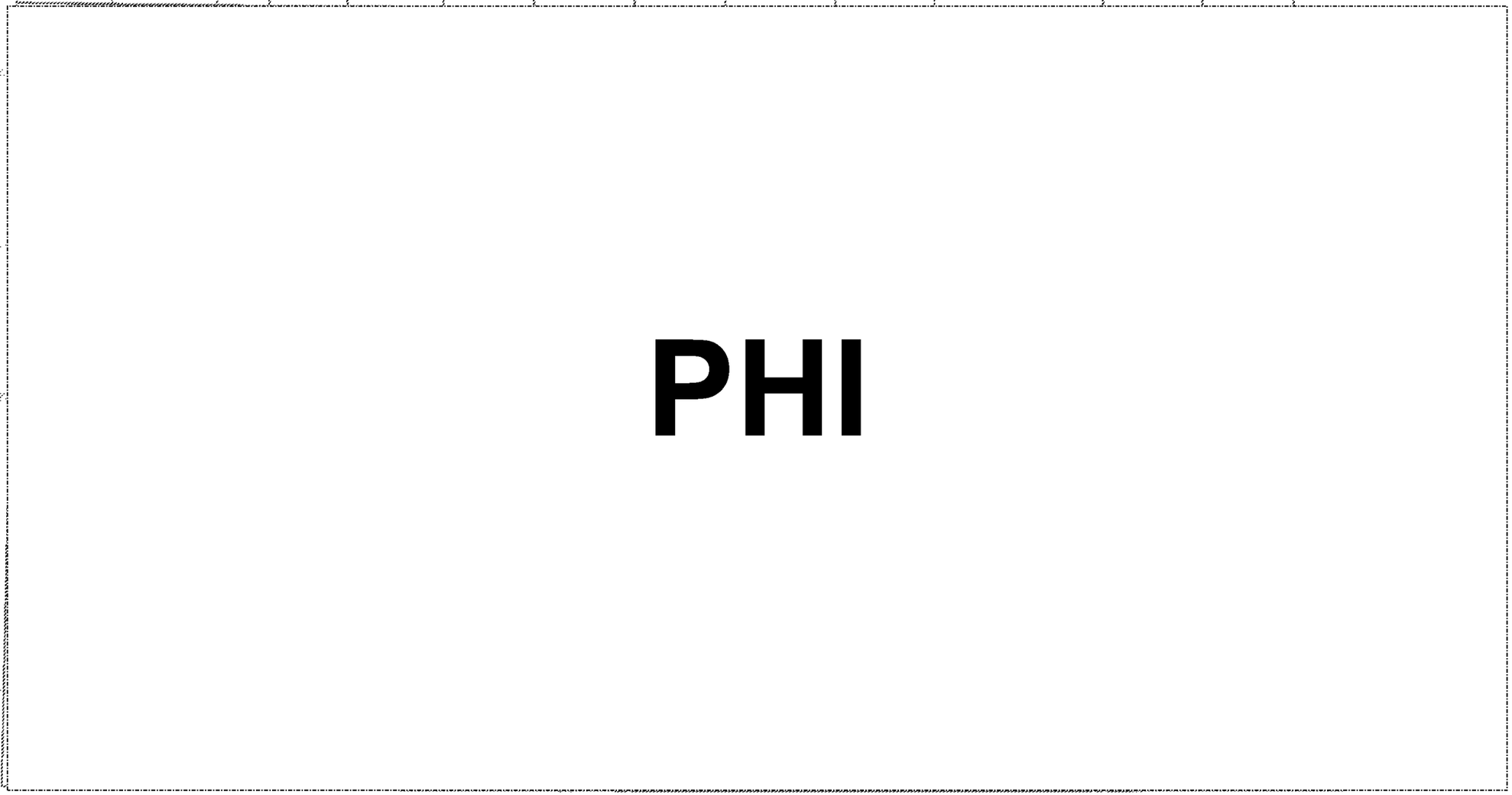
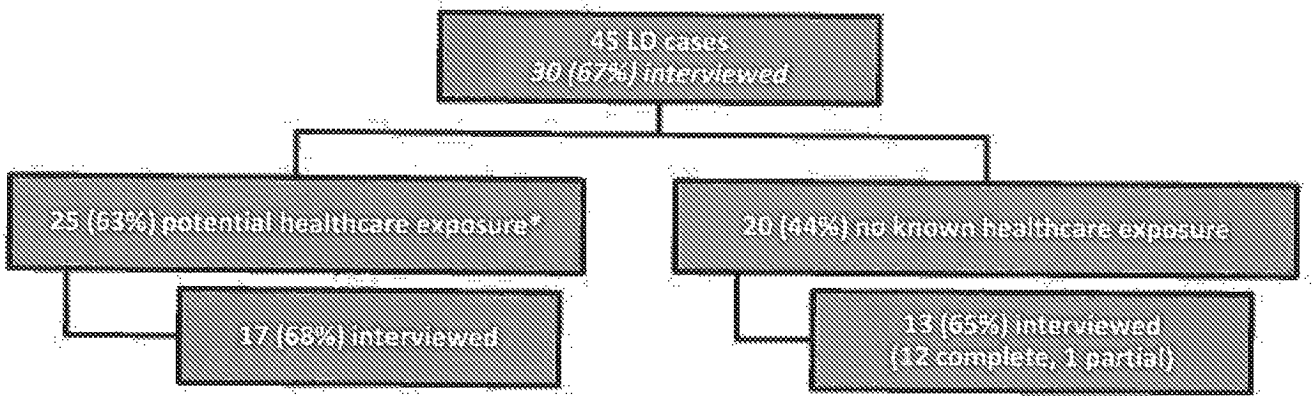
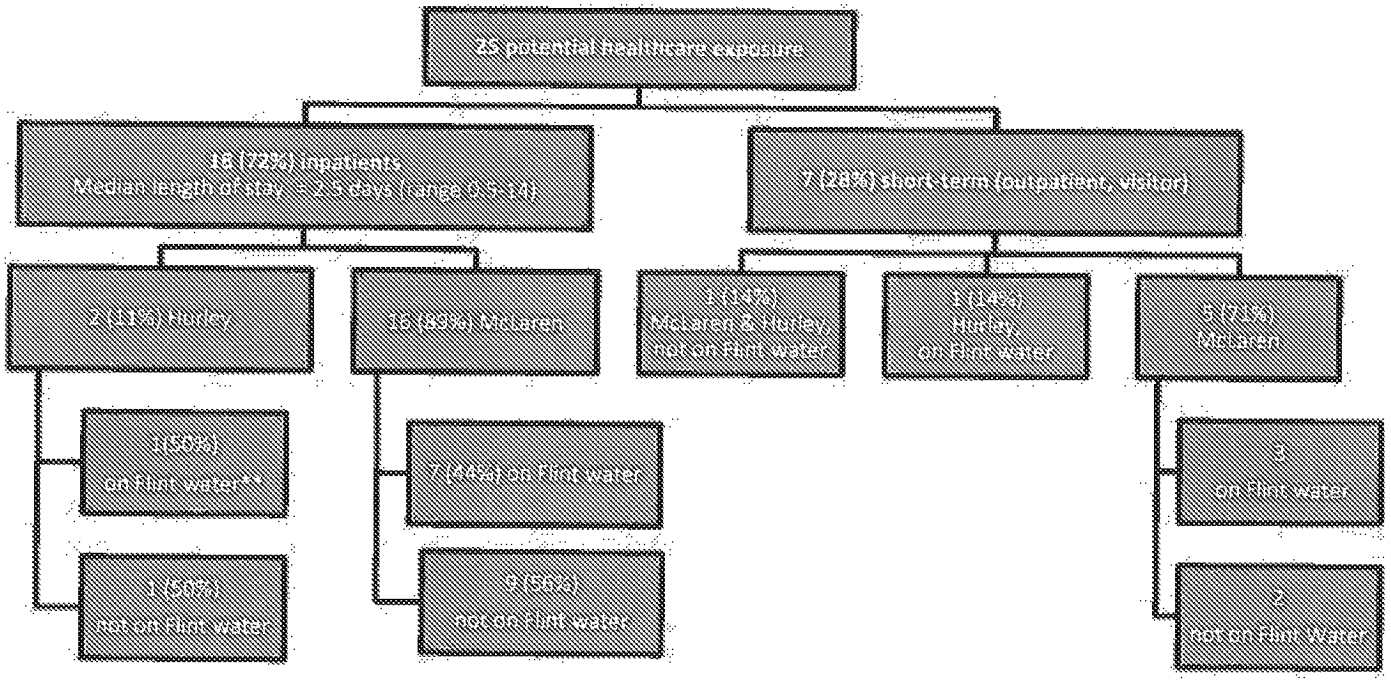


PHI

PHI

Legionellosis Cases by Healthcare Exposure (as of May 15, 2015)





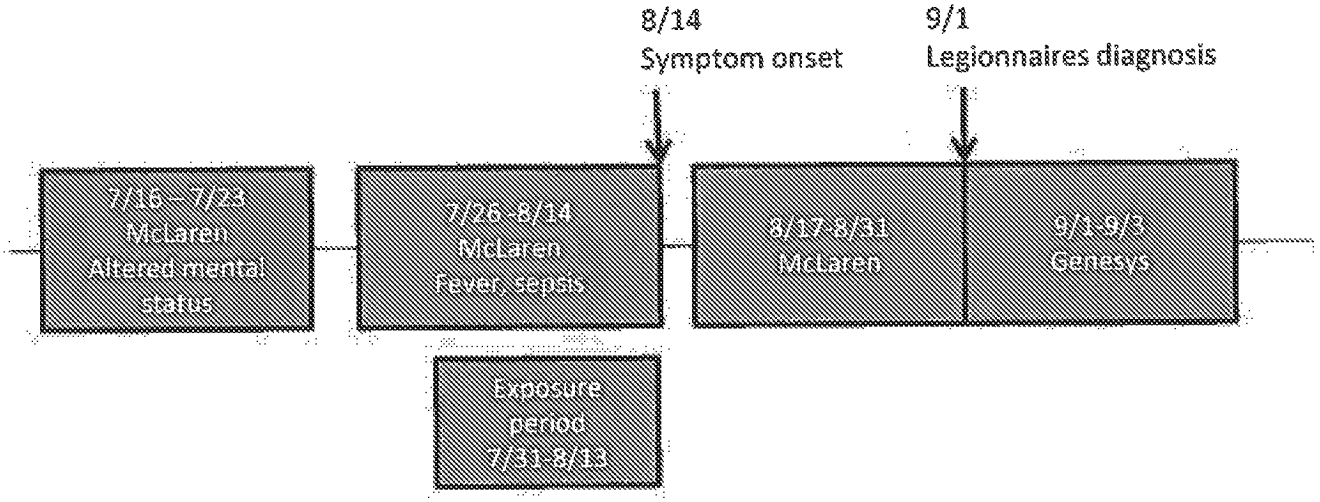
* Healthcare exposure = inpatient, outpatient or visitor to McLaren or Hurley health systems during 14 days prior to symptom onset date (exposure period)

** On Flint water = patient's residential water (during exposure period) supplied by City of Flint

Type of Healthcare Exposure

	# cases	McLaren			Hurley			Live on Flint water	Epi Info Record #
		IN	OUT	VISIT	IN	OUT	VISIT		
McLaren (n=10)	7	Y	N	N	N	N	N	N	2, 5, 6, 12, 19, 25, 29
	1	Y	Y	N	N	N	N	N	17
	1	N	Y	N	N	N	N	N	14
	1	N	N	Y	N	N	N	N	33
McLaren & Flint H_2O (n=11)	7	Y	N	N	N	N	N	Y	4, 9, 23, 27, 30, 35, 44
	3	N	Y	N	N	N	N	Y	13, 39, 45
	1	Y	N	Y	N	N	N	Y	37
Hurley (n=1)	1	N	N	N	Y	N	N	N	26
Hurley & Flint H_2O (n=2)	1	N	N	N	Y	N	N	Y	40
	1	N	N	N	N	N	Y	Y	11
McLaren & Hurley (n=1)	1	N	N	Y	N	N	Y	N	7
total	*25*	*16*	*5*	*3*	*2*	*0*	*2*	*13*	

1 patient (EpiInfo Record #6) spent entire exposure period in McLaren

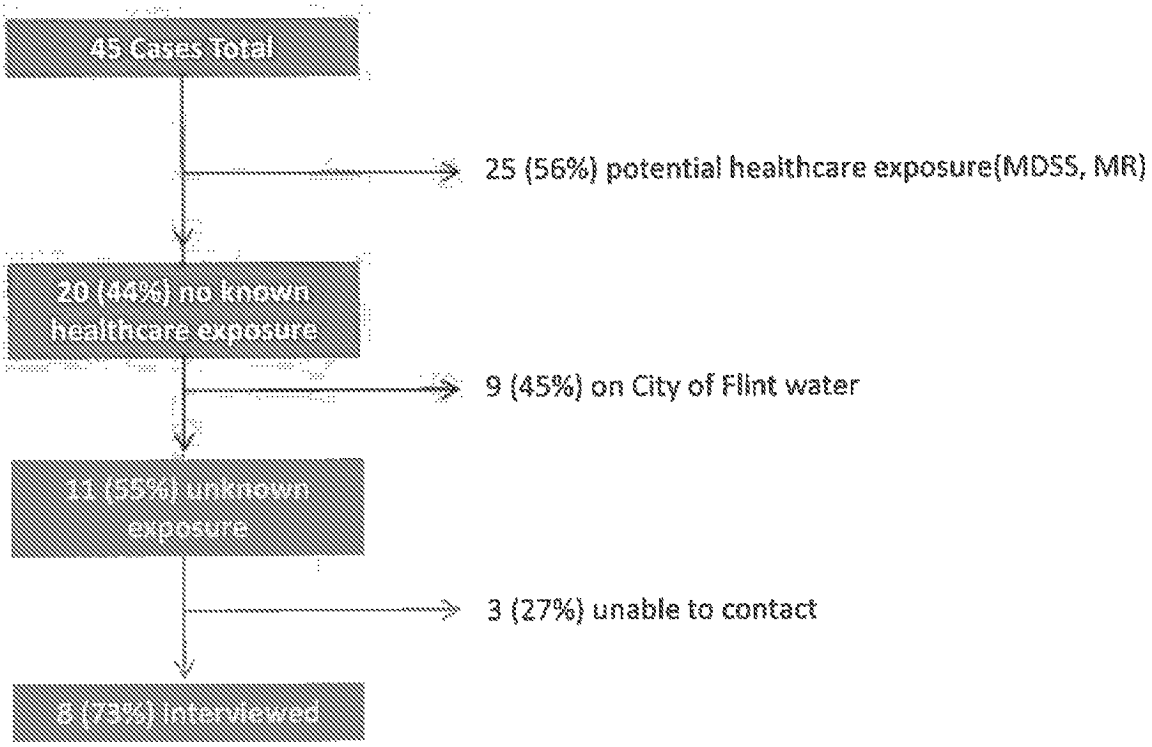


Patient reported comorbidities and health behaviors by healthcare exposure

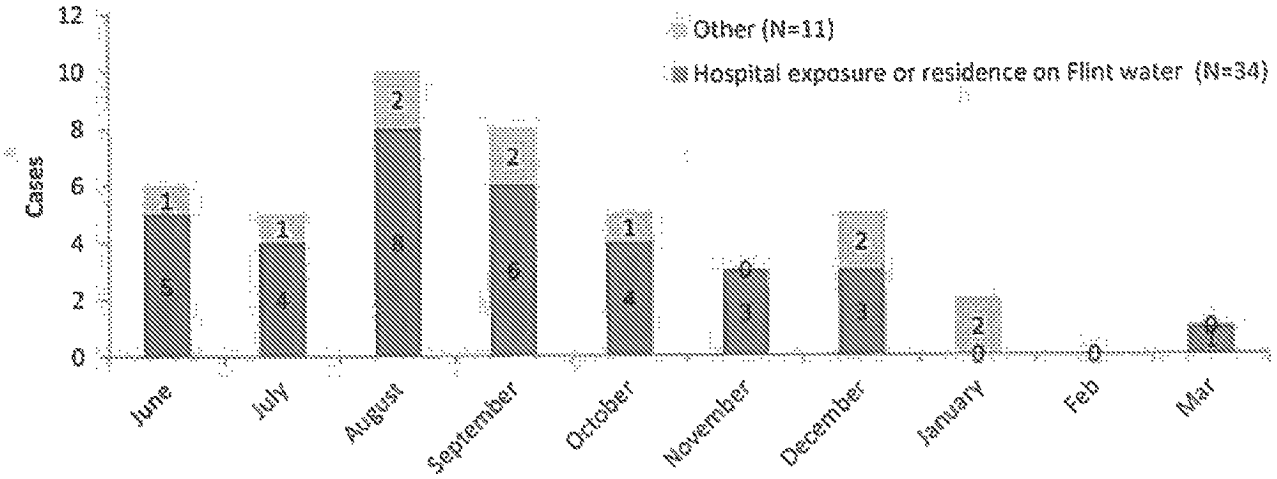
	Total		Healthcare exposure (N=17)		No known healthcare exposure (N=12)	
	n	%	n	%	n	%
≥1 comorbidity	25	86.2	16	94.1	9	75.0
Chronic kidney disease	11	37.9	7	41.2	4	33.3
Immunocompromised	9	33.3	4	26.7	5	41.7
Diabetes	11	39.3	8	47.1	3	27.3
Chronic lung disease	12	41.4	8	47.1	4	33.3
Asthma, chronic bronchitis	7	24.1	4	23.5	3	25.0
Heart disease	12	41.4	8	47.1	4	33.3
Liver disease	0	0.0	0	0.0	0	0.0

	Total		Healthcare exposure (N=17)		No known healthcare exposure (N=12)	
	N	%	N	%	N	%
Former or current smoker	24	82.8	14	82.4	10	83.3
Current smoker	11	37.9	7	41.2	4	33.3
Median packs per day (range)			1 (0.15-2)		1 (0.14-2)	
Median years (range)			35 (20-45)		30 (15-35)	
Former smoker	14	53.8	7	50.0	7	58.3
Median packs per day (range)			1 (0.5-1.5)		1 (0.2-3.5)	
Median years (range)			35 (20-45)		30 (15-35)	
Drinks alcohol	9	31.0	6	35.3	3	25.0
Median drinks per day (range)			1.1 (0.1-2)		1 (0.2-2)	
Median years (range)			45 (1-57)		no data	

Legionellosis Cases with Unknown Exposures (as of May 15, 2015)



Legionnaires' Disease Cases by Estimated Symptom Onset—Genesee County, June 2014–March 2015 (N=45)



Cases with no known hospital exposure and not on City of Flint water

9 people – no exp. (2 not interviewed)

EpiInfo Number	City of Flint Exposure	Exposure
3	No	Industrial Painter
10	No	Probably drove through Flint(?)
15	Yes (?)	Aldi
16	Yes	HR Technician, Hurley
18	Yes	Kroger & Aldi
20	No	Had Mclaren visit prior to exposure period
22	No	
32	Yes	Motel 6; Not interviewed
36	?	Not interviewed
38	?	Not interviewed
44	Yes	Visit wife at Hurley and McLaren

Barbershop visit during exposure period?	
Yes	7
Not on Flint Water	
1209 E Wackerly St, Midland MI 48642	1
12163 N State Rd., Ottisville, MI 48463	1
Atherton Rd Burton MI	1
Pasadena St, Flint MI	1
On Flint water	
3122 Clio Road, Flint MI 48504	1
"Beauty School" Flint	1
Pierson Road	1
No	22
Not on Flint Water	12
On Flint water	10
Unknown	1
Missing	16

Place of Worship visit during exposure period?	
Yes	8
Not on Flint Water	
First Baptist	1
804 W Main St, Durand MI 48429	
First United Church	1
1116 W Hill Rd, Flint MI 48507	
Kingdom of Heaven Ministries	1
2430 Dutcher Rd, Flint, MI	
Shawn Baptist Church	1
2493 N Genesee Rd. Burton, MI 48509	
On Flint water	
St John Vianney Catholic Church	2
2415 Bagley St Flint MI 48504 (corner of N Chevrolet Ave)	
Unsure	2
No	21
Not on Flint Water	12
On Flint water	9
Unknown	0
Missing	17

Carwash visit during exposure period?	
Yes	5
Not on Flint Water	
Center Rd and Atherton Rd, Burton MI	1
Clio, MI?	1
Pierson Rd, Flushing MI	1
On Flint water	
112 W 5th Ave Flint, MI 48503	1
Flint, MI ?	1
No	24
Not on Flint Water	13
On Flint water	11
Unknown	1
Missing	16

'Yes' to Home Improvement Store exposure:	
Not on Flint Water	**Interview Total=3**
Home Depot	
4245 E Court St. Burton, MI	1
Menards	
11357 Linden Rd, Clio MI	1
7410 E Court Davison MI 48423	1
On Flint Water	**Interview Total= 4**
Home Depot	
4380 W Corunna Rd, Flint, MI 48532	1
5300 Pierson Road Flushing, MI 48433	1
4245 E Court St. Burton, MI	2
Lowes	
2100 T A Monsour Blvd Flint, MI 48532	1
4274 Court St. Burton	1

'Yes' to grocery store exposure:

Not on Flint Water	Interview Total=12
Kroger	
7188 N Saginaw Rd, Mount Morris, MI 48458	2
700 N State Rd Davison MI 48423	1
3838 Richfield Rd Flint, MI 48506	1
Meijer	
2333 Center Rd. Flint MI 48519	4
9515 Birch Run Rd, Birch Run MI	1
2591 E M21, Corunna MI 48817	1
4141 Morrish Road, Swartz Creek MI 48473	1
Aldi	
Center St. Burton	2
5340 W Pierson Rd, Flushing, MI 48433	1
Corunna Rd Flint MI	1
WalMart	
11493 N Linden Rd, Clio, MI, 48420	2
5323 E Court St N Burton, MI 48509	1
Other (Not In Flint)	4

On Flint Water	Interview Total= 8
Kroger	
5249 Corunna Rd, Flint, MI 48532	2
1542 E Pierson Rd, Flushing	1
1916 Davison Rd, Flint	2
Meijer	
2333 Center Rd. Flint MI 48519	1
4333 W Pierson Rd	3
WalMart	
4313 Corunna Rd, Flint	1
Save-a-Lot	
1918 N Dort Hwy Flint, MI 48506	1

Genesee Legionnaires' Disease Outbreak Investigation
Interview Data Analysis Plan

1. Cleaning
   - ✓ Check address and City of Flint Water (COFW) status
     i. Check the one non-COFW to COFW water (purple tabs on Water map)
   - ✓ Check hospitalization during exposure period?
   - ✓ Create variables: Inpatient YN, Outpatient YN, Visited YN and check if the hospital exposure occurred during the exposure period HC exp YN
2. Add comorbidity and symptom data from MR/MDSS to EpiInfo –
- ✓ Stratify by healthcare, COFW
- ✓ Basic analysis of interview data
- ✓ Stratify Q4-7 by Tap Water Source
3. Community Exposures Analysis
   - ✓ Stratify Community exposures by COFW Y/N
   - ✓ Stratify Community exposures by hospital visit status Y/N
   - ✓ Map Community Exposures of 9 non-hospital/non-CoFW exposure with interviews Vern
4. M- Healthcare exposure analysis Meghan
   - ✓ Stratify by LoS Length of stay
   - ✓ Stratify by CoF water
   - ✓ Stratify by smoking status
5. L- Comorbidity analysis Meghan
   - ✓ General
   - ✓ Of hospitalized patients
   - a. Unknown exposures
6. ~~12~~ non-healthcare, non-flint
   - ✓ Check resident address
   - ✓ Mapping (see 2c)

Based on Medical Records:

45 Cases

→ 25 people had some exposure to a hospital (inpatient, outpatient, or visitor)

1. 18 hospitalized (inpatient) within exposure period (XX did not)
    a. 16 McLaren: 8 on CoFW, 8 not on CoFW
    b. 2 Hurley: 1 on CoFW, 1 not on CoFW
2. 5* outpatient visits within exposure period (41 did not, 0 unknown)
    a. 5 McLaren: 3 on COFW, 2 not on COFW
    b. One also had an inpatient visit to McLaren (NOT on COFW)
3. 4* visited someone in the hospital (17 did not, 23 were unknown)
    a. 1 visited McLaren and Hurley (NOT on COFW)
    b. 2 McLaren (1 on COFW, also had inpatient at McLaren, 1 not COFW)
    c. 1 Hurley (on COFW)

→20 people with no exposure to hospital based on Medical Records

4. 8 on COFW
5. 12 not on COFW

→ 12 people not on CoFW with no hospital exposure

6. 9 interviewed
7. 3 lost to follow up

Based on

from Suzanne Cupal

06/24/2014- Bug Fuzz Meeting- Hospitals discussed legionella cases that had been previously hospitalized at Mclaren.Began monitoring legionella cases that were previously hospitalized (especially at McLaren) – GCHD did not note a significant increase in Legionella

07/2014- Total cases hospitalized from McLaren- 3

08/20/2014 CDIRT-Discussed increase in Legionella – Started to talk to Mclaren around this time (suspect cooling towers as potential source, planned meeting with engineering department to discuss their investigation) **6 cases hospitalized from Mclaren out of 13**

9/4/2014- McLaren identifies location of their patients with legionella, found them same towers but different floors. They have hired someone to inspect the air valves on 13th floor and will keep us updated. **10 out of 18 total cases from Mclaren**

9/05/2014-Mclaren First Test

9/26/2014- Test results returned to Mclaren

10/4/2014- McLaren does hyper chlorination

10/15/2014- CDIRT-Discussed Legionella- 15 Total cases in September Mclaren hyper chlorinated, more cases- Jim to talk to DEQ, develop Environmental survey for cases

10/30/2014- Jim meets with McLaren +DPW- we get results for Heterotrophic plate count (October only) and Mclaren results for testing- Mclaren will continue to test monthly for legionella, they have a plan in place for remediation if necessary.

MDHHS Preliminary Stats on Genesee County Legionellosis Investigation, April 29, 2015

Number of lab-confirmed cases of Legionnaires' Disease: 45

Number of Pontiac fever cases: 1 with positive Ag test but asymptomatic

Total number of legionellosis cases: 46

Working case definitions:

> Confirmed Legionnaires' Disease (LD) – meets the CDC clinical and laboratory case definition for confirmed LD and illness occurred since June 1, 2014 in residents of Genesee County or those who had visited the Flint area in 2 weeks prior to their illness onset date.
>
> Suspected LD – meets the CDC clinical and laboratory case definition for suspected LD and illness occurred since June 1, 2014 in residents of Genesee County or those who had visited the Flint area in 2 weeks prior to their illness onset date.
>
> Confirmed Pontiac Fever (PF) – meets the CDC clinical and laboratory case definition for confirmed PF and illness occurred since June 1, 2014 in residents of Genesee County or those who had visited the Flint area in 2 weeks prior to their illness onset date.

Geographic distribution:

> 45/46 Genesee Co (27 Flint, 6 Mt. Morris, 4 Burton, 2 Flint Twp, 1 Flushing, 1 Byron, 1 Davison, 1 Linden, 1 Otisville, 1 Vienna Twp)
>
> 1/46 Saginaw County (1 Chesaning)

Age range: 26-94 years

Average age (median): 62.2 years (63.5 years)

% Males: 50% (23/46)

Range of illness onset dates (n=45): 6/6/14- 3/9/2015

Number (%) of deaths: 15.2% (7/46)

Number (%) with other underlying comorbidities: TBD

Data sources: MDSS, hospital chart reviews

S.I.D.E.

Date outbreak-specific survey completed and approved: 2/23/15

Number of cases interviewed: 29 completed + one partial (63% complete; 95.7% in total attempted/completed)

MDHHS: 19 completed / 31 contacted (MDCH had 2 interviewers – now increased to 4)

Genesee: 10 completed / 15 (1 status unknown)

Number (%) of cases hospitalized: 45/46 (97.8%). Number in ICU: 22/45 (48.8%)

Number of cases interviewed: 29 completed (63%; 95.7% in total attempted/completed)

MDHHS: 19 completed / 31 contacted (MDCH had 2 interviewers – now increased to 4)

Genesee: 10 completed / 15 (1 status unknown)

Number (%) of cases hospitalized: 45/46 (97.8%). Number in ICU: 22/45 (48.8%)

Number (%) of cases hospitalized at McLaren: 18/45 (40%)

Number (%) of cases hospitalized at Hurley: 14/45 (31%)

Number (%) of cases hospitalized at Genesys: 6/45 (13.3%)

Number (%) of cases hospitalized at other hospitals outside Flint: 7/45 (15.6%)

Number (%) of cases who had been hospitalized in 2-weeks prior to onset: 19/45 (37.8%)

Number (%) of cases who had only a short-term visit to a hospital/healthcare facility in 2-weeks prior to onset: 7/45 (15.6%)

Number (%) of cases who had been hospitalized or who had a short-term visit to a hospital/healthcare facility in 2-weeks prior to onset: 26/45 (57.8%)

Number (%) of cases who work outside the home: 8/46 (17.4%) [min of 72% were at home]

Number (%) of cases who are retired: 20 (43.5%)

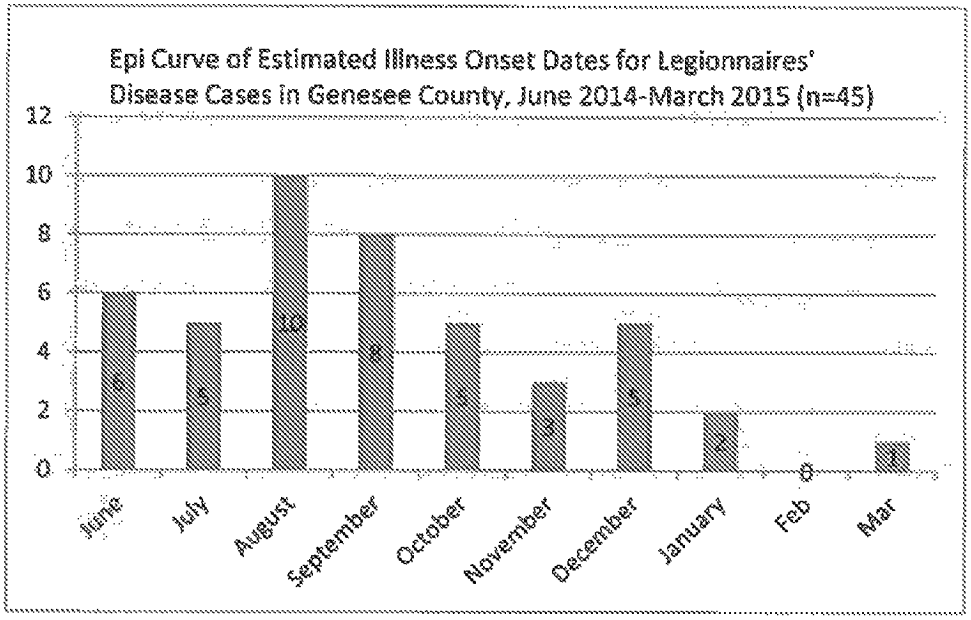
Number (%) of cases who are unemployed: 7/46 (15.2%)

Number (%) of cases who are disabled: 6/46 (13%)

Number (%) of cases whose occupation status is unknown: 5/46 (10%)

Data sources: MDSS, hospital chart reviews

S.I.D.E.



Data sources: MDSS, hospital chart reviews

S.I.D.E.

Residence Water and Healthcare Exposures During the 2 Weeks Prior to Onset

As of 4/29/15

Healthcare exposure in 2 wks prior to onset	Residence on city water	Residence NOT on city water
Hospitalized at McLaren	8	9
Hospitalized at Hurley	1	1
Outpatient at McLaren	3	1
Visited McLaren	0	2
Visited Hurley	1	0
Visited other hospital	0	1 (Saginaw VA)
No known healthcare exposure	8	11
Total	21	25

Cases admitted (overnight) to a hospital during the 2 weeks prior to onset:

9/21 (43%) cases on City of Flint water with a hospital admission during the 2 weeks prior to onset.

- 8/21 (38%) admission to McLaren hospital
- 1/21 (5%) admission to Hurley

10/25 (40%) cases NOT on City of Flint water with a hospital admission during the 2 weeks prior to onset.

- 9/25 (36%) admission to McLaren hospital
- 1/25 (4%) admission to Hurley

Cases with any hospital exposure during the 2 weeks prior to onset:

13/21 (62%) cases on City of Flint water with any hospital exposure during the 2 weeks prior to onset.

- 11/21 (52%) admission, outpatient, or visit to McLaren
- 2/21 (10%) admission or visit to Hurley

14/25 (56%) cases NOT on City of Flint water with any hospital exposure during the 2 weeks prior to onset.

- 12/25 (48%) admission, outpatient, or visit to McLaren
- 1/25 (4%) admission to Hurley
- 1/25 (4%) visit Saginaw VA

Overall:

17/46 (37%) Hospitalized at McLaren (overnight) during the 2 weeks prior to onset.

23/46 (50%) Any exposure to McLaren during the 2 weeks prior to onset.

MDHHS Preliminary Data on Genesee County Legionellosis Investigation (April 29, 2015)
Epi Info Analysis of Questionnaire Data

30 cases of 46 have been interviewed so far (65% interviewed). Of these interviews, 29 are complete and 1 interview was refused half way through (97% completed, 63% of all cases).

3.) Where did you get your tap (drinking and other household use) water from __/__/__ to __/__/__?

Water Source	Number	%
City of Flint Water	13	43
City of Flint Township Water	3	10
Other municipal water system	4	13
Private well	7	23
Unknown	3	10
TOTAL	30	100

13/30

4.) During the last year, has the water pressure at your residence changed?

Variable	Yes	%	No	%	Unk	%	Total Number
City of Flint Water	2	67	8	36	3	60	13
City of Flint Township Water	0	0	2	9	1	20	3
Other municipal water system	0	0	3	14	1	20	4
Private well	1	33	6	27	0	0	7
Unknown	0	0	3	14	0	0	3
TOTAL	3	100	22	100	5	100	30

5.) During the last year, has the water quality (appearance, taste, smell) at your residence changed?

Variable	Yes	%	No	%	Unk	%	TOTAL
City of Flint Water	10	100	2	11	1	100	13
City of Flint Township Water	0	0	3	16	0	0	3
Other municipal water system	0	0	4	21	0	0	4
Private well	0	0	7	37	0	0	7
Unknown	0	0	3	16	0	0	3
TOTAL	10	100	19	100	1	100	30

6.) Prior to your illness, did you make any recent plumbing changes or repairs at your residence?

Variable	Yes	%	No	%	Unk	%	TOTAL
City of Flint Water	1	33	11	44	1	50	13
City of Flint Township Water	0	0	3	12	0	0	3
Other municipal water system	2	67	1	4	1	50	4
Private well	0	0	7	28	0	0	7
Unknown	0	0	3	12	0	0	3
TOTAL	3	100	25	100	2	100	30

7.) Prior to your illness, were there any water main breaks or other water line issues that affected the water at your residence, including boil water advisories?

Variable	Yes	%	No	%	Unk	%	TOTAL
City of Flint Water	6	100	5	23	2	100	13
City of Flint Township Water	0	0	3	14	0	0	3
Other municipal water system	0	0	4	18	0	0	4
Private well –N/A	0	0	7	32	0	0	7
Unknown	0	0	3	14	0	0	3
TOTAL	6	100	22	100	2	100	30

8.) During this 2 week period (exposure period), did you work or volunteer, either full or part time?

Variable	Yes	%	No	%	Not Sure	%	Total
Work or volunteer	6	21	23	79	0	0	29

10.) Visit, reside, or work in a long term care facility, nursing home, assisted living facility, or senior living facility?

Variable	Yes	%	No	%	Unk	%	TOTAL
Resident	0	0	29	100	0	0	29
Visitor	2	7	27	93	0	0	29
Employee	0	0	29	100	0	0	29

11.) In the 2 weeks before you before you got sick, did you spend any nights away from home (excluding healthcare settings)?

Variable	Yes	%	No	%	Unk	%	TOTAL
Travel Exposure	2	7	27	93	0	0	29

in MI26

12.) In the 2 weeks before you before you got sick (__/__/__ to __/__/__), did you visit any of the following community venues?

Variable	Yes	%	No	%	Unk	%	Total
Hotel (no stay)	0	0	28	97	1	3	29
Auditorium	1	3	28	97	0	0	29
Barbershop or Hair salon	7	23	22	73	1	3	30
Car Wash	5	17	24	80	1	3	30
Casino	3	10	26	87	1	3	30
Place of worship*	8	28	21	72	0	0	29
Gym or Work out facility	1	3	27	93	0	0	29
Grocery Store (multiple locations)	20†	69	7	24	2	7	29
Aldi's**	3						
Kroger**	8						
Meijer**	9						
Walmart**	4						
Other stores	5						
Home improvement store	7	24	17	59	3	10	29
Spa or nail salon	0	0	27	93	0	0	29
Mall or Department store	2	7	24	83	1	3	29
Movie Theater	0	0	28	97	0	0	29
Other (specify)	4	14	17	59	0	0	29

*Only 2 reported the same church

**Need to check addresses, not all the same location

†Do not sum to 20 because people visited multiple locations

13.) In the 2 weeks before you got sick, did you have exposure to any of the following water sources, either *at home* or while *away from home*?

Variable	Yes	%	No	%	Unk	%	Total
At Home							
Shower	27	93	2	7	0	0	29
By water source:							
City of Flint	10(37%)						
City of Flint Township	3 (11%)						
Other Municipal water system	4 (15%)						
Private	7 (26%)						
Unknown	3 (11%)						
Use a detachable shower head or hose	8	28	21	72	0	0	29
By water source:							
City of Flint	3 (38%)						
City of Flint Township	0 (0%)						
Other Municipal water system	1 (13%)						
Private	3 (38%)						
Unknown	1 (13%)						
Hot tub, whirlpool spa, Jacuzzi tub	2	7	27	93	0	0	29
Sat NEAR a working hot tub or whirlpool spa	0	0	29	100	0	0	29
Steam room or wet sauna	0	0	29	100	0	0	29
Humidifier	6	21	22	76	1	3	29
By water source:							
City of Flint	2 (33%)						
City of Flint Township	0 (0%)						
Other Municipal water system water	1 (17%)						
Private	3 (50%)						
Unknown	0 (0%)						
Respiratory therapy machine	6	21	23	79	0	0	29
CPAP	1 (17%)						
Nebulizer	5 (83%)						
Away from home							
Shower at gym, work, other location	3	10	26	89	0	0	29
Use a detachable shower head or hose	1	3	28	97	0	0	29
Hot tub, whirlpool spa, Jacuzzi tub	0	0	29	100	0	0	29
Sat NEAR a working hot tub or whirlpool spa	0	0	29	100	0	0	29
Humidifier (whole house or portable)	1	4	27	96	0	0	28
Pool/splash pad/waterpark (3 different locations)	3	11	25	89	0	0	28
Recreational or cooling misters	0	0	29	100	0	0	29
Steam room or wet sauna	0	0	29	100	0	0	29
Decorative fountain	1	3	27	93	1	3	29
Outdoor watering hose or sprinkler	5	17	23	79	1	3	29
Beach, lake, pond, river, creek, etc.	2	7	27	93	0	0	29

Meghan

Preliminary Data on Genesee County Legionellosis Investigation (as of April 29, 2015)

Water exposures

Variable	Yes	%	No	%	Unk	%	Missing	%
At Home								
Shower (by Flint water)	27	90	2	7	0	0	1	3
Use a detachable shower head or hose	8	27	21	70	0	0	1	3
Hot tub, whirlpool spa, Jacuzzi tub	2	7	27	90	0	0	1	3
Sat NEAR a working hot tub or whirlpool spa	0	0	29	97	0	0	1	3
Steam room or wet sauna	0	0	29	97	0	0	1	3
Humidifier	6	20	22	73	1	3	1	3
Respiratory therapy machine	6	20	23	77	0	0	1	3
CPAP with bottled	1							
Nebulizer with tap water	1							
Nebulizer with bottled water	1							
Nebulizer with unknown water source	1							
Nebulizer without water	1							
Nebulizer with albuterol	1							
Other	1	3	14	47	0	0	15	50
	1							
Away from home								
Shower at gym, work, other location	3	10	26	87	0	0	1	3
Friend's home in Dansville (3 days)	1							
2 McLaren (while hospitalized)	1							
Use a detachable shower head or hose	1	3	28	93	0	0	1	3
Hot tub, whirlpool spa, Jacuzzi tub	0	0	29	97	0	0	1	3
Sat NEAR a working hot tub or whirlpool spa	0	0	29	97	0	0	1	3
Humidifier (whole house or portable)	1	3	27	90	0	0	1	3
Whole house, furnace	1							
Pool/splash pad/waterpark	3	10	25	83	0	0	2	7
Outdoor Ventures; Davidson, MI	1							
Pool at home that grandkids use	1							
Blue Bell Beach splashpad	1							
Recreational or cooling misters	0	0	29	97	0	0	1	3
Steam room or wet sauna	0	0	29	97	0	0	1	3
Decorative fountain (Blue Bell Beach)	1	3	27	90	1	3	1	3
Outdoor watering hose or sprinkler	5	17	23	77	1	3	1	3
Beach, lake, pond, river, creek, etc.	2	7	27	90	0	0	1	3
Other (specify)	1	3	18	60	0	0	11	37
Drinking water at hospital	1							

Variable	Yes	%	No	%	Unk	%	Missing	%
Work or volunteer, either full or part time?	6	20	23	77	0	0	1	3

1. Construction; 312 Maxine, Flint
2. Industrial Painter; Clawson tank, Clarkston, MI
3. Welder; Creative Foam, Fenton, MI
4. HR Technician; Genesee Health Systems
5. Makes kitty blankets at home
6. Contractor, painting

Variable	Yes	%	No	%	Unk	%	Missing	%
Spend any time in a hospital, doctor's office, clinic, or dentist office as a patient, visitor, employee, or volunteer?	24	80	6	20	0	0	0	0
Inpatient	13	43	17	57	0	0	0	0
McLaren	9							
Hurley	2							
McLaren and Hurley	2							
Outpatient	12							

1. Clarkston Urgent Care (Clarkston, MI)
2. (1) Dr. Kunadi in Grand Blanc (2) Genesys Hurley Cancer Institute?
3. Clinic across from Hurley
4. (1) Urgent Care (Fenton, MI) (2) Dr. Theresa Sherman
5. McLaren Wound Center (Flint, MI)
6. VA (Saginaw, MI)
7. Dr. Razzak on Center Rd (Burton, MI)
8. Gateway Clinic
9. VA Cardiology Clinic (Ann Arbor, MI)
10. Hamilton Clinic (Saginaw St)
11. Dr. Linnel Fleetwood (1415 Broadway, Flint, MI)
12. Dr. Samuel Sayed on Beecher Rd

Visitor	4	13	26	87	0	0	0	0

1. Mother inpatient at McLaren, Grand Blanc rehab, and Hurley
2. Husband's appointments at VA in Saginaw
3. Husband at McLaren
4. Wife in Hurley, McLaren, UofM

Employee	0	0	30	100	0	0	0	0
Volunteer	0	0	30	100	0	0	0	0

Lily Survey 30 interviews Excel

Water Source	Frequency	Percent	Cum. Perc	95% CI Low	95% CI Upper
City of Flint Water (0)	13	43.33%	43.33%	25.46%	62.57%
City of Flint Township Water (1)	3	10.00%	53.33%	2.11%	26.53%
Other municipal water system (2)	4	13.33%	66.67%	3.76%	30.72%
Private well (3)	7	23.33%	90.00%	9.93%	42.28%
Unknown (4)	3	10.00%	100.00%	2.11%	26.53%
TOTAL	30	100.00%	100.00%		

not missing

4.) During the last year, has the water pressure at your residence change (by water system)

City of Flint Water (0)

Water Pressure Change in last year	Frequency	Percent	Cum. Perce	95% CI Low	95% CI Upper
Yes	2	15.38%	15.38%	1.92%	45.45%
No	8	61.54%	76.92%	31.58%	86.14%
Not Sure	3	23.08%	100.00%	5.04%	53.81%
TOTAL	13	100.00%	100.00%		

City of Flint Township Water (1)

Water Pressure Change in last year	Frequency	Percent	Cum. Perce	95% CI Low	95% CI Upper
Yes	0	0.00%	0.00%	0.00%	70.76%
No	2	66.67%	66.67%	9.43%	99.16%
Not Sure	1	33.33%	100.00%	0.84%	90.57%
TOTAL	3	100.00%	100.00%		

Other municipal water system (2)

Water Pressure Change in last year	Frequency	Percent	Cum. Perce	95% CI Low	95% CI Upper
Yes	0	0.00%	0.00%	0.00%	60.24%
No	3	75.00%	75.00%	19.41%	99.37%
Not Sure	1	25.00%	100.00%	0.63%	80.59%
TOTAL	4	100.00%	100.00%		

Private well (3)

Water Pressure Change in last year	Frequency	Percent	Cum. Perce	95% CI Low	95% CI Upper
Yes	1	14.29%	14.29%	0.36%	57.87%
No	6	85.71%	100.00%	42.13%	99.64%
Not Sure	0	0.00%	100.00%	0.00%	40.96%
TOTAL	7	100.00%	100.00%		

Unknown (4)

Water Pressure Change in last year	Frequency	Percent	Cum. Perce	95% CI Low	95% CI Upper
Yes	0	0.00%	0.00%	0.00%	70.76%
No	3	100.00%	100.00%	100.00%	100.00%
Not Sure	0	0.00%	100.00%	0.00%	70.76%
TOTAL	3	100.00%	100.00%		

5.) During the last year, has the water quality (appearance, taste, smell) at your residence changed?

City of Flint Water (0)

Water Quality Change in last year	Frequency	Percent	Cum. Perce	95% CI Low	95% CI Upper
Yes	10	76.92%	76.92%	46.19%	94.96%
No	2	15.38%	92.31%	1.92%	45.45%
Not Sure	1	7.69%	100.00%	0.19%	36.03%
TOTAL	13	100.00%	100.00%		

City of Flint Township Water (1)

Water Quality Change in last year	Frequency	Percent	Cum. Perce	95% CI Low	95% CI Upper
Yes	0	0.00%	0.00%	0.00%	70.76%
No	3	100.00%	100.00%	100.00%	100.00%
Not Sure	0	0.00%	100.00%	0.00%	70.76%
TOTAL	3	100.00%	100.00%		

Other municipal water system (2)

Water Quality Change in last year	Frequency	Percent	Cum. Perce	95% CI Low	95% CI Upper
Yes	0	0.00%	0.00%	0.00%	60.24%
No	4	100.00%	100.00%	100.00%	100.00%
Not Sure	0	0.00%	100.00%	0.00%	60.24%
TOTAL	4	100.00%	100.00%		

Private well (3)

Water Quality Change in last year	Frequency	Percent	Cum. Perce	95% CI Low	95% CI Upper
Yes	0	0.00%	0.00%	0.00%	40.96%
No	7	100.00%	100.00%	100.00%	100.00%
Not Sure	0	0.00%	100.00%	0.00%	40.96%
TOTAL	7	100.00%	100.00%		

Unknown (4)

Water Quality Change in last year	Frequency	Percent	Cum. Perce	95% CI Low	95% CI Upper
Yes	0	0.00%	0.00%	0.00%	70.76%
No	3	100.00%	100.00%	100.00%	100.00%
Not Sure	0	0.00%	100.00%	0.00%	70.76%
TOTAL	3	100.00%	100.00%		

6.) Prior to your illness, did you make any recent plumbing changes or repairs at your residence?

ALL WATER SOURCES	Frequency	Percent	Cum. Perce	95% CI Low	95% CI Upper
0	3	10.00%	10.00%	2.11%	26.53%
1	25	83.33%	93.33%	65.28%	94.36%
2	2	6.67%	100.00%	0.82%	22.07%
TOTAL	30	100.00%	100.00%		

6.) Prior to your illness, did you make any recent plumbing changes or repairs at your residence?

City of Flint Water (0)

Plumbing Change in last year	Frequency	Percent	Cum. Perce	95% CI Low	95% CI Upper
Yes	1	7.69%	7.69%	0.19%	36.03%
No	11	84.62%	92.31%	54.55%	98.08%
Not Sure	1	7.69%	100.00%	0.19%	36.03%

TOTAL	13	100.00%	100.00%

City of Flint Township Water (1)

Plumbing Change in last year	Frequency	Percent	Cum. Perce	95% CI Low	95% CI Upper
Yes	0	0.00%	0.00%	0.00%	70.76%
No	3	100.00%	100.00%	100.00%	100.00%
Not Sure	0	0.00%	100.00%	0.00%	70.76%
TOTAL	3	100.00%	100.00%		

Other municipal water system (2)

Plumbing Change in last year	Frequency	Percent	Cum. Perce	95% CI Low	95% CI Upper
Yes	2	50.00%	50.00%	6.76%	93.24%
No	1	25.00%	75.00%	0.63%	80.59%
Not Sure	1	25.00%	100.00%	0.63%	80.59%
TOTAL	4	100.00%	100.00%		

Private well (3)

Plumbing Change in last year	Frequency	Percent	Cum. Perce	95% CI Low	95% CI Upper
Yes	0	0.00%	0.00%	0.00%	40.96%
No	7	100.00%	100.00%	100.00%	100.00%
Not Sure	0	0.00%	100.00%	0.00%	40.96%
TOTAL	7	100.00%	100.00%		

Unknown (4)

Plumbing Change in last year	Frequency	Percent	Cum. Perce	95% CI Low	95% CI Upper
Yes	0	0.00%	0.00%	0.00%	70.76%
No	3	100.00%	100.00%	100.00%	100.00%
Not Sure	0	0.00%	100.00%	0.00%	70.76%
TOTAL	3	100.00%	100.00%		

7.) Prior to your illness, were there any water main breaks or other water line issues that affected the wat

City of Flint Water (0)

Water Line Issues before illness	Frequency	Percent	Cum. Perce	95% CI Low	95% CI Upper
Yes	6	46.15%	46.15%	19.22%	74.87%
No	5	38.46%	84.62%	13.86%	68.42%
Not Sure	2	15.38%	100.00%	1.92%	45.45%
TOTAL	13	100.00%	100.00%		

City of Flint Township Water (1)

Water Line Issues before illness	Frequency	Percent	Cum. Perce	95% CI Low	95% CI Upper
Yes	0	0.00%	0.00%	0.00%	70.76%
No	3	100.00%	100.00%	100.00%	100.00%
Not Sure	0	0.00%	100.00%	0.00%	70.76%
TOTAL	3	100.00%	100.00%		

Other municipal water system (2)

Water Line Issues before illness	Frequency	Percent	Cum. Perce	95% CI Low	95% CI Upper

Yes	0	0.00%	0.00%	0.00%	60.24%
No	4	100.00%	100.00%	100.00%	100.00%
Not Sure	0	0.00%	100.00%	0.00%	60.24%
TOTAL	4	100.00%	100.00%		

Private well (3) -NOT APPLICABLE

Water Line Issues before illness	Frequency	Percent	Cum. Perce	95% CI Low	95% CI Upper
Yes	0	0.00%	0.00%	0.00%	45.93%
No	6	100.00%	100.00%	100.00%	100.00%
Not Sure	0	0.00%	100.00%	0.00%	45.93%
TOTAL	6	100.00%	100.00%		

Unknown (4)

Water Line Issues before illness	Frequency	Percent	Cum. Perce	95% CI Low	95% CI Upper
Yes	0	0.00%	0.00%	0.00%	70.76%
No	3	100.00%	100.00%	100.00%	100.00%
Not Sure	0	0.00%	100.00%	0.00%	70.76%
TOTAL	3	100.00%	100.00%		

Community Exposures	Yes	%	No	%	Unk	%	Missing	%
Hotel (no stay)	0	0	28	93	1	3	1	3
Auditorium	1	3	28	93	0	0	1	3
Flushing High School & The Whiting	1							
Barbershop or Hair salon	7	23	22	73	1	3	0	0
GunBarn	1							
Kings & Queens Beauty Barbershop	1							
Master's	1							
Nathan's Hair Unlimited	1							
Roger's Barbershop	1							
Beauty School in Flint (unspec)	0				1			
Car Wash	5	17	24	80	1	3	0	0
John's Car Wash	1							
Unknown automated car wash	3							
Unknown	1							
Casino	3	10	26	87	1	3	0	0
Motor City Casino	1							
Soaring Eagle Casino	1				1			
Mt. Pleasant Casino & Battle Creek Casino	1							
Church or Place of worship	8	27	21	70	0	0	1	3
First Baptist	1							
First United Church	1							
Kingdom of Heaven Ministries	1							
Shawn Baptist Church	1							
St. John Vianney Catholic Church	2							
Unknown	1							
Various	1							
Gym or Work out facility	1	3	27	90	0	0	2	7
Grocery Store	20		7		2		1	3
Aldi's (need to check addresses)	3*							
Kroger (need to check addresses)	8*							
Meijer (need to check addresses)	9*							
Walmart (need to check addresses)	4*							
Frank's Grocery	1							
Riverside Groceries	1							
Denny's Supermarket	1							
Simons IGA	1							
Unsure	1							
Home improvement store	7	23	17	57	3	10	3	10
Home Depot (need to check addresses)	3*				1			
Lowes (need to check addresses)	1							
Menards	2*							
Spa or nail salon	0	0	27	90	0	0	3	10
Mall or Department store	2	7	24	80	1	3	3	10
Movie Theater	0	0	28	93	0	0	2	7

Other (specify)	4	13	17	57	0	0	1	3
Colonial Lanes (bowling?)	1							
Roma's Back Door (restaurant)	1							
'several restaurants'	1							
Union Prescription, Rite Aid, Family Dollar	1							

10) LTC exposures in 2 prev. wks

	Y	N	miss
LTC / nursing home	2	27	1

(GrandBlanc, Willow[illegible] manor Buchurst)

	Y	N	miss
11) Travel outside home (not HC)	3	27	1

12) Community events pulled out

not for Thurs

9.5) Was a healthcare exposure to any of the three hospital systems recorded in the patient's medical records

All	Frequency	Percent
Yes	20	45.45%
No	22	50.00%
Unk	2	4.55%
TOTAL	44	100.00%

Of *ALL* hospital exposures

Hurley	2	10.00%
McLaren	18	90.00%
TOTAL	20	100.00%

Where MR reported Yes to hospital exposure:

Inpatient	Frequency	Percent
Yes	18	90.00%
No	2	10.00%
TOTAL	20	100.00%

Of the *Inpatient* exposures:

Hospital	Frequency	Percent
Hurley	2	11.11%
McLaren	16	88.89%
TOTAL	18	100.00%

Outpatient	Frequency	Percent
Yes	1	5.00%
No	19	95.00%
TOTAL	20	100.00%

Of the *Outpatient* exposures:

Hospital	Frequency	Percent
Hurley	0	0.00%
McLaren	1	100.00%
TOTAL	1	100.00%

Visitor	Frequency	Percent
Yes	1	2.17%
No	19	97.83%
TOTAL	20	100.00%

Of the *Visitor* exposures:

Hospital	Frequency	Percent
Hurley	0	0.00%
McLaren	1	100.00%
TOTAL	1	100.00%

Where MR reported Yes to hospital exposure:

Inpatient	18	90.00%			
			Hurley TOTAL	**2**	**10.00%**
			McLaren	16	80.00%
Outpatient	1	5.00%	McLaren	1	5.00%
Visitor	1	5.00%	McLaren	1	5.00%
TOTAL	20	100.00%	**McLaren TOTAL**	**18**	**90.00%**

Number of comorbid conditions by healthcare exposure (ANY)

Comorbidities are self-report from interviews, hospital exposure from medical records

	Healthcare Exposure (N=17)								No known healthcare exposure (N=12)		TOTAL	
	Hurley		McLaren		McLaren & Hurley		Total					
	n	%	n	%	n	%	n	%	n	%	n	%
≥1 comorbidity	1	5.88	14	82.35	1	5.88	16	94.12	9	75.00	25	86.21
0 comorbid conditions	0	0.00	1	5.88	0	0.00	1	5.88	3	25.00	4	13.79
1 comorbid conditions	1	5.88	6	35.29	0	0.00	7	41.18	3	25.00	10	34.48
2 comorbid conditions	0	0.00	2	11.76	0	0.00	2	11.76	1	8.33	3	10.34
3 comorbid conditions	0	0.00	1	5.88	0	0.00	1	5.88	3	25.00	4	13.79
4 comorbid conditions	0	0.00	4	23.53	1	5.88	5	29.41	1	8.33	6	20.69
5 comorbid conditions	0	0.00	1	5.88	0	0.00	1	5.88	0	0.00	1	3.45
6 comorbid conditions	0	0.00	0	0.00	0	0.00	0	0.00	1	8.33	1	3.45

Community Exposures by healthcare exposure (ANY)

	Healthcare Exposure (N=17)								No known healthcare exposure (N=12)		TOTAL	
	Hurley		McLaren		McLaren & Hurley		Total					
	n	%	n	%	n	%	n	%	n	%	n	%
Auditorium	0	0.00	1	5.88	0	0.00	0	0.00	0	0.00	1	3.45
Barbershop	1	5.88	2	11.76	1	5.88	4	23.53	3	25.00	7	24.14
Car Wash	1	5.88	0	0.00	1	5.88	2	11.76	3	25.00	5	17.24
Casino	1	5.88	0	0.00	0	0.00	1	5.88	2	16.67	3	10.34
Church	0	0.00	4	23.53	1	5.88	5	29.41	3	25.00	8	27.59
Gym	1	5.88	0	0.00	0	0.00	1	5.88	0	0.00	1	3.45
Grocery	1	5.88	9	52.94	1	5.88	11	64.71	9	75.00	20	68.97
Home Improvement Store	0	0.00	3	17.65	0	0.00	3	17.65	4	33.33	7	24.14
Spa/Nail Salon	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Mall	0	0.00	0	0.00	1	5.88	1	5.88	1	8.33	2	6.90
Movie Theater	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00

Report 8: Epi-Curve Graph

Time Period: 01/01/2010 - 04/14/2015

Time Breakdown: by Month

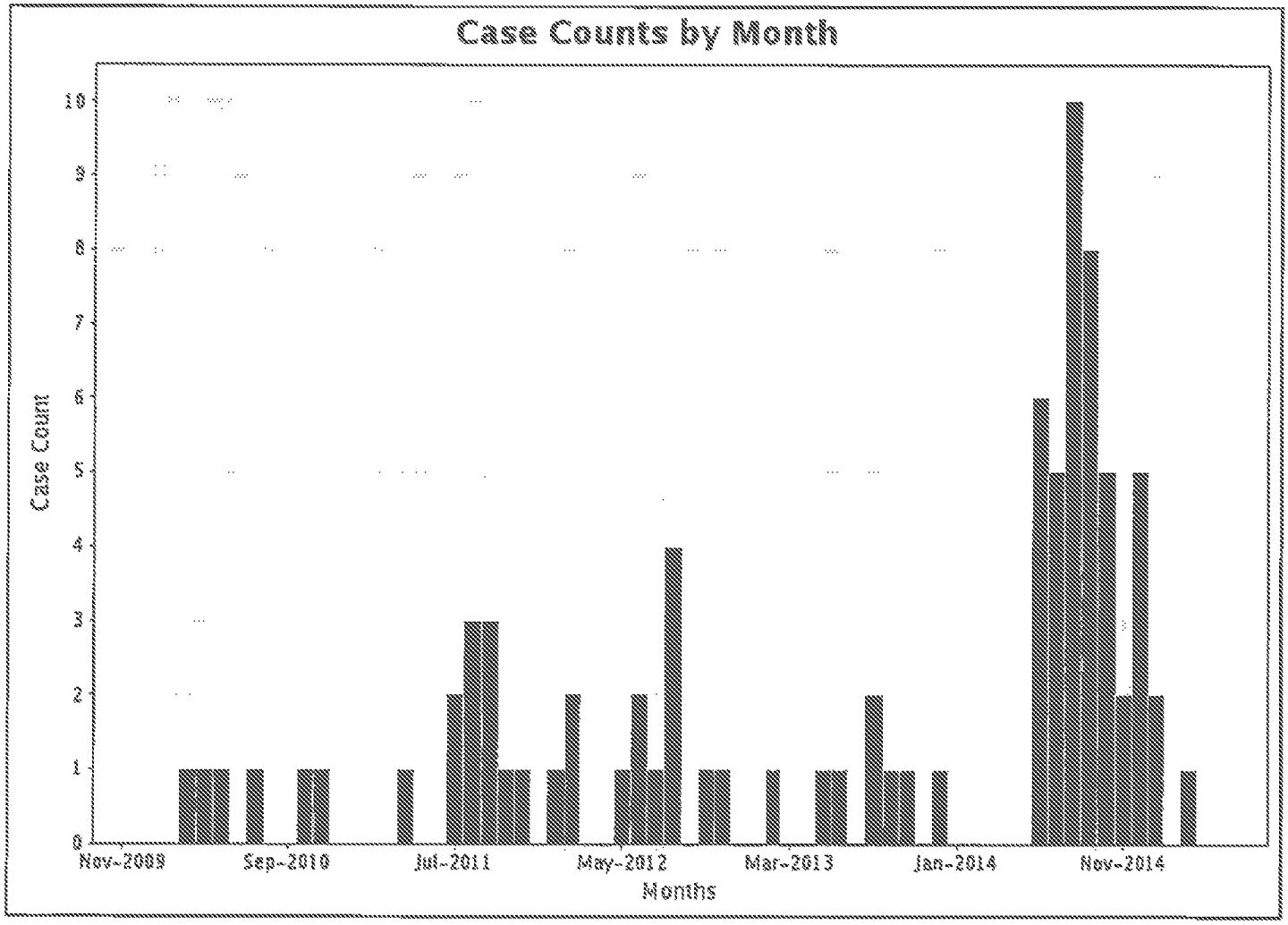
Reportable Condition: Legionellosis

Case Status: Confirmed, Probable, Suspect, Unknown

Investigation Status: Active, Completed, Completed - Follow Up, New, Review

Jurisdictions:
Genesee County

Case Types: Individual and Aggregate



Month	Total
MAR 2010	1
APR 2010	1
MAY 2010	1
JUL 2010	1
OCT 2010	1
NOV 2010	1
APR 2011	1
JUL 2011	2
AUG 2011	3
SEP 2011	3
OCT 2011	1
NOV 2011	1
JAN 2012	1
FEB 2012	2
MAY 2012	1
JUN 2012	2
JUL 2012	1
AUG 2012	4
OCT 2012	1
NOV 2012	1

Month	Total
FEB 2013	1
MAY 2013	1
JUN 2013	1
AUG 2013	2
SEP 2013	1
OCT 2013	1
DEC 2013	1
JUN 2014	6
JUL 2014	5
AUG 2014	10
SEP 2014	8
OCT 2014	5
NOV 2014	2
DEC 2014	5
JAN 2015	2
MAR 2015	1

Preliminary Stats on Genesee County Legionellosis Investigation,

April 7, 2015

Number of lab-confirmed cases of Legionnaires' Disease: 45

Number of Pontiac fever cases: 1 possible

Total number of legionellosis cases: 46

Geographic distribution:

45/46 Genesee Co (27 Flint, 6 Mt. Morris, 4 Burton, 2 Flint Twp, 1 Flushing, 1 Byron, 1 Davison, 1 Linden, 1 Otisville, 1 Vienna Twp)

1/46 Saginaw County (1 Chesaning)

Age range: 26-94 years

Average age (median): 62.2 years (63.5 years)

% Males: 50% (23/46)

Range of illness onset dates (n=45): 6/6/14-1/10/15 (new case onset 3/9/2015)

Number (%) of deaths: 15.2% (7/46); expect this number will increase as interviews are completed

Number (%) with other underlying comorbidities: TBD

Conference calls with Genesee County: Jan 27; Feb 10, Feb 19, Apr 7, 2015

Conference calls with hospitals: Jan 28, 2015

Date outbreak-specific survey completed and approved: 2/23/15

Number of cases interviewed: 21 completed (45.7%; 82.6% in total attempted/completed; 7 still unassigned)

MDCH: 14 completed / 29 contacted (MDCH had 2 interviewers – now increased to 4)

Genesee: 7 completed / 10 2 have deceased - did not contact

Number (%) of cases hospitalized: 45/46 (97.8%). Number in ICU: 22/45 (48.8%)

Number (%) of cases hospitalized at McLaren: 18/45 (40%)

Number (%) of cases hospitalized at Hurley: 14/45 (31%)

Number (%) of cases hospitalized at Genesys: 6/45 (13.3%)

Number (%) of cases hospitalized at other hospitals outside Flint: 7/45 (15.6%)

Number (%) of cases who had been hospitalized in 2-weeks prior to onset: 20/45 (44.4%)

Number (%) of cases who had been hospitalized in 2-weeks prior to onset at McLaren: 16/45 (35.6%)

Number (%) of cases who had been hospitalized in 2-weeks prior to onset at Hurley: 2/45 (4%)

Number (%) of cases who had been hospitalized in 2-weeks prior to onset at Genesys: 0

Number (%) of cases who had been hospitalized in 2-weeks prior to onset at other hospitals: unknown

Number (%) of cases who had a short-term visit to a hospital in 2-weeks prior to onset:

Number (%) of cases who had a short-term visit to McLaren facility in 2-weeks prior to onset: 5/45 (11.1%)

Number (%) of cases who had a short-term visit to Hurley facility in 2-weeks prior to onset: 1/45 (2%)

Number (%) of cases who had a short-term visit to Genesys facility in 2-weeks prior to onset: 0

Number (%) of cases who had been hospitalized or who had a short-term visit to a hospital facility in 2-weeks prior to onset:

Number (%) of cases who had been hospitalized or who had a short-term visit to a McLaren facility in 2-weeks prior to onset: 21/45 (46.7%)

Number (%) of cases who had been hospitalized or who had a short-term visit to a Hurley facility in 2-weeks prior to onset: 3/45 (6.7%)

Number (%) of cases who had been hospitalized or who had a short-term visit to a Genesys facility in 2-weeks prior to onset: 0

Number (%) of cases who work outside the home: 8/46 (17.4%) [min of 72% at home]

Number (%) of cases who are retired: 20 (43.5%)

Number (%) of cases who are unemployed: 7/46 (15.2%)

Number (%) of cases who are disabled: 6/46 (13%)

Number (%) of cases whose occupation status is unknown: 5/46 (10%)

Number (%) of cases whose homes are on Flint water: 45.6% (21/46)

Preliminary Stats on Genesee County Legionellosis Investigation,

March 25, 2015

Number of lab-confirmed cases of Legionnaires' Disease: 45

Number of Pontiac fever cases: 1 possible

Total number of legionellosis cases: 46

Geographic distribution:

45/46 Genesee Co (27 Flint, 6 Mt. Morris, 4 Burton, 2 Flint Twp, 1 Flushing, 1 Byron, 1 Davison, 1 Linden, 1 Otisville, 1 Vienna Twp)

1/46 Saginaw County (1 Chesaning)

Age range: 26-94 years

Average age (median): 64 years

% Males: 50% (23/46)

Range of illness onset dates (n=45): 6/6/14-1/10/15 (new case onset 3/9/2015)

Number (%) of deaths: 11% (5/46); expect this number will increase as interviews are completed

Number (%) with other underlying comorbidities: TBD

Conference calls with Genesee County: Jan 27; Feb 10, Feb 19, 2015

Conference calls with hospitals: Jan 28, 2015

Date outbreak-specific survey completed and approved: 2/23/15

Number of cases interviewed: 16 completed (35%; 82.6% in total contacted)

MDCH: 10 completed / 28 contacted (MDCH had 2 interviewers – now increased to 4)

Genesee: 6 completed / 10

Number (%) of cases hospitalized: 45/46 (97.8%). Number in ICU: 22/45 (48.8%)

Number (%) of cases hospitalized at McLaren: 18/45 (40%)

Number (%) of cases hospitalized at Hurley: 14/45 (31%)

Number (%) of cases hospitalized at Genesys: 6/45 (13.3%)

Number (%) of cases hospitalized at other hospitals outside Flint: 7/45 (15.6%)

Number (%) of cases who had been hospitalized in 2-weeks prior to onset: 20/45 (44.4%)

Number (%) of cases who had been hospitalized in 2-weeks prior to onset at McLaren: 16/45 (35.6%)

Number (%) of cases who had been hospitalized in 2-weeks prior to onset at Hurley: 2/45 (4%)

Number (%) of cases who had been hospitalized in 2-weeks prior to onset at Genesys: 0

Number (%) of cases who had been hospitalized in 2-weeks prior to onset at other hospitals: unknown

Number (%) of cases who had a short-term visit to a hospital in 2-weeks prior to onset:

Number (%) of cases who had a short-term visit to McLaren facility in 2-weeks prior to onset: 5/45 (11.1%)

Number (%) of cases who had a short-term visit to Hurley facility in 2-weeks prior to onset: 1/45 (2%)

Number (%) of cases who had a short-term visit to Genesys facility in 2-weeks prior to onset: 0

Number (%) of cases who had been hospitalized or who had a short-term visit to a hospital facility in 2-weeks prior to onset:

Number (%) of cases who had been hospitalized or who had a short-term visit to a McLaren facility in 2-weeks prior to onset: 21/45 (46.7%)

Number (%) of cases who had been hospitalized or who had a short-term visit to a Hurley facility in 2-weeks prior to onset: 3/45 (6.7%)

Number (%) of cases who had been hospitalized or who had a short-term visit to a Genesys facility in 2-weeks prior to onset: 0

Number (%) of cases who work outside the home: 8/46 (17.4%) [min of 72% at home] ✓

Number (%) of cases who are retired: 20 (43.5%) 2

Number (%) of cases who are unemployed: 7/46 (15.2%) ✓

Number (%) of cases who are disabled: 6/46 (13%) ✓

Number (%) of cases whose occupation status is unknown: 5/46 (10%)

Number (%) of cases whose homes are on Flint water: 45.6% (21/46)

Status of case interviews (MDCH/Genesee)

-How far on list (by referral date) have interviews been assigned to/completed by staff at MDCH/GCHD

-Who will conduct final 6-7 unassigned interviews (~Oct, 2014 cases)

-Discuss goal date to finish current interviews

-Discuss number of attempts before determining "lost to follow-up"

-Lily entering questionnaire data into Epi Info database as she receives them

Status of any clinical samples

-Most recent case negative on hospital culture specimen (+UA)

-Were any cultures retained at McLaren/Hurley/Genesys on previously dx'd cases? (Genesee)

Status of environmental investigation (Genesee)

- DEQ/Genesee updates
- DEQ/EPA/CDC recommendations?

McLaren 350 beds
Hurley 418 beds
Genesys 410

Preliminary Stats on Genesee County Legionellosis Investigation,

March 25, 2015

Number of lab-confirmed cases of Legionnaires' Disease: 45

Number of Pontiac fever cases: 1 possible

Total number of legionellosis cases: 46

Geographic distribution:

45/46 Genesee Co (27 Flint, 6 Mt. Morris, 4 Burton, 2 Flint Twp, 1 Flushing, 1 Byron, 1 Davison, 1 Linden, 1 Otisville, 1 Vienna Twp)

1/46 Saginaw County (1 Chesaning)

Age range: 26-94 years

Average age (median): 64 years

% Males: 50% (23/46)

Range of illness onset dates (n=45): 6/6/14-1/10/15 (new case onset 3/9/2015)

Number (%) of deaths: 11% (5/46); expect this number will increase as interviews are completed

Number (%) with other underlying comorbidities: TBD

Conference calls with Genesee County: Jan 27; Feb 10, Feb 19, 2015

Conference calls with hospitals: Jan 28, 2015

Date outbreak-specific survey completed and approved: 2/23/15

Number of cases interviewed: 10 completed (21.7%)

MDCH: 10 completed / 32 contacted (MDCH had 2 interviewers – now increased to 4) (70% contacted)

Genesee: 4 completed / ?

Number (%) of cases hospitalized: 45/46 (97.8%). Number in ICU: 22/45 (48.8%)

Number (%) of cases hospitalized at McLaren: 18/45 (40%)

Number (%) of cases hospitalized at Hurley: 14/45 (31%)

Number (%) of cases hospitalized at Genesys: 6/45 (13.3%)

Number (%) of cases hospitalized at other hospitals outside Flint: 7/45 (15.6%)

Number (%) of cases who had been hospitalized in 2-weeks prior to onset: 20/45 (44.4%)

Number (%) of cases who had been hospitalized in 2-weeks prior to onset at McLaren: 16/45 (35.6%)

Number (%) of cases who had been hospitalized in 2-weeks prior to onset at Hurley: 2/45 (4%)

Number (%) of cases who had been hospitalized in 2-weeks prior to onset at Genesys: 0

Number (%) of cases who had been hospitalized in 2-weeks prior to onset at other hospitals: unknown

Number (%) of cases who had a short-term visit to a hospital in 2-weeks prior to onset:

Number (%) of cases who had a short-term visit to McLaren facility in 2-weeks prior to onset: 5/45 (11.1%)

Number (%) of cases who had a short-term visit to Hurley facility in 2-weeks prior to onset: 1/45 (2%)

Number (%) of cases who had a short-term visit to Genesys facility in 2-weeks prior to onset: 0

Number (%) of cases who had been hospitalized or who had a short-term visit to a hospital facility in 2-weeks prior to onset:

Number (%) of cases who had been hospitalized or who had a short-term visit to a McLaren facility in 2-weeks prior to onset: 21/45 (46.7%)

Number (%) of cases who had been hospitalized or who had a short-term visit to a Hurley facility in 2-weeks prior to onset: 3/45 (6.7%)

Number (%) of cases who had been hospitalized or who had a short-term visit to a Genesys facility in 2-weeks prior to onset: 0

Number (%) of cases who work outside the home: 8/46 (17.4%) [min of 72% at home]

Number (%) of cases who are retired: 20 (43.5%)

Number (%) of cases who are unemployed: 7/46 (15.2%)

Number (%) of cases who are disabled: 6/46 (13%)

Number (%) of cases whose occupation status is unknown: 5/46 (10%)

Number (%) of cases whose homes are on Flint water: 45.6% (21/46)

Prelim data on Legionnaires' Disease Cases in Genesee County from June 2014 to March 18, 2015

44 Legionnaires' disease cases total (as of 3/18/2015)
20 cases on City of Flint water system
24 cases NOT on City of Flint water system. (Originally 25 cases, but one of the non-Flint water system cases is very likely sporadic. No reported Flint water exposures and likely had exposure in Clarkston, MI at job site as industrial painter.)

Cases admitted (overnight) to hospital during the 2 weeks prior to onset:
8/20 (40%) cases on City of Flint water with admission to hospital during the 2 weeks prior to onset.
7/20 (35%) admission to McLaren hospital
1/20 (5%) admission to Hurley

10/24 (42%) cases NOT on City of Flint water with admission to hospital during the 2 weeks prior to onset.
9/24 (38%) admission to McLaren hospital
1/24 (4%) admission to Hurley

Cases with any exposure to hospital during the 2 weeks prior to onset:
11/20 (55%) cases on City of Flint water with any exposure to hospital during the 2 weeks prior to onset.
10/20 (50%) admission or visit to McLaren (hospital, wound clinic, cancer institute, community medical center)
1/20 (5%) admission or visit to Hurley (admission)

11/24 (46%) cases NOT on City of Flint water with admission to hospital during the 2 weeks prior to onset.
10/24 (42%) admission or visit to McLaren (hospital, cancer institute)
1/24 (4%) admission or visit to Hurley (admission)

Overall:
16/44 (36%) Hospitalized at McLaren (overnight) during the 2 weeks prior to onset.
20/44 (45%) Any exposure to McLaren during the 2 weeks prior to onset.

No hospital exposures
22/44 (50%) have no known hospital exposures in the 2 weeks prior to their onsets.
For those with no known hospital exposure in the 2 weeks prior to onset:
9/22 (41%) are on city of Flint water
13/22 (59%) are NOT on city of Flint water.

Preliminary Stats on Genesee County Legionellosis Investigation,

March 16, 2015

Number of lab-confirmed cases of Legionnaires' Disease: 44

Number of Pontiac fever cases: 1 possible

Total number of legionellosis cases: 45

Geographic distribution:

44/45 Genesee Co (26 Flint, 6 Mt. Morris, 4 Burton, 2 Flint Twp, 1 Flushing, 1 Byron, 1 Davison, 1 Linden, 1 Otisville, 1 Vienna Twp)

1/45 Saginaw County (1 Chesaning)

Age range: 26-94 years

Average age (median): 64 years

% Males: 48.9% (22/45)

Range of illness onset dates (n=44): 6/6/14-1/10/15

Number (%) of deaths: 11% (5/45); expect this number will increase as interviews are completed

Number (%) with other underlying comorbidities: TBD

Conference calls with Genesee County: Jan 27, 2015; Feb 19, 2015

Conference calls with hospitals: Jan 28, 2015

Date outbreak-specific survey completed and approved: 2/23/15

Number of cases interviewed:

MDCH: 4 completed/18 contacted (MDCH had 2 interviewers – now increased to 4)

Genesee: 3 completed /10 contacted

Number (%) of cases hospitalized: 44/45 (97.8%). Number in ICU: 22/44 (50%)

Number (%) of cases hospitalized at McLaren: 17/44 (38.6%)

Number (%) of cases hospitalized at Hurley: 14/44 (31.8%)

Number (%) of cases hospitalized at Genesys: 6/44 (13.6%)

Number (%) of cases hospitalized at other hospitals outside Flint: 7/44 (16%)

Number (%) of cases who had been hospitalized in 2-weeks prior to onset: 19/44 (43.2%)

Number (%) of cases who had been hospitalized in 2-weeks prior to onset at McLaren: 16/44 (36.4%)

Number (%) of cases who had been hospitalized in 2-weeks prior to onset at Hurley: 5/44 (11.4%)

Number (%) of cases who had been hospitalized in 2-weeks prior to onset at Genesys: 0

Number (%) of cases who had been hospitalized in 2-weeks prior to onset at other hospitals: unknown

Number (%) of cases who had a short-term visit to a hospital in 2-weeks prior to onset:

Number (%) of cases who had a short-term visit to McLaren facility in 2-weeks prior to onset:

Number (%) of cases who had a short-term visit to Hurley facility in 2-weeks prior to onset:

Number (%) of cases who had a short-term visit to Genesys facility in 2-weeks prior to onset:

Number (%) of cases who had been hospitalized or who had a short-term visit to a hospital facility in 2-weeks prior to onset:

Number (%) of cases who had been hospitalized or who had a short-term visit to a McLaren facility in 2-weeks prior to onset:

Number (%) of cases who had been hospitalized or who had a short-term visit to a Hurley facility in 2-weeks prior to onset:

Number (%) of cases who had been hospitalized or who had a short-term visit to a Genesys facility in 2-weeks prior to onset:

Number (%) of cases who work outside the home:

Number (%) of cases who are retired:

Number (%) of cases who are unemployed:

Number (%) of cases who are disabled:

Number (%) of cases whose occupation status is unknown:

Number (%) of cases whose homes are on Flint water: 44.4% (20/45)

Called to clarify that we (MDCH) can check in Hurley MR for the patients with legionellosis. 3/6/15

Bohm, Susan (DCH)

From: Ann Newell <AnnNewell@hurleymc.com>
Sent: Wednesday, March 04, 2015 12:57 PM
To: Bohm, Susan (DCH)
Subject: RE: Update on legionellosis cases in Genesee County

Hi Susan,
You are more than welcome to look back to see if our patients did have a prior admissions. When the cases are identified this is something we look at. We have only one possible case that was reported in December with prior admissions. We however cannot look to see if patients identified at other healthcare facilities had prior admission here at HMC.
Thanks,

Ann M. Newell, CIC
Infection Control Manager
Hurley Medical Center
Flint, MI 48503
(810)262-9459
(810)262-7268 Fax

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From: Bohm, Susan (DCH) [mailto:bohms@michigan.gov]
Sent: Wednesday, March 04, 2015 10:58 AM
To: Wiskur, Lori (Lori.Wiskur@genesys.org) (Lori.Wiskur@genesys.org); Ann Newell
Cc: Hasan, Shurooq (shasan@gchd.us); Johnson, Shannon (DCH); Fiedler, Jay (DCH)
Subject: Update on legionellosis cases in Genesee County

Good morning,

First of all, many thanks for your cooperation and input to date into the ongoing Genesee County legionellosis investigation. One of the aspects of the investigation into the increase in legionellosis cases since June 2014 that we at MDCH have been assisting with was to determine the illness onset dates of those cases, which we would now like to share with you – please see the attached epi curve. Many of the illness onset dates are estimates based on information from the medical records. As you may know, many of the cases had previous hospitalizations, out-patient visits, or visited someone else in a hospital prior to their illness. Our next step is to document all hospital exposures in the 2-week period prior to the illness onset date. If the patient was previously hospitalized or had an out-patient visit at the same hospital where they were hospitalized for legionellosis, that information was readily collected; however, we would now like to ask the hospitals for your consent to allow us to check for hospitalizations/visits in the 2-week period prior to onset for all the legionellosis patients from June 2014 to the present at each of McLaren Flint, Hurley, & Genesys. For example, if someone was hospitalized at hospital A for legionellosis, we would like to check the other two hospitals B & C to see if there was a previous hospitalization or visit 2 weeks prior to illness onset of legionellosis.

Please let me know as soon as possible and thank you again for your continued support during this investigation.

Susan Bohm, MS
Manager, Enteric & Respiratory Illnesses Epidemiology Unit
Surveillance and Infectious Disease Epidemiology
Division of Communicable Disease
Michigan Department of Community Health
201 Townsend St, 5th Flr
Lansing, MI 48933
517-335-8165 or 517-373-5508 (Cell: PPI) 517-335-8263
bohms@michigan.gov www.michigan.gov/mdch

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Report 8: Epi-Curve Graph

Time Period: 06/01/2014 - 02/27/2015

Time Breakdown: by Month

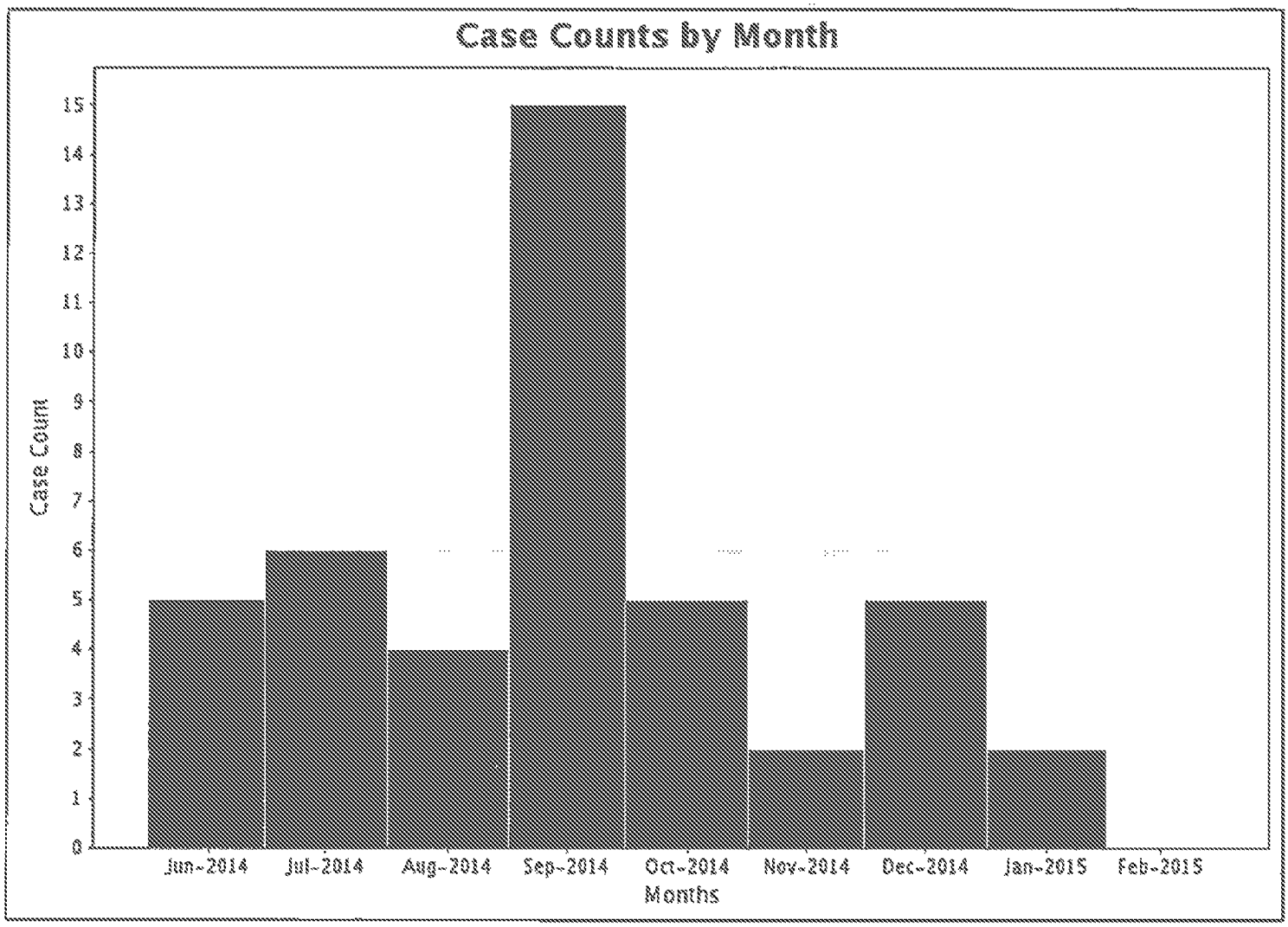
Reportable Condition: Legionellosis

Case Status: Confirmed

Investigation Status: Active, Canceled, Completed, Completed - Follow Up, New, Review, Superceded

Jurisdictions:
Genesee County

Case Types: Individual and Aggregate



Month	Case
JUN 2014	5
JUL 2014	6
AUG 2014	4
SEP 2014	15
OCT 2014	5
NOV 2014	2
DEC 2014	5
JAN 2015	2

Report 8: Epi-Curve Graph

Time Period: 06/01/2014 - 02/27/2015

Time Breakdown: by Month

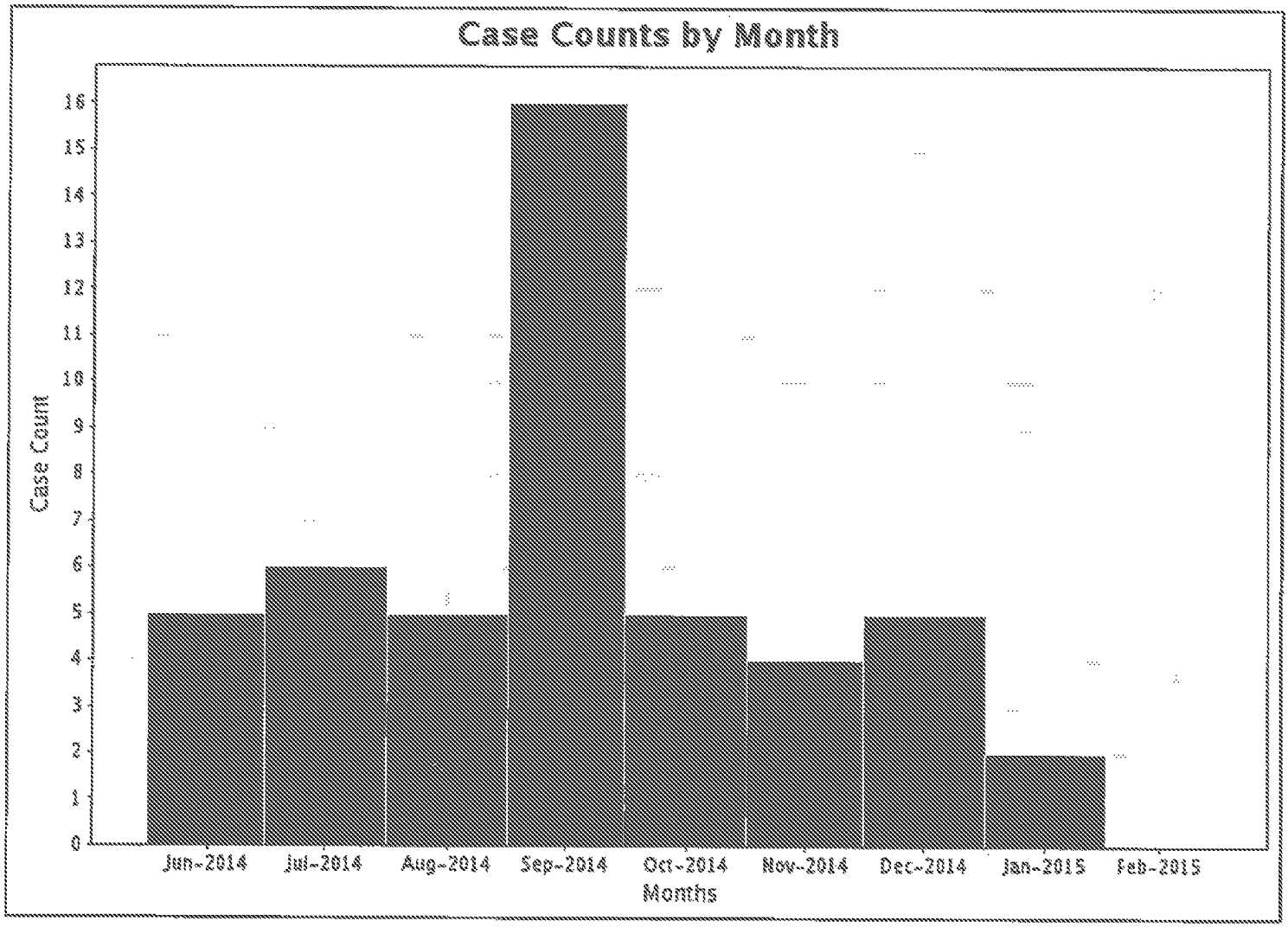
Reportable Condition: Legionellosis

Case Status: Confirmed, Confirmed-Non Resident, Not a Case, Probable, Suspect, Unknown

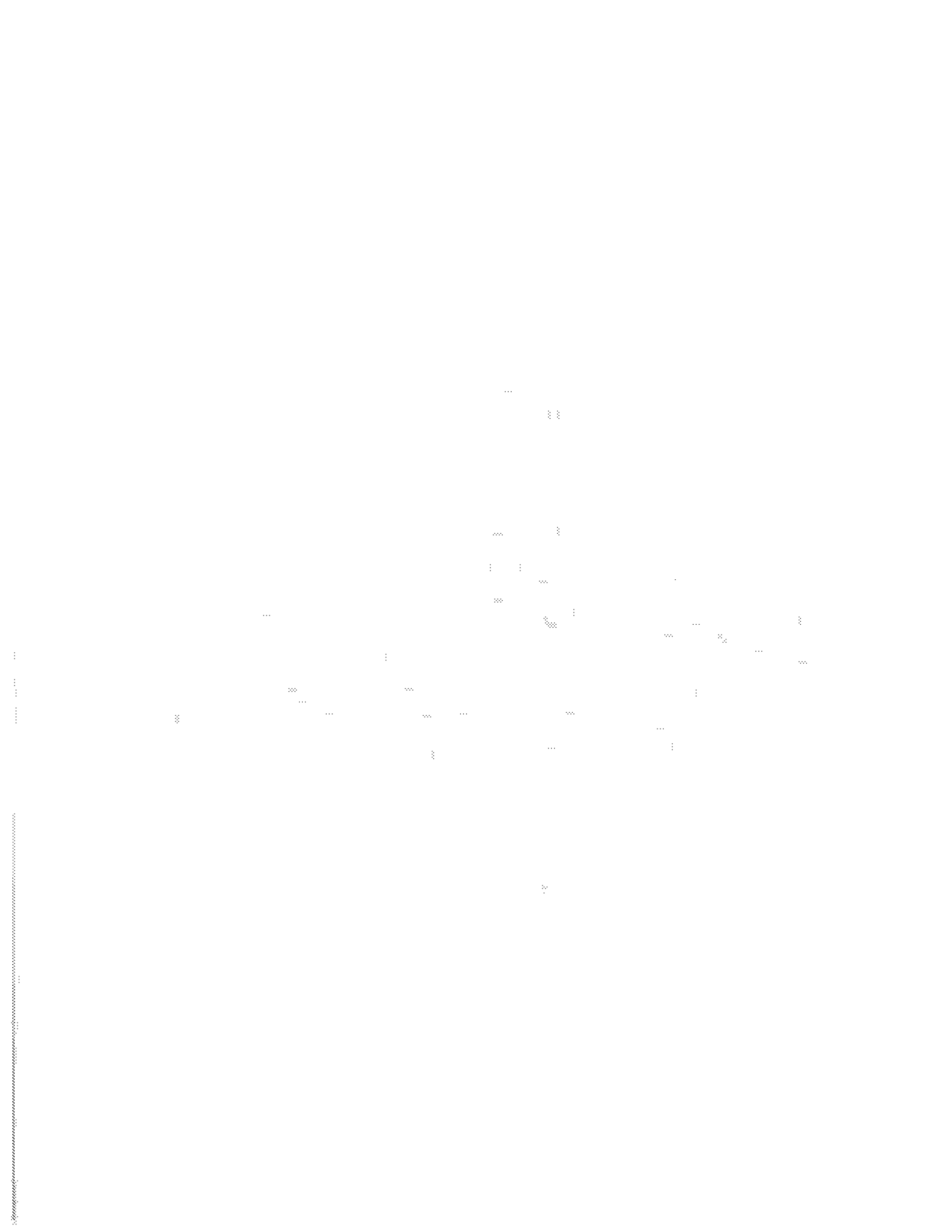
Investigation Status: Active, Canceled, Completed, Completed - Follow Up, New, Review, Superceded

Jurisdictions:
Genesee County

Case Types: Individual and Aggregate



Month	Total
JUN 2014	5
JUL 2014	6
AUG 2014	5
SEP 2014	16
OCT 2014	5
NOV 2014	4
DEC 2014	5
JAN 2015	2



exp. period 2 wks from now

Color Key for Mgt

✓ 16 Red Mclean H exposure

✓ 9/31 Orange Mclean other exposure

3 Yellow Hurley H exposure Pur Hurley hyp

4 W Blue Other Incipisomal

✓ 16 Green no hosp. or H/C exposure

44

16/5 = 31

3

16/4

44

Genesee Response 1/20/2015

Data being requested by MDCH and/or suggested data collection needs to be addressed:

1) **Please provide the name of the primary point-of-contact for the overall GCHD legionellosis investigation.** Shurooq Hasan is lead on the CD investigation. Jim Henry is the lead on the water system investigation. Our entire CDIRT team is involved in both investigations.

2) **The current copy of the GCHD Legionnaires Disease outbreak data collection line list is requested and updates sent to MDCH on a regular basis.** Let us know the time table you are proposing. We would like to request a regular meeting schedule so we can discuss our mutual findings.

3) **Onset dates or estimated onset dates need to be determined for all cases.** As discussed during our call, we can provide estimated onset dates. We would like your input...would you prefer we report the onset date reported by the patient, their primary care physician or the ID Physician consulting? There are differences. Please keep this in mind when reviewing the data.

4) **A current map of the municipal water system needs to be obtained and cases' residences mapped in relation to the water system.** As discussed in our call, we are experiencing difficulty in obtaining the information we have requested from DWP and MDEQ. We have sent the FOIA request for the current map of the municipal water system. As discussed during our call, we have mapped our cases to look for commonalities and to identify the proximity of the cases to the boil water advisories.

5) **The investigation needs a Genesee-specific supplemental questionnaire beyond the MDCH supplemental form and the 6 questions in the email message dated 10/17/14.** As discussed in our call, GCHD has been identifying and reaching out to individuals with expertise with type 1 water supplies. During our call, we asked specifically of anyone at MDCH has this expertise. Please let us know if you have a staff member we can consult with. Also stated during our call, we requested the assistance of MDCH in creating our Genesee specific questionnaire....the questionnaire we are currently using. We are reaching out to water experts to assist in the updating of our questionnaire. In the limited conversations we have had so far, we have learned a great deal which will inform the questions we need to ask. We also look forward to additional conversations with our MDCH colleages

6) **All previous cases (since 5/1/14) and new cases should be re-interviewed as soon as possible with the new outbreak-specific questionnaire. If cases are not available, then a proxy should be interviewed, ideally someone from the same household.** See me notes below...

7) **To look for cases of milder illness such as Pontiac Fever, the questionnaire should ask if there are other household members who have had a similar respiratory illness. Any household contacts with legionellosis-consistent illness should also be interviewed with the outbreak-specific questionnaire.** As discussed on the call in the review of our invesitgations, we have found this and, we have been reporting this... and have reported them in MDSS. This is the reason why we asked for testing of clinical samples not only of the patients, but, also of their close contacts.

8) **Clinical culture specimens, in addition to urine antigen testing, should be collected from all suspect cases where individuals are seeking medical care.** As discussed in our call, this is what we have requested from MDCH. In addition, we requested testing of close contacts, environmental testing of the patient home environments and potentially testing of key locations in the community with high heterotrophic plate counts. Based on the feedback from our consultations, this may be very helpful.

9) **Hospitals should be queried to determine whether any previously diagnosed cases had respiratory cultures collected and whether any of these culture specimens were retained. If so, it should be requested that these samples be held until a determination on environmental testing can be made.** This was discussed at our Bug Fuzz meeting on 1/22/15. We will also be requesting more information regarding previous years legionella testing. We suspect a

significant increase in the numbers of tests conducted, particularly during August/September than in previous years. Remember, the hyperclorination done at our hospital of interest was completed 10/4/15. That may also influence the number of tests conducted.

<u>Assistance that MDCH can provide to Genesee to aid in the outbreak investigation:</u>

1) **MDCH can provide language to GCHD for distribution to the medical community regarding the request for clinical respiratory culture collection on all suspect cases of legionellosis (Legionnaire's Disease and Pontiac Fever).** What we specifically requested was the specific testing protocols for sample collection, storage and transportation of clinical samples. We also requested testing of environmental samples from patient homes and key community sites. We would like the same protocol information for this type of testing as well. Jim's email covered some of this, but, we still have some questions.

2) **MDCH staff is available to conduct medical record extraction, as needed.** Medical records are attached in MDSS and we do not need assistance with this at this time.

3) **MDCH staff can assist with data entry into MDSS, as needed.** At this time, we do not need assistance with this. Please see the note below...

4) **MDCH staff can help with the development of a Genesee-specific outbreak questionnaire.** We welcome your participation in the revision of our Genesee specific questionnaire. We have already received some helpful feedback from our expert consultations.

5) **MDCH is willing to assist with supplemental questionnaire data collection by conducting case interviews (on previously and/or newly diagnosed cases) and also by assisting with data analysis, as needed.** Our CD nurses can address newly diagnosed cases. We would like to discuss MDCH's assistance for conducting interviews with previously diagonosed/interviewed cases.

6) **MDCH can assist with the coordination and communication with MDEQ for specific data requests by GCHD.** As discussed in our call, we are requesting MDCH assistance with obtaining information from MDEQ. GCHD has sent a FOIA letter requesting the information we have not been able to obtain regarding the water system. If we do not receive the information or have other challenges we would request MDCH assistance in obtaining the information.

7) **The MDCH PIO can work with the GCHD PIO to develop a coordinated public health message to respond to public and media inquiries.** As discussed in our call, the water system is an extremely sensitive topic. We are very careful in crafting messages. Should we need MDCH PIO assistance, we will request it.

Confirmed Legionellosis Cases In PHI County June 1, 2014 to Jan 23, 2015

InvestigationID	JURISDICTION	Onset_Date	Investigation	Patient_Statu	First	Last	Street_Addre	City	Zip	Sex	Age_yrs	Race
PHI												

PHI

GCHD linelist

Confirmed Legionellosis Cases in PHI County June 1, 2014 to Jan 23, 2015

Last	Hospitalized	Hospital	Admission_Date	Discharge_Date	Travel?	Dental_work	Visit_a_hosp	Work_in_a_h	Nosocomial?	Culture_posit	If_yes__date	Serogroup_
								PHI				

PHI

43 cases

16 McLean
14 w.i.

7 Exempt
to Other

Report 8: Epi-Curve Graph

Time Period: 01/01/2014 - 01/22/2015

Time Breakdown: by Week

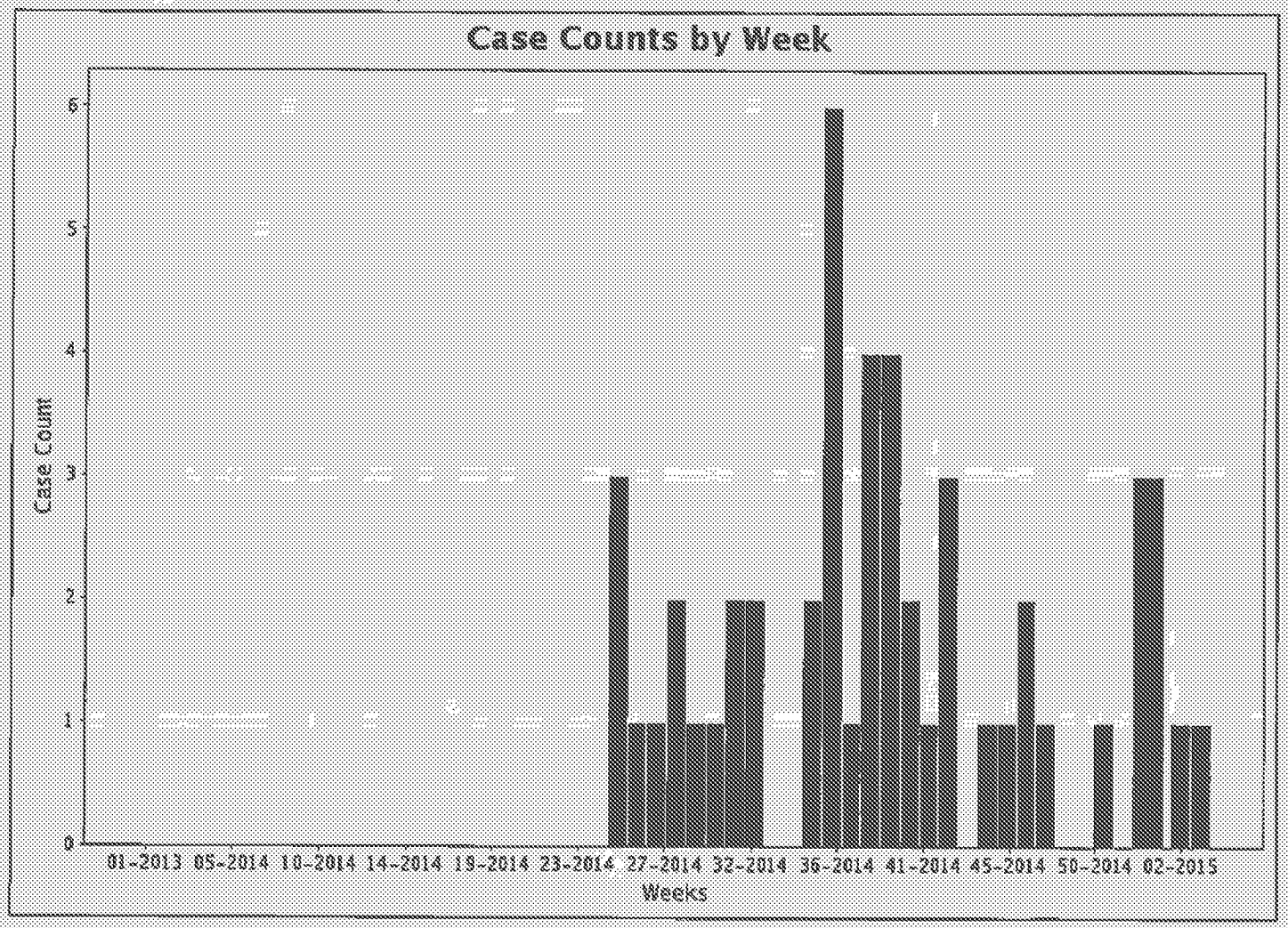
Reportable Condition: Legionellosis

Case Status: Confirmed, Confirmed-Non Resident, Not a Case, Probable, Suspect, Unknown

Investigation Status: Active, Canceled, Completed, Completed - Follow Up, New, Review, Superceded

Counties:
Genesee

Case Types: Individual and Aggregate



Week	Total
25-2014	3
26-2014	1
27-2014	1
28-2014	2
29-2014	1
30-2014	1
31-2014	2
32-2014	2
35-2014	2
36-2014	6
37-2014	4
38-2014	4
39-2014	4
40-2014	2
41-2014	1
42-2014	3
44-2014	1
45-2014	2
46-2014	2
47-2014	1

Week	Total
50-2014	1
52-2014	3
2-2015	1
3-2015	1

Report 8: Epi-Curve Graph

Time Period: 01/01/2009 - 01/22/2015

Time Breakdown: by Month

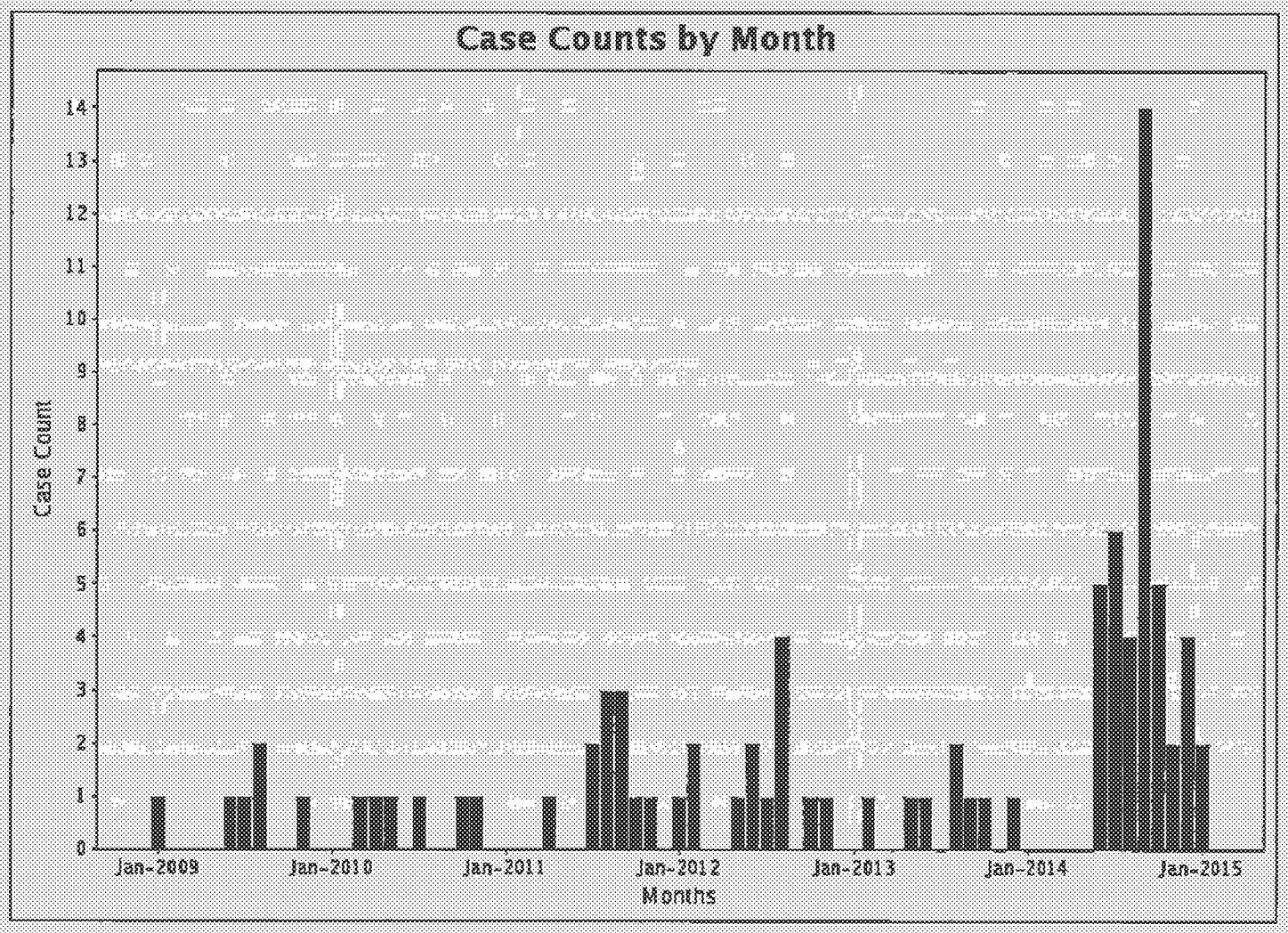
Reportable Condition: Legionellosis

Case Status: Confirmed, Probable, Suspect, Unknown

Investigation Status: Active, Completed, Completed - Follow Up, New, Review

Jurisdictions:
Genesee County

Case Types: Individual and Aggregate



Month	Cnt
JAN 2009	1
JUN 2009	1
JUL 2009	1
AUG 2009	2
NOV 2009	1
MAR 2010	1
APR 2010	1
MAY 2010	1
JUL 2010	1
OCT 2010	1
NOV 2010	1
APR 2011	1
JUL 2011	2
AUG 2011	3
SEP 2011	3
OCT 2011	1
NOV 2011	1
JAN 2012	1
FEB 2012	2
MAY 2012	1

Month	Total
JUN 2012	2
JUL 2012	1
AUG 2012	4
OCT 2012	1
NOV 2012	1
FEB 2013	1
MAY 2013	1
JUN 2013	1
AUG 2013	2
SEP 2013	1
OCT 2013	1
DEC 2013	1
JUN 2014	5
JUL 2014	6
AUG 2014	4
SEP 2014	14
OCT 2014	5
NOV 2014	2
DEC 2014	4
JAN 2015	2

Report 8: Epi-Curve Graph

Time Period: 01/01/2009 - 01/22/2015

Time Breakdown: by Month

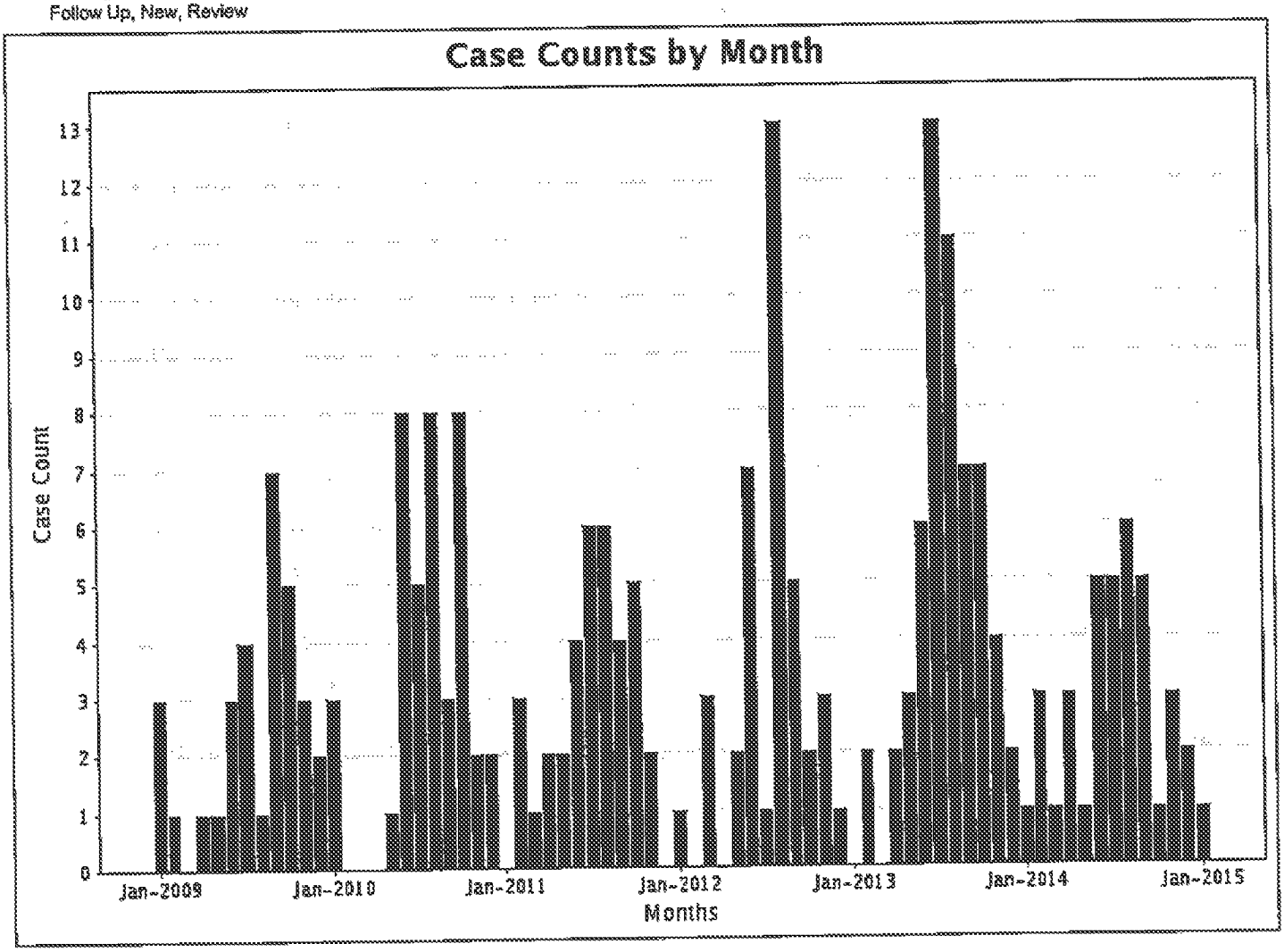
Reportable Condition: Legionellosis

Case Status: Confirmed, Probable, Suspect, Unknown

Investigation Status: Active, Completed, Completed - Follow Up, New, Review

Jurisdictions:
Lapeer County, Livingston County, Oakland County, Saginaw County, Shiawassee County, Tuscola County

Case Types: Individual and Aggregate



Month	Total
JAN 2009	3
FEB 2009	1
APR 2009	1
MAY 2009	1
JUN 2009	3
JUL 2009	4
AUG 2009	1
SEP 2009	7
OCT 2009	5
NOV 2009	3
DEC 2009	2
JAN 2010	3
MAY 2010	1
JUN 2010	5
JUL 2010	5
AUG 2010	8
SEP 2010	3
OCT 2010	8
NOV 2010	2
DEC 2010	2

Month	Total
FEB 2011	3
MAR 2011	1
APR 2011	2
MAY 2011	2
JUN 2011	4
JUL 2011	6
AUG 2011	6
SEP 2011	4
OCT 2011	5
NOV 2011	2
JAN 2012	1
MAR 2012	3
MAY 2012	2
JUN 2012	7
JUL 2012	1
AUG 2012	13
SEP 2012	5
OCT 2012	2
NOV 2012	3
DEC 2012	1

Month	Total
FEB 2013	2
APR 2013	2
MAY 2013	3
JUN 2013	6
JUL 2013	13
AUG 2013	11
SEP 2013	7
OCT 2013	7
NOV 2013	4
DEC 2013	2
JAN 2014	4
FEB 2014	3
MAR 2014	1
APR 2014	3
MAY 2014	1
JUN 2014	6
JUL 2014	6
AUG 2014	6
SEP 2014	5
OCT 2014	1

Month	Total
NOV 2014	3
DEC 2014	2
JAN 2015	1

Report 8: Epi-Curve Graph

Time Period: 01/01/2009 - 01/22/2015

Time Breakdown: by Month

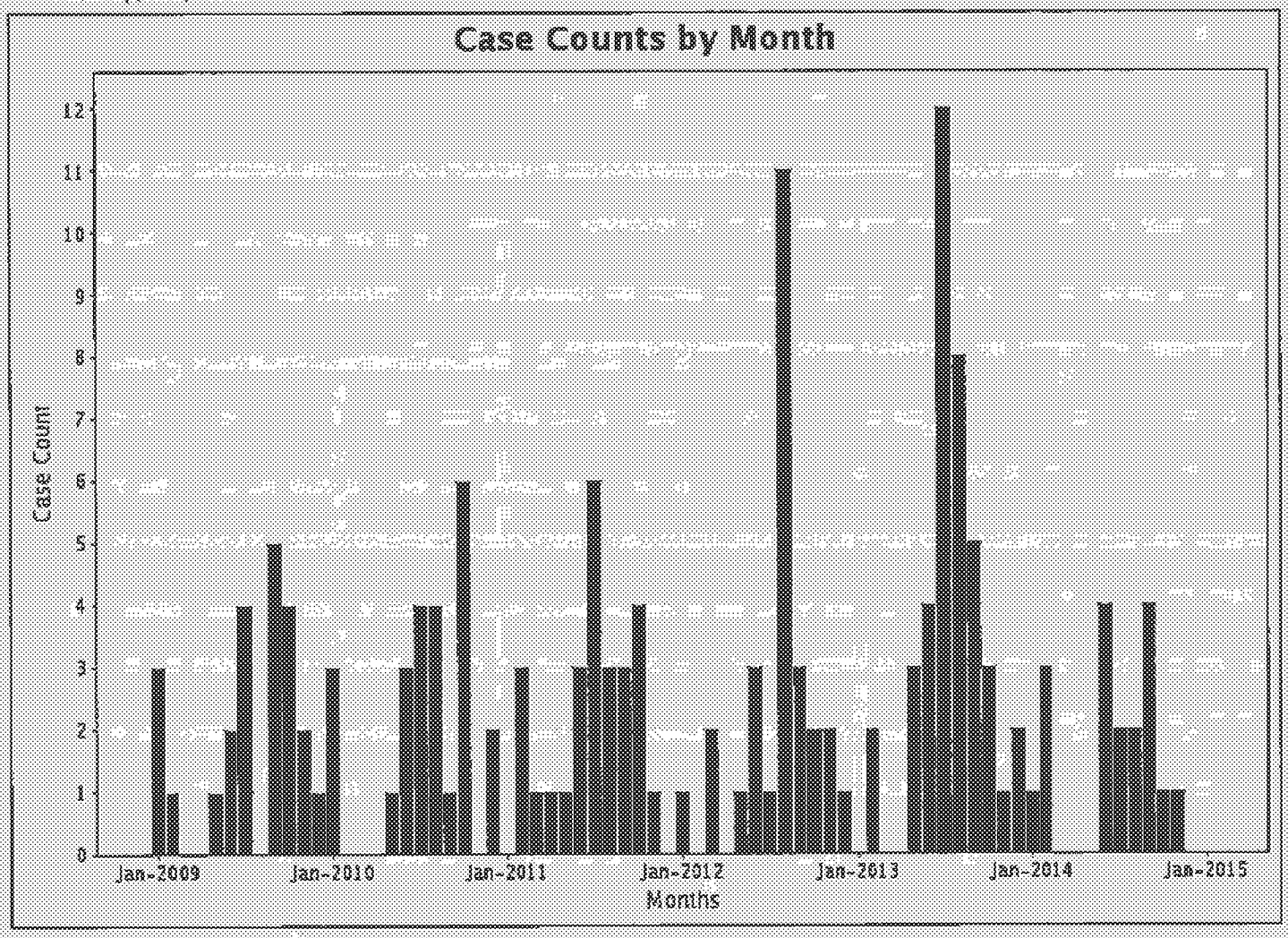
Reportable Condition: Legionellosis

Case Status: Confirmed, Probable, Suspect, Unknown

Investigation Status: Active, Completed, Completed - Follow Up, New, Review

Jurisdictions:
Oakland County

Case Types: Individual and Aggregate



Month	Total
JAN 2009	3
FEB 2009	1
MAY 2009	1
JUN 2009	2
JUL 2009	4
SEP 2009	5
OCT 2009	4
NOV 2009	2
DEC 2009	1
JAN 2010	3
MAY 2010	1
JUN 2010	3
JUL 2010	4
AUG 2010	4
SEP 2010	1
OCT 2010	6
DEC 2010	2
FEB 2011	3
MAR 2011	1
APR 2011	1

Month	Total
MAY 2011	1
JUN 2011	3
JUL 2011	6
AUG 2011	3
SEP 2011	3
OCT 2011	4
NOV 2011	1
JAN 2012	1
MAR 2012	2
MAY 2012	1
JUN 2012	3
JUL 2012	1
AUG 2012	11
SEP 2012	3
OCT 2012	2
NOV 2012	2
DEC 2012	1
FEB 2013	2
MAY 2013	3
JUN 2013	4

Month	Total
JUL 2013	12
AUG 2013	8
SEP 2013	5
OCT 2013	3
NOV 2013	1
DEC 2013	2
JAN 2014	1
FEB 2014	3
JUN 2014	4
JUL 2014	2
AUG 2014	2
SEP 2014	4
OCT 2014	1
NOV 2014	1

Report 8: Epi-Curve Graph

Time Period: 01/01/2009 - 01/22/2015

Time Breakdown: by Month

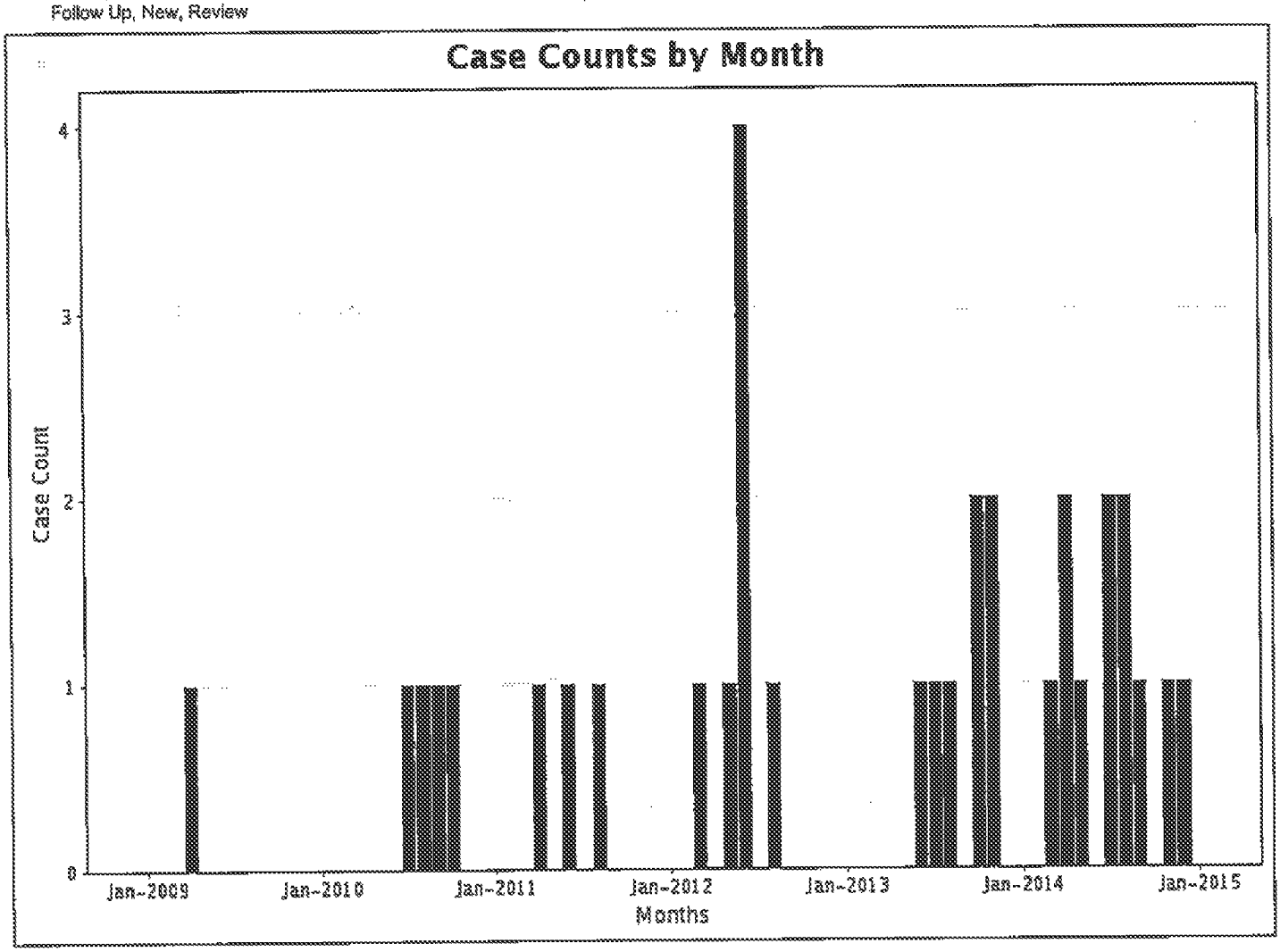
Reportable Condition: Legionellosis

Case Status: Confirmed, Probable, Suspect, Unknown

Investigation Status: Active, Completed, Completed - Follow Up, New, Review

Jurisdictions:
Saginaw County

Case Types: Individual and Aggregate



Month	Total
APR 2009	1
JUL 2010	1
AUG 2010	1
SEP 2010	1
OCT 2010	1
APR 2011	1
JUN 2011	1
AUG 2011	1
MAR 2012	1
MAY 2012	1
JUN 2012	4
AUG 2012	1
JUN 2013	1
JUL 2013	1
AUG 2013	1
OCT 2013	2
NOV 2013	2
MAR 2014	1
APR 2014	2
MAY 2014	1

Month	Total
JUL 2014	2
AUG 2014	2
SEP 2014	1
NOV 2014	1
DEC 2014	1

Report 8: Epi-Curve Graph

Time Period: 01/01/2009 - 01/22/2015

Time Breakdown: by Month

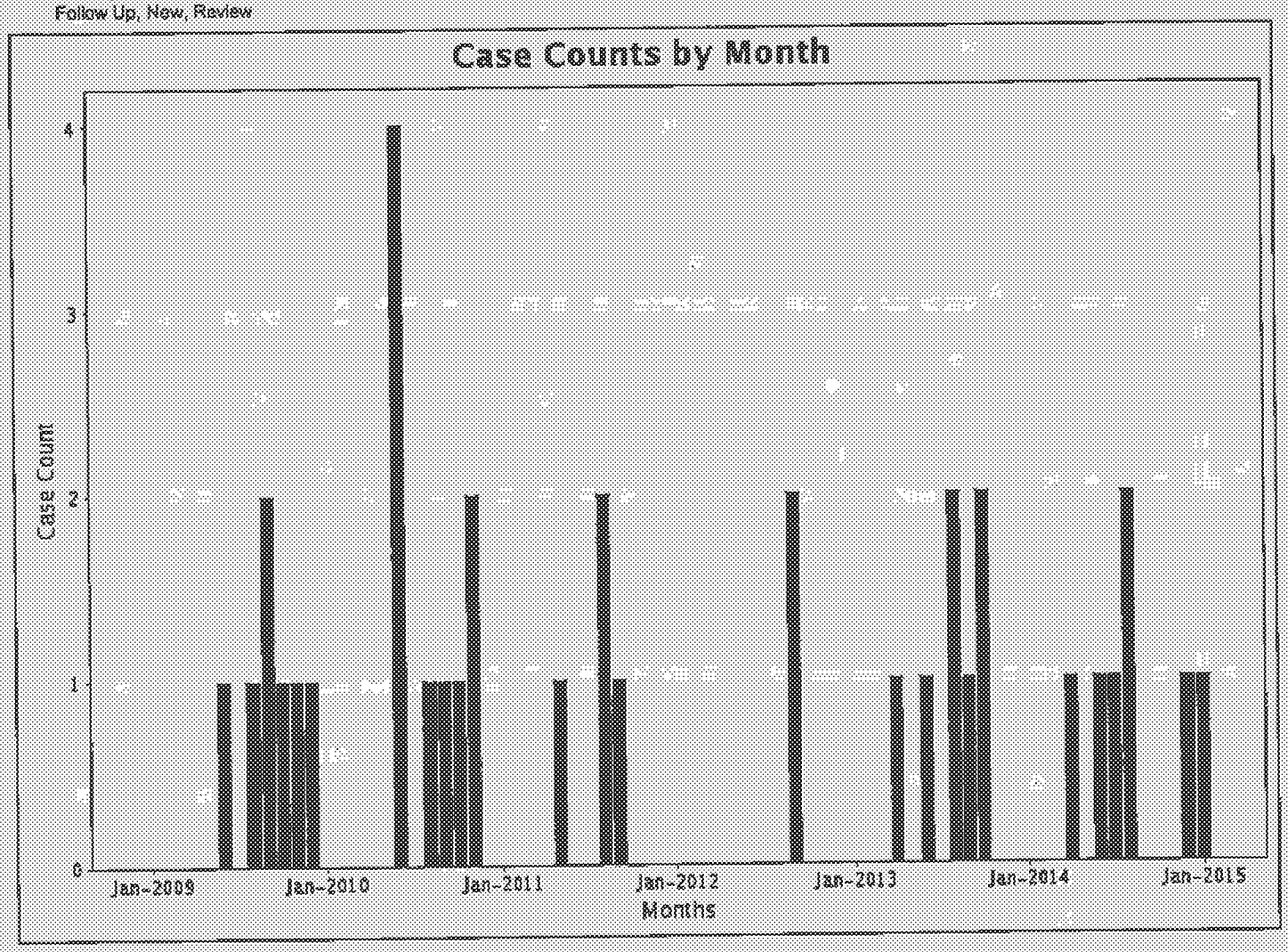
Reportable Condition: Legionellosis

Case Status: Confirmed, Probable, Suspect, Unknown

Investigation Status: Active, Completed, Completed - Follow Up, New, Review

Jurisdictions:
Livingston County

Case Types: Individual and Aggregate



Month	Total
JUN 2009	1
AUG 2009	1
SEP 2009	2
OCT 2009	1
NOV 2009	1
DEC 2009	1
JUN 2010	4
AUG 2010	1
SEP 2010	1
OCT 2010	1
NOV 2010	2
MAY 2011	1
AUG 2011	2
SEP 2011	1
SEP 2012	2
APR 2013	1
JUN 2013	1
AUG 2013	2
SEP 2013	1
OCT 2013	2

Month	Total
APR 2014	1
JUN 2014	1
JUL 2014	1
AUG 2014	2
DEC 2014	1
JAN 2015	1

Report 8: Epi-Curve Graph

Time Period: 01/01/2009 - 01/22/2015

Time Breakdown: by Month

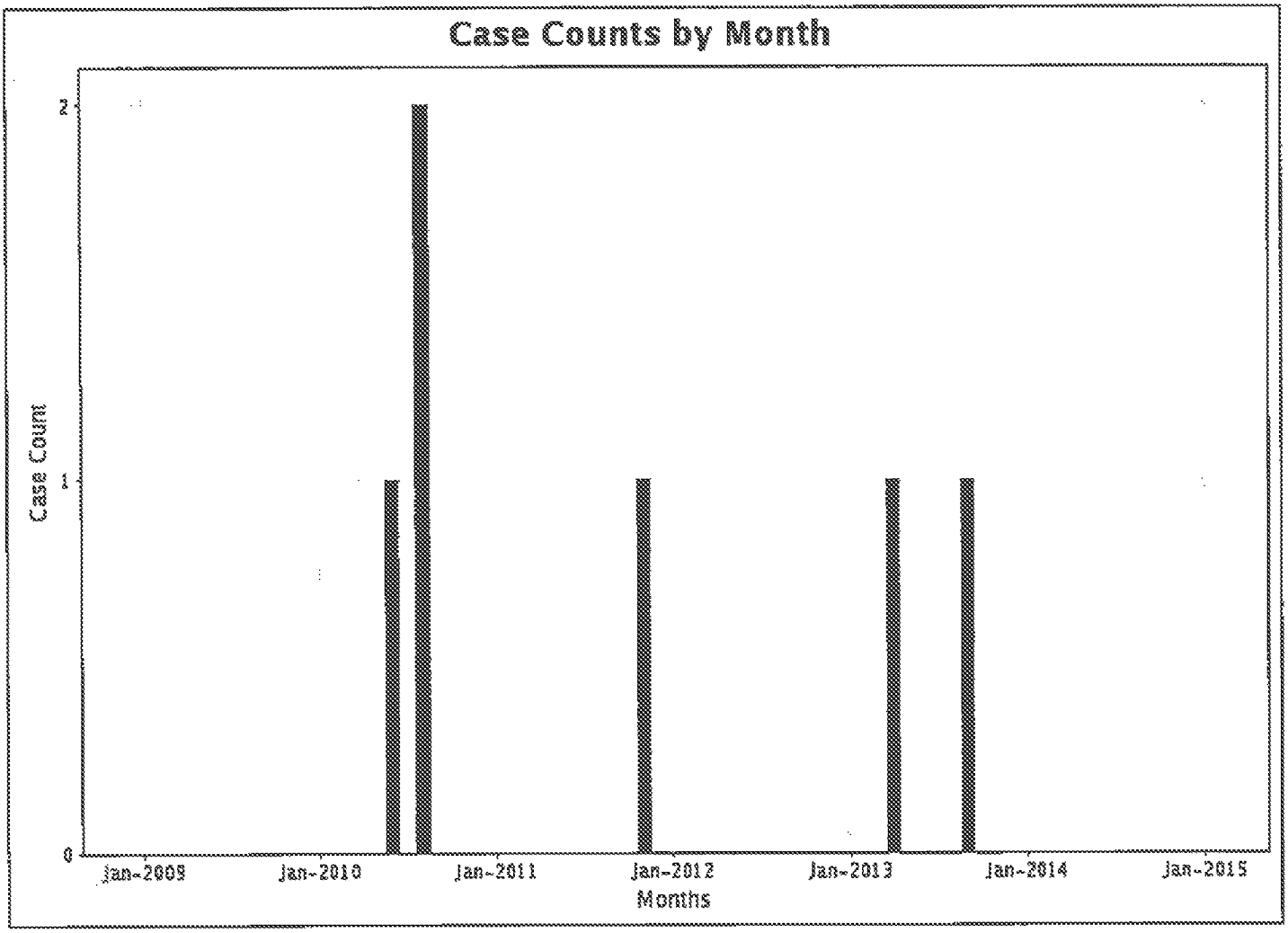
Reportable Condition: Legionellosis

Case Status: Confirmed, Probable, Suspect, Unknown

Investigation Status: Active, Completed, Completed - Follow Up, New, Review

Jurisdictions:
Lapeer County

Case Types: Individual and Aggregate



Month	Total
JUN 2010	1
AUG 2010	2
NOV 2011	1
APR 2013	1
SEP 2013	1

Report 8: Epi-Curve Graph

Time Period: 01/01/2009 - 01/22/2015

Time Breakdown: by Month

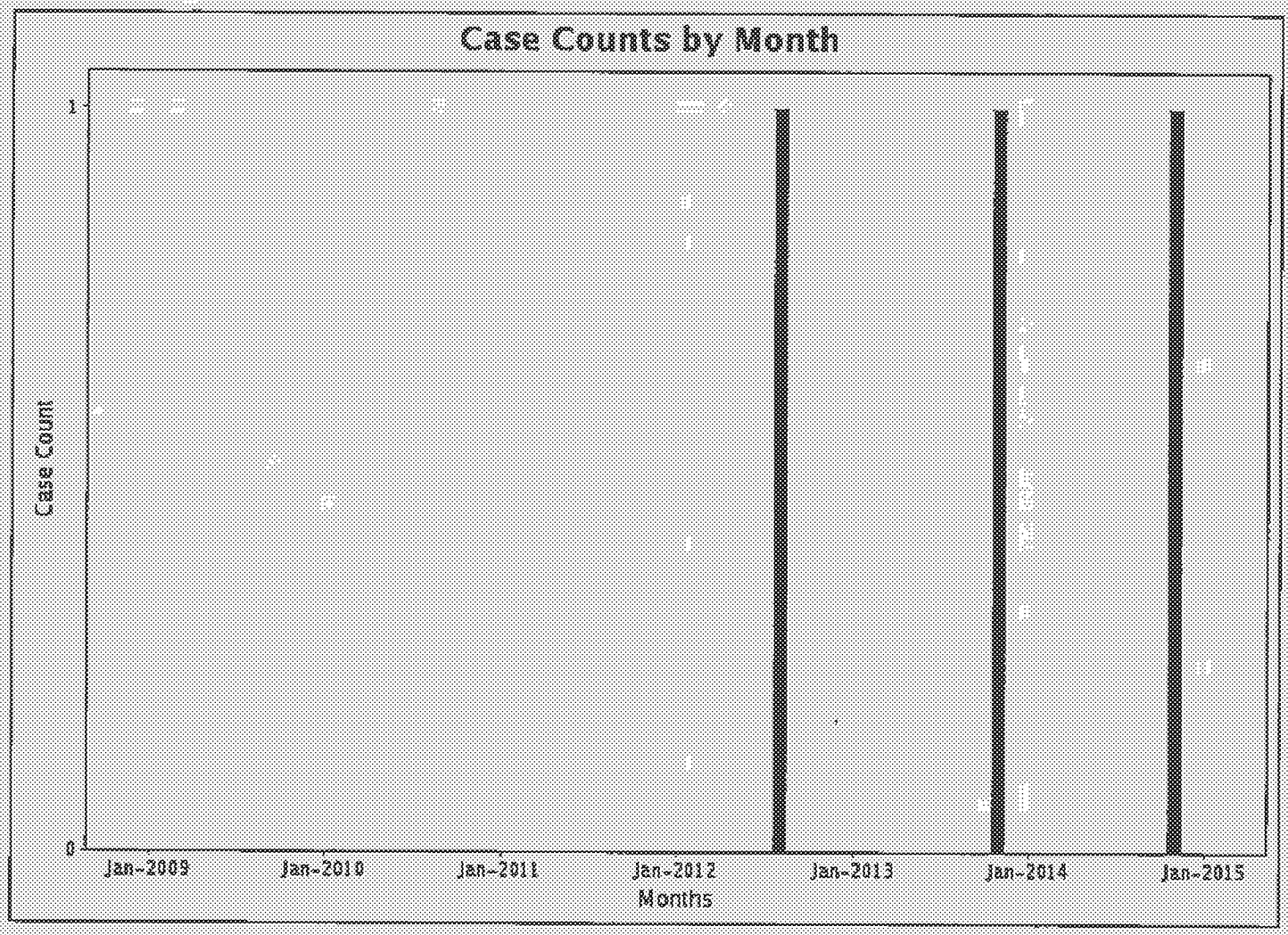
Reportable Condition: Legionellosis

Case Status: Confirmed, Probable, Suspect, Unknown

Investigation Status: Active, Completed, Completed - Follow Up, New, Review

Jurisdictions:
Shiawassee County

Case Types: Individual and Aggregate



Month	Total
AUG 2012	1
NOV 2013	1
NOV 2014	1

Report 8: Epi-Curve Graph

Time Period: 01/01/2009 - 01/22/2015

Time Breakdown: by Month

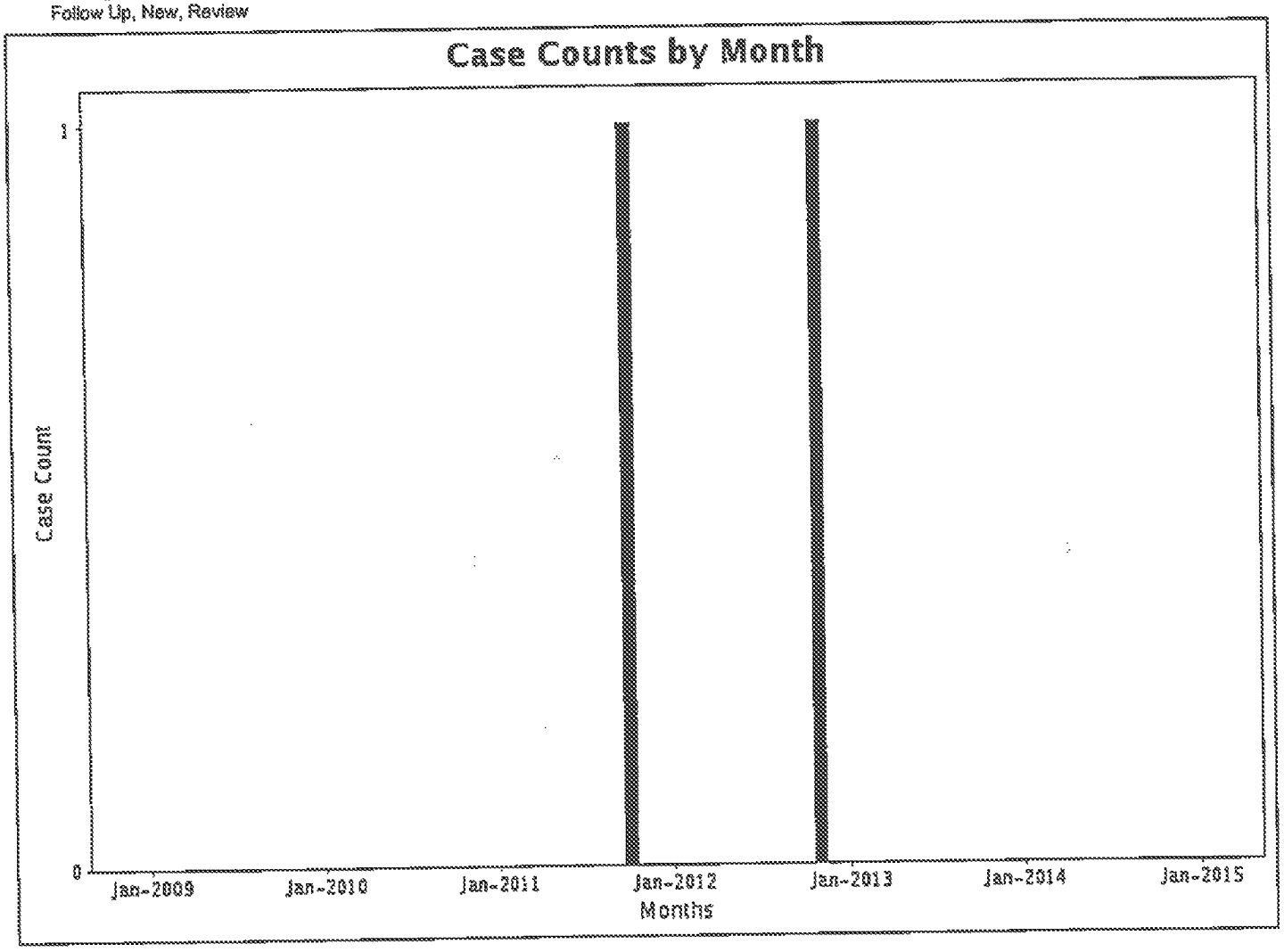
Reportable Condition: Legionellosis

Case Status: Confirmed, Probable, Suspect, Unknown

Investigation Status: Active, Completed, Completed - Follow Up, New, Review

Jurisdictions:
Tuscola County

Case Types: Individual and Aggregate



Month	Total
OCT 2011	1
NOV 2012	1

PHI

PHI County Legionellosis Cases from June 2014

20150219

Travel

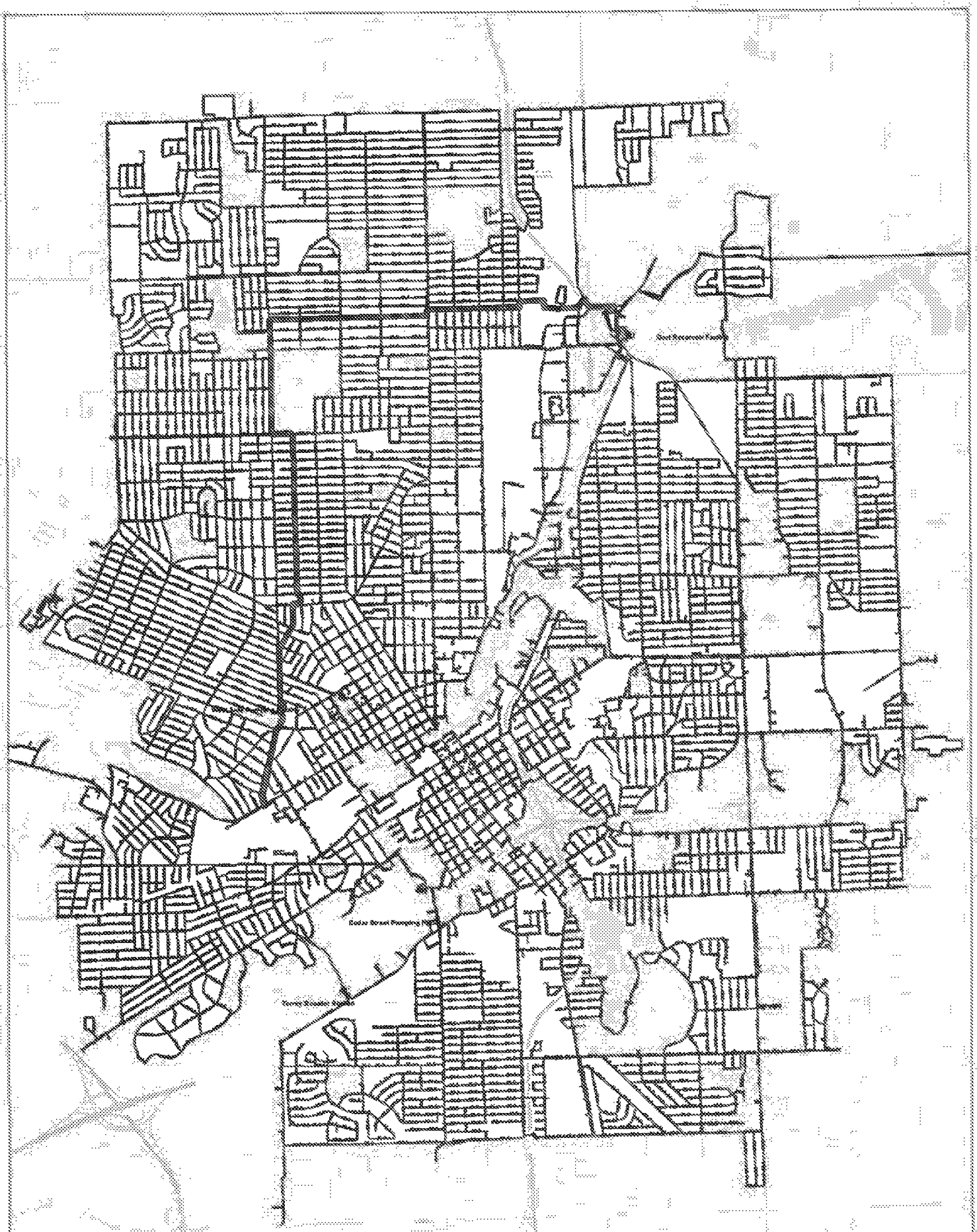
InvestigationID	Onset Date	Diagnosis_Date	Patient_ID	First	Last	City	Sex	Date_of_Birt	Age	Days_Hospitalized	Did_the_p	Was_case_h	Urine_Antig	If_yes__date_:	Specimen	Mclaren Re-admit

PHI

PHI County Legionellosis Cases from June 2014

InvestigationID	Onset Date	Diagnosis_Date	Patient_ID	First	Last	City	Sex	Date_of_Birt	Age	Days_Hospitalized	Did_the_p	Was_case_h	Urine_Antig	If_yes__date_	Specimen	Mclaren Re-admit

PHI



CITY OF FLINT WATER LINE REPLACEMENT

PHI County Legionellosis Cases, May through December 2015

Last	MDSS_ID	Referral_Date	Case_Status	First	Last	Street_Address	City	County	Zip	Residence on Flint water (from questionnaire)	Sex	DOB	Ag

PHI

PHI County Legionellosis Cases, May through December 2015

Last	MDSS_ID	Referral_Date	Case_Status	First	Last	Street_Address	City	County	Zip	Residence on Flint water (from questionnaire)	Sex	DOB	A
PHI													
KEY													
Culture-confirmed case													
Pontiac Fever case?													
Water map data													
Blue & purple: updates from med records Susan & Seth													
PHI													

PHI County Legionellosis Cases, May through December 2015

Last	Hospital_City	Hosp_Record_No_	Onset_Date	Symptoms at admission	Diagnosis_Date	Admit_Date	Discharge_Date	Days_Hospitalized	Died?	Date_of_death	Diagnosis_

PHI

PHI County Legionellosis Cases, May through December 2015

Last	Hospital_City	Hosp_Record_No_	Onset_Date	Symptoms at admission	Diagnosis_Date	Admit_Date	Discharge_Date	Days_Hospitalized	Died?	Date_of_death	Diagnosis_
PHI											
KEY											
Culture-confirm											
Pontiac Fever ca											
Water map data											
Blue & purple: u											
PHI											

PHI County Legionellosis Cases, May through December 2015

Last	Last	Hosp_2wksprior_this_admit? (according to questionnaire or if mentioned in MDSS notes)	Prev_hosp_site	Onset_Date (column copied)	Prev_admit_date	Prev_disch_date	Duration_prev_hosp_days

PHI

PHI County Legionellosis Cases, May through December 2015

Last	Last	Hosp_2wksprior_this_admit? (according to questionnaire or if mentioned in MDSS notes)	Prev_hosp_site	Onset_Date (column copied)	Prev_admit_date	Prev_disch_date	Duration_prev_hosp_days
PHI							
KEY	KEY						
Culture-confirm	Culture-confirmed case						
Pontiac Fever ca	Pontiac Fever case?						
Water map data	Water map data						
Blue & purple: u	Blue & purple: updates from med records Susan & Seth						
PHI							

Last	Reason_prev_hosp	Other hospitalizations

PHI

PHI County Legionellosis Cases, May through December 2015

Last	Reason_prev_hosp	Other hospitalizations

PHI

KEY		
Culture-confirm		
Pontiac Fever ca		
Water map data		
Blue & purple:		

PHI

EM, DT, SAM, RTAB Analyst
Liz, MSP, PD,

City of Flint Thursday 9:00am Phone Conference Agenda

February 19, 2015

[PPI], Access code [PPI]

		Last Report	Status
1) Public Safety Update – FPD, MSP, (FFD, if needed)			
	a) FPD	Status Report - Murder ↑ ; CSC ↓ 20% ; Robbery ↑ Arson, Assault, Bug. Larc ↓ ; Auto Theft ↑	Update
	b) FFD	* SAFER Grant - Recommendation is to not apply in 2015, do apply in 2016 in light of anticipated FY17 shortfall.	Update
	c) Other update from Chief Tolbert and MSP		
2) Governor's Office Update – R. Baird, H. Hollins, B. Clement			
Issue of Retirement Package for Judges ←	a) District Court Consolidation	County Commissioners voted on 12/10/14 to approve "pursuant to the terms and conditions set forth in a MOU to be approved between City of Flint and Gen. Cty."	Meeting with County Rep. Feb 18. Waiting for proposed MOU from County.
	b) Local Income Tax Initiative	Additional source of funds still needed for City. H. Hollins working to find a new sponsor. Projected financial challenges associated with projection of FY17 budget may emphasize the rational.	No Change
3) Finance and Administrative Update			
	a) Financial Ordinances	Complete	Update
	b) Management Vacancies	MML has been selected to recruit candidates for Treasurer, HR Director and Finance Director. Search for Fire Chief to be added - effective date 7/1/15	Update

		Last Report	Status
	c) Budget	Dr. Scorsone to assist with updating financial projections by Feb. 18. Budget planning session held with Council on 2/16/17. ✳ Projected gap between revenues and status quo expenses is between $4.5million and $5.0million.	New
Fiscal Stabalization Bonds	d) DEP/RAP	Progress under DEP/RAP being revised.	No change
	e) Purchasing	Revised purchasing ordinance being enacted.	New
4) City Council Update			
	a) EM Order	An Order also being developed defining organizational reporting relationships to new City Administrator.	No Change
	b) Council/Mayor Compensation	Revision to Council and Mayor compensation is being developed.	Update
5) Water Issues			
Specific recommendations forthcoming	a) MDEQ Violation Notice	The next TTHM sampling was conducted 2/17/15, testing will be done by the MDEQ. Our most recent internal tests show water to be within federal/state guidelines. Expect to receive a violation notice from MDEQ, due to the running average calculation, in 7-10 days. The notice to customers will go out by mid-March.	Update
	b) Distressed Cities Grants	Announcements made for grant awards to Flint for Leak Detection and Sewage sludge Load Out Facility.	No Change
	c) Drinking Water Revolving Fund	Discussing possible restructuring of loans.	No Change
	d) Water Quality Consultant	Veolia will provide preliminary recommendations at the 2/18/15 Public Works Committee meeting - including process improvements, distributions system actions, communications improvements, and personnel support by way of new policies and procedures, training and new testing models. Priority budget, and timeline to follow within 1-2 weeks; much improvement has occurred as demonstrated by the most recent testing.	Update
40 organizations	e) WAC/TAC	A Water Advisory Committee and a Technical Advisory Committee have been formed as part of the process of improving communication and receiving additional feedback.	New

		Last Report	Status
6) 9-1-1 Reconsolidation Plan			
	a) Tower Transfer to Consortium	Preparing Tower Transfer justification package for EM and Council. Sending grant amendment request to E. Cole for use of current C-GAP grant to pay for consolidation expenses.	Update
7) Transition Activities			
	a) Transition Management	New Council Committee structure has been implemented and Council is now meeting twice per month. Council has been engaged in the planning and budget process for FY16-20, adopting updated Vision, Mission and Goals, and participating in a budget workshop led by Dr. Eric Scorsone. Next step will be for Council to receive 5 Year Revenue/Expense projections and adopt budget priorities. Begining in March, more business items will be sent to Council for consideration. Date specific transition calendar will need to be developed.	Update
8) Other Items			
	MDNR and Purchase of CSX rail area	Requesting DNR authorize full amount of appraised property value to be paid by DNR grant. **Note from Planning and Development Director:** In brief, the City hired an appraiser for the Grand Traverse Greenway trail to complete acquisition of the CSX properties. We forwarded the appraisal of $170,000 to the DNR for approval to proceed with negotiations with CSX. During our negotiations, CSX disputed the appraisal and submitted their own appraisal for the property of $330,000. After reviewing the CSX appraisal, DNR told the City that they would be willing to increase the grant up to $215,000 for acquisition, but the City would have to make up the difference. After doing additional research on similar properties including acquisition of the Genesee Valley Trail in the City of Flint, we realize that CSX offer is not unreasonable. We asked DNR to reconsider and allow us to have our appraisal amended so that we can fully use the DNR grant for the $330,000 asking price. (Our DNR grant allocation is $700,000 more than enough to cover the $330,000 asking price. Thus far, DNR has been unwilling to provide the additional funding and suggested we talk to MDOT about making up the difference. I think the MDNR is concerned about setting precedent for future trail acquisition, but I don't think it matters if MDOT is routinely paying more.	Awaiting update from Treasury.

DT, Admin, SAM, EM, RTAB Analyst
Chief Tolbert, MSP, [redacted] Fire
Harvey Hollins

City of Flint Wednesday 9:00am Phone Conference Agenda

February 4, 2015

PPI, Access code PPI

		Last Report	Status
1) Public Safety Update – FPD, MSP, (FFD, if needed)			
• Missing Weapons – No Audit in at least 20 years – 1 determined to have been sold	a) FPD • Response to PSF Study → AccoMM	* Police and Fire studies have been presented to the Public Safety Committees. Evaluation of recommendations underway.	Update
		* SRMS MOA has been signed, project charter development is underway. Last item for which Flint needed to provide a sign-off has been completed.	No Change
		* Evidence Room and Police Equipment Audit have been media items last week. – Determine response	New
	b) FFD • Base on PSF Study • Cannot alter # of emp.	* SAFER Grant - Considering whether or not to apply.	New
• New Community Policing Effort • CrimeMapping.com		* City applied for $999,103 grant from the FEMA Assistance to Firefighters Grant Program to purchase a new aerial truck.	Awaiting decision
	c) Other update from Chief Tolbert and MSP – N/A		
2) Governor's Office Update – R. Baird, H. Hollins, B. Clement			
	a) District Court Consolidation	County Commissioners voted on 12/10/14 to approve "pursuant to the terms and conditions set forth in a MOU to be approved between City of Flint and Gen. Cty."	Waiting for proposed MOU from County.
	b) Local Income Tax Initiative	Additional source of funds still needed for City. H. Hollins working to find a new sponsor.	No Change
	c) Grant Announcement	Decision regarding Distressed Cities Grant announced 2/3/15	New – $ 2M Awarded

		Last Report	Status
3) Finance and Administrative Update			
Fiscal Stab Bond - Deficit - some CIP	a) Financial Ordinances	City Council approved Fund Balance Policy, OPEB, BSF and strategic planning processes ordinances. Purchasing Ordinance to be enacted.	Update
	b) Management Vacancies	MML has been selected to recruit candidates for Treasurer, HR Director and Finance Director. Search for Fire Chief to be added - effective date 7/1/15	Update – Add Fire Chief from 7-1
	c) Budget	Mid-year budget amendment is enacted. Dr. Scorsone to assist with updating financial projections by Feb. 13.	New
	e) Strategic Planning Workshops	Two workshops, facilitated by Dr. Scorsone have been completed. Updated VMG by Council scheduled for Feb. 9	Update
	f) DEP/RAP	Progress under DEP/RAP being revised. - on-track	New
4) City Council Update			
In effect 02-04-15	a) EM Order	An Order has been issued establishing a new Council and Committee meeting schedule - a move toward transition. An Order also being developed defining organizational reporting relationships to new City Administrator.	New
	b) Council/Mayor Compensation	Asked MML to provide comparisons of MI cities' Council and Mayor compensation packages.	New

		Last Report	Status
5) Water Issues			
	a) MDEQ Violation Notice	Two separate, independent testing results by news media find Flint water within EPA/MDNR guidelines, as does most recent internal testing.	Update
	b) Distressed Cities Grants	Announcements of awards due Feb. 3 for Flint's two grant requests: Leak Detection and Sewage sludge Load Out Facility.	Update
	c) Drinking Water Revolving Fund	Discussing possible restructuring of loans. - Research underway	New
	d) Consultant	RFP process resulted in a proposal from Veolia. Agreement being finalized for initial evaluation phase, to begin next week and to take a week or so to complete. - 4 staff for 1 week $40K - not to exceed	New
6) 9-1-1 Reconsolidation Plan			
	a) Tower Transfer to Consortium	Tower built with C-GAP funds. Procedure necessary to transfer asset to Consortium? Need to have assessment of value? Value exceeds $50,000, the intent to transfer was included in the last two updates to the Financial and Operating Plan. Responses send to R. Byrne last week.	Update
7) Transition Activities			
	a) Update of Transition Management Plan	A planning calendar for the next three months is being developed.	NEW

8) Other Items		Last Report	Status
	MDNR and Purchase of CSX rail area	Requesting DNR authorize full amount of appraised property value to be paid by DNR grant. **Note from Planning and Development Director:** In brief, the City hired an appraiser for the Grand Traverse Greenway trail to complete acquisition of the CSX properties. We forwarded the appraisal of $170,000 to the DNR for approval to proceed with negotiations with CSX. During our negotiations, CSX disputed the appraisal and submitted their own appraisal for the property of $330,000. After reviewing the CSX appraisal, DNR told the City that they would be willing to increase the grant up to $215,000 for acquisition, but the City would have to make up the difference. After doing additional research on similar properties including acquisition of the Genesee Valley Trail in the City of Flint, we realize that CSX offer is not unreasonable. We asked DNR to reconsider and allow us to have our appraisal amended so that we can fully use the DNR grant for the $330,000 asking price. (Our DNR grant allocation is $700,000 more than enough to cover the $330,000 asking price. Thus far, DNR has been unwilling to provide the additional funding and suggested we talk to MDOT about making up the difference. I think the MDNR is concerned about setting precedent for future trail acquisition, but I don't think it matters if MDOT is routinely paying more.	Awaiting update from Treasury. Randy will get back to us on this.

- Stay to end of April

01-07-15

SAM, RTAB Analyst, Admin, DT
EM, FD, Chief Tolbert, FD
MSP,

City of Flint Wednesday 9:00am Phone Conference Agenda

January 7, 2015

PPI Access code PPI

		Last Report	Status
1) Public Safety Update – FPD, MSP, (FFD, if needed)			
42% ↓ in Homicides All crimes ↓ 15% ↑ in Arson Fresh Start Program PD-116	a) FPD	* The final draft reports for the evaluation of both the Police and the Fire Departments have been received. The study will be presented to City Council at the Public Safety Committee on January 22, 2015. * SRMS MOA has been signed, project charter development is underway. Last item for which Flint needed to provide a sign-off has been completed.	UPDATE UPDATE
	b) FFD	City applied for $999,103 grant from the FEMA Assistance to Firefighters Grant Program to purchase a new aerial truck.	No Action Needed
	c) Other update from Chief Tolbert and MSP		
2) Governor's Office Update – R. Baird, H. Hollins, B. Clement			
MOU Pending	a) District Court Consolidation	County Commissioners voted on 12/10/14 to approve "pursuant to the terms and conditions set forth in a MOU to be approved between City of Flint and Gen. Cty."	UPDATE
	b) Local Income Tax Initiative	No action was taken during the lame duck session. Additional source of funds still needed for City. – DOA Readdress in new Leg session	UPDATE
	c) Other		

		Last Report	Status
3) Finance and Administrative Update			
	a) Firefighters Contract Delay MERS valuation	City Council sent an alternative contract to the Emergency Loan Board on December 17, 2014. Prompt action necessary on IAFF contract - this is delaying the valuation of the pension system by MERS. Decision needed by end of January.	UPDATE
	b) Financial Ordinances VC Input	City Council approved first reading of Fund Balance Policy, OPEB, BSF and strategic planning processes ordinances. Purchasing Ordinance still to be moved.	UPDATE
	c) City Administrator Hired	Natasha Henderson was announced as new Flint City Administrator on December 22, 2014. Start date: Feb 23, 2015	NEW
	d) Management Vacancies	A search firm will be contracted to identify Treasurer, HR Director and Finance Director. - RFP sent → MML ? Interim help ? HR very weak	NEW
→ Send BH Lang to EM	e) City Clerk Supervision	Can EM establish supervisory oversight of the City Clerk; change priorities, activities of Clerk? Appointed by VC EM order to rpt to CA.	NEW
4) City Council Update			
	a) Vacant Council Seats Completed	Three candiates have been sent to City Council for consideration for Ward 3 and Ward 6. Special meeting held Jan 5, 2015. Kerry Nelson and Herb Winfrey selected.	NEW
5) Water Issues			
Ongoing Have a Plan to address	a) MDEQ Violation Notice	Violation notice received 12/16/14 maximum contaminant level for TTHM exceeded. Public notice required. Notices sent out Jan 5, 2015. Most recent readings in compliance.	NEW

		Last Report	Status
6) 9-1-1 Reconsolidation Plan			
	a) Tower Transfer to Consortium ST approval Assess value of Tower	Tower built with C-GAP funds. Procedure necessary to transfer asset to Consortium? Need to have assessment of value?	NEW
7) Transition Activities			
Training being Planned.	a) Planning Workshop	Off-site workshop for Council, Dept. Heads, and new CA scheduled for Jan. 10, 2015. Transition activities and budget prep. Cancelled temporarily.	NEW
At Transition?	b) Council Meeting Schedule	Council President has asked to return to regular Council meeting schedule and committee meetings with new dates and fewer restrictions.	NEW
	c) Council/Mayor Compensation	What happens to salary for council and mayor when the EM leaves? As budgeted or back to old levels? – EM order	NEW
Two-year budget Dates	d) Update of Transition Management Plan	See attached.	NEW
8) Other Items			
	MDNR and Purchase of CSX rail area	Assistance needed to change allowable purchase price of Grand Traverse Greenway trail from CSX.	NEW

RTAB NAMES

Bev Grafi
Ed Kurtz
Jerry Ambrose

City of Flint

Steps to Prepare for Transition From Emergency Manager to Receivership Transition Advisory Board

	Target	Completion	7 Pt. Trans. Plan #	Comments
Chief Administrative Officer			4	
* National Recruitment	9/1/14	12/18/2014		Started 9/1/14, open until filled
* Appoint Selection Committee	10/1/14	11/4/2014		
* Select finalists	11/10/14	11/4/2014		
* Conduct Interviews	11/24/14	11/12/2014		
* Recommend Candidate	12/15/14	12/1/2014		
* EM Appoints Selected Candidate	12/15/14	12/18/2014		
Organizational Development				
* EM/Mayor determine recommended City organizational structure	5/17/14	5/17/2014	4	
* EM/Mayor recommend Council action on ordinance changes to implement organizational structure		6/26/2014	4	
* Council to review and adopt revised organizational structure	5/17/14	6/26/2014	4	
* Finalization organizational structure roles: Mayor, Council, Administration	6/26/14	6/26/2014	4	
Complete Bargaining Units Contracts			4	
* Local 1600	7/1/14	Ratified		
* Local 1799	7/1/14	Ratified		
* FPOA	7/1/14	Imposed		
* PD - Sgts.	7/1/14	Ratified		
* PD -Capts & Lts.	7/1/14	Ratified		
* Fire Union	7/1/14			Sent to State Loan Board for decision

City of Flint

Steps to Prepare for Transition From Emergency Manager to Receivership Transition Advisory Board

	Target	Completion	7 Pt. Trans. Plan #	Comments
Comprehensive Public Safety Study			4	
* Contract with ICMA for Study		5/8/2014		
* Collect Data	5/9/14-9/30/14	9/30/2014		
* Receive Draft Report	9/30/14	11/1/2014		
* Receive Final Report	11/1/14	12/23/2014		
* Plan Implementation				
* Determine best, most appropriate use of $1.1 million State Allocation				
Retiree Health Care Lawsuit			5	
* City Notified of Lawsuit				
* Injunction Received		1/13/2014		
* Injunction Modified		6/30/2014		
Cornerstone determines impact on FY15				
* & 16 Budget	9/1/14			Tying into budget prep
* Implement Modifications	11/1/14			
* Scheduling Conference				
* Mayor and Council to support City's position on retiree health care or adopt measures offsetting increased costs	6/26/14	6/26/2014	5	
Biennial Budget Implementation			6	
* Biennial Budget Adopted		6/26/2014		
* 1st Quarter Status	10/1/14	10/13/2014		
* 2nd Quarter Status	1/1/15	1/8/2015		
FY 14 Budget Close Out				
* Preliminary Close				FY14 closed on June 30, 2014
* Audit Received	11/30/14	12/30/2014		
* Audit Presentation to City Council	12/15/14			

City of Flint

Steps to Prepare for Transition From Emergency Manager to Receivership Transition Advisory Board

	Target	Completion	7 Pt. Trans. Plan #	Comments
Governance				
* EM receives BRC Final Report	7/18/14	7/18/2014	3	
* Present Report to Mayor and City Council	7/28/14	7/28/14		
* Mayor and Council Submit Comments to EM	7/28/14	7/28/14	3	
* EM Orders BRC Recommended Charter Admendments and Charter Commission Initiative on Nov. Ballot	7/30/14	8/5/2014		Charter Review Cmte. approved by voters 11/4/14
* EM develops proposed governance structure and sends to governor			3	Part of Final Order
* Mayor and Council Comments on EM Proposal	7/28/14	7/28/2014	3	
* Define and incorporate financial and organizational best practices	3/25/13	3/25/2014	7	Reso on TAB
Deficit Elimination/Reserve Accumulation Plan			1	
* EM Submits Plan to Treasury	7/1/14	7/1/2014		
* Treasury Approval Received		7/16/2014		
* EM Orders DE/RAP Adoption		7/15/2014		
* City Council passes resolution of support for DE/RAP		3/25/2014	1	Reso on TAB
* Confirmation by Mayor and Council that DE/RAP actions will be a top priority in budgeting	6/26/14	6/26/2014	1	

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City of Flint

Steps to Prepare for Transition From Emergency Manager to Receivership Transition Advisory Board

	Target	Completion	7 Pt. Trans. Plan #	Comments
City Council Activity				
* Council to receive quarterly reports from Mayor/Fin. Director on progress of achieving strategic objectives and priorities	9/22/14	10/13/2014	6	
* Completion of City Ordinance Review by Council as proposed by EM	9/22/14		3	
* Review Strategic Plan, FY16 Budget	1/20/15		6/7	
* 6 mos. FY15 Budget Review/Amendments	1/20/15		6/7	
* Strategic Plan to be updated annually	2/20/15		6	
* FY17 Budget Development	2/20/15			
* Completion of MML Level One Education Award per EM Order 2	3/28/14		7	
Five Year Financial Analysis			2	
* City Council adopts 5 Year Analysis	6/1/14	6/1/2014	2	
* Finance/Adm Cmte shall annually review analysis in February each year and Send to Council for approval	2/20/15		2	
Issue outgoing EM Order	4/8/2015			